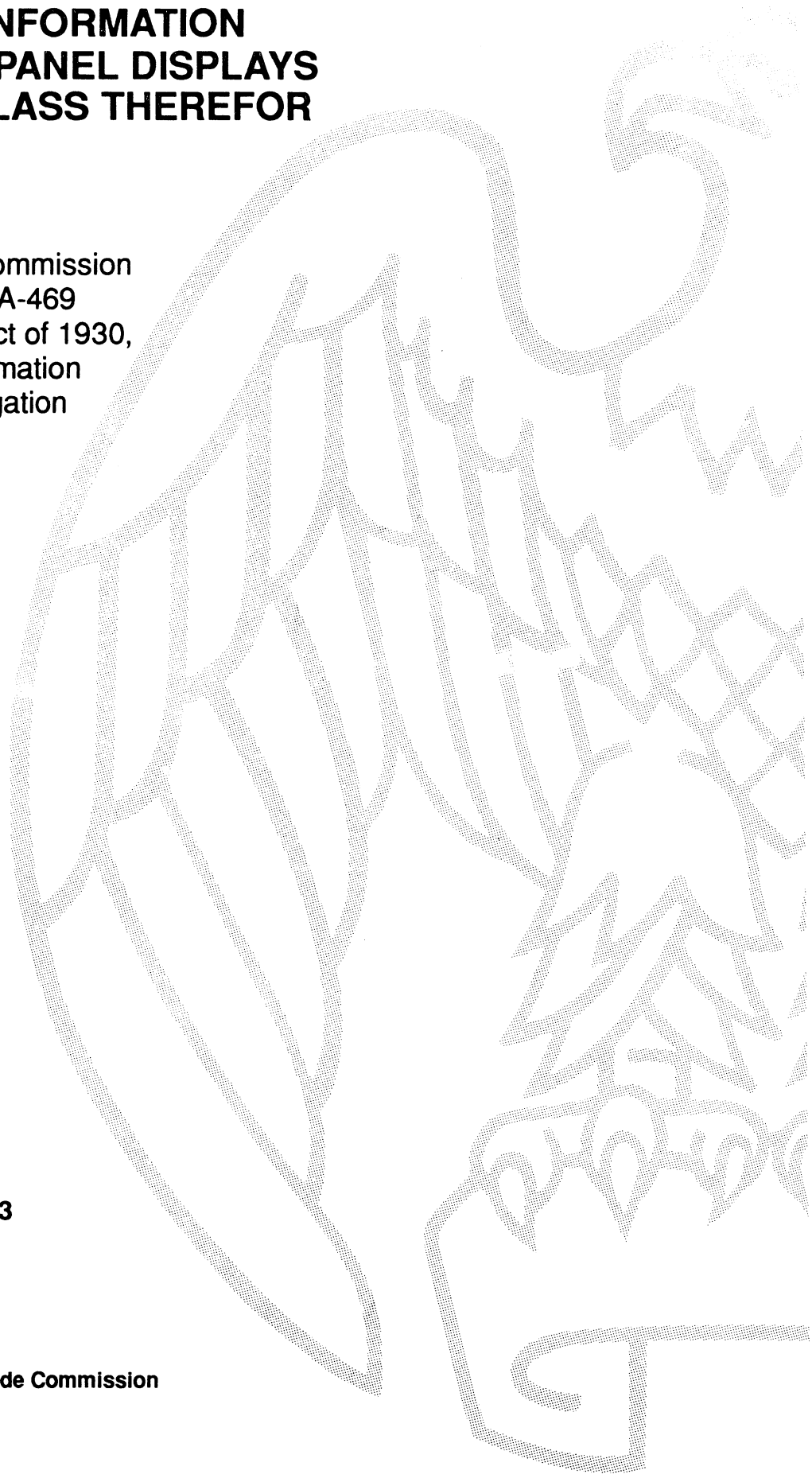
CERTAIN HIGH-INFORMATION CONTENT FLAT PANEL DISPLAYS AND DISPLAY GLASS THEREFOR FROM JAPAN

Determination of the Commission
Investigation No. 731-TA-469
Final Under the Tariff Act of 1930,
Together With the Information
Obtained in the Investigation



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Note.--Information that would reveal the business proprietary operations of individual concerns may not be published and, therefore, has been deleted from this report.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-469 (Final)

HIGH-INFORMATION CONTENT FLAT PANEL DISPLAYS AND SUBASSEMBLIES THEREOF FROM JAPAN

Determination

On the basis of the record [1] developed in the subject investigation, the Commission determines, [2] 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 materially injured by reason of imports from Japan of high-information content flat panel displays and display glass therefor (HIC FPDs) [3] that have been

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

[2] Acting Chairman Brunsdale dissenting.

[3] The products covered by this investigation are active matrix liquid crystal high information content flat panel displays and display glass therefor ("active matrix LCDs") and electroluminescent high information content flat panel displays and display glass therefor ("EL displays"). Such products are large-area, matrix-addressed displays, no greater than four inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video. Active matrix LCDs utilize a thin-film transistor array to activate liquid crystal at individual pixel locations. EL displays incorporate a matrix of electrodes that, when activated, apply an electrical current to a solid compound of electroluminescent material (e.g., zinc sulfide) causing it to emit light.

Active matrix LCD display glass and EL display glass, whether or not integrated with additional components, exclusively dedicated and designed for use in, respectively, active matrix LCDs and EL displays, are defined as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage and contact pads for interconnecting drive electronics.

HIC FPDs are currently classified in the following provisions of the Harmonized Tariff Schedule of the United States (HTS): 8543, 8803, 9013, 9014, 9017.90.00, 9018, 9022, 9026, 9027, 9030, 9031, 8471.92.30, 8471.92.40, 8473.10.00, 8473.21.00, 8473.30.40, 8442.40.00, 8466, 8517.90.00, 8528.10.80, 8529.90.00, 8531.20.00, 8531.90.00, and 8541.

been found by the Department of Commerce to be sold in the United States at less than fair value (LTFV).

Background

The Commission instituted this investigation effective February 21, 1991, following a preliminary determination by the Department of Commerce that imports of HIC FPDs from Japan were being sold at LTFV within the meaning of section 733(b) of the act (19 U.S.C. § 1673b(b)). Notice of the institution 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 March 27, 1991 (56 F.R. 12741). The hearing was held in Washington, DC, on July 11, 1991, and all persons who requested the opportunity were permitted to appear in person or by counsel.

VIEWS OF COMMISSIONER LODWICK, COMMISSIONER ROHR, AND COMMISSIONER NEWQUIST

Based on the record obtained in this final investigation, we determine that an industry in the United States is materially injured by reason of imports of high-information content (HIC) flat panel displays and display glass therefor from Japan that are sold at less than fair value (LTFV).

I. Like Product

We begin our analysis by defining the "like product." The "like product" is a "product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to investigation."[1] Generally, the Commission looks for clear dividing lines among products in terms of distinct characteristics and uses. Minor variations in products are insufficient to find separate like products.[2]

The articles subject to this investigation are certain HIC flat panel

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[1] 19 U.S.C. § 1677(10). Our decision regarding the appropriate like product(s) in an investigation is essentially a factual determination, based on the record, including the arguments of the parties, in each case, and we have applied the statutory standard of "like" or "most similar in characteristics and uses" on a case-by-case basis. Asociacion Colombiana de Exportadores de Flores v. United States, 12 CIT ___, 693 F. Supp. 1165, 1169 (CIT 1988) ("Asocoflores"). In analyzing like product issues, we generally consider a number of factors relating to characteristics and uses including (1) physical characteristics, (2) uses, (3) interchangeability of the products, (4) channels of distribution, (5) customer or producer perceptions, (6) common manufacturing facilities and production employees, (7) production processes and, where appropriate, (8) price. See, e.g., Asocoflores, 693 F. Supp. at 1170; Gray Portland Cement and Cement Clinker from Venezuela, Invs. Nos. 303-TA-21 and 731-TA-519 (Preliminary), USITC Pub. 2400 at 3 (July 1991); Heavy Forged Handtools from the People's Republic of China, Inv. No. 731-TA-457 (Final), USITC Pub. 2357 at 4 (February 1991)(Handtools). No single factor is necessarily dispositive, and we may consider other factors we deem relevant based upon the facts of a particular investigation.

[2] See S. Rep. No. 249, 96th Cong., 1st Sess. 90-91 (1979); Asocoflores, 693 F. Supp. at 1169.

displays and display glass therefor from Japan. The Commerce Department (Commerce) defined two classes or kinds of merchandise subject to its dumping finding in relevant part as follows:

> Active-matrix liquid crystal high information content flat panel displays (active-matrix LCD FPDs) are large area, matrix addressed displays, no greater than four inches in depth, with a picture element (pixel) count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Active-matrix LCD FPDs utilize a thin-film transistor array to activate liquid crystal at individual pixel locations. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video.
>
> Electroluminescent high information content flat panel displays (EL FPDs) are large area, matrix addressed displays, no greater than four inches in depth, with a pixel count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. EL FPDs incorporate a matrix of electrodes that, when activated, apply an electrical current to a solid compound of electroluminescent material (e.g., zinc sulfide) causing it to emit light. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video.[3]

Commerce rescinded its investigation as to HIC passive matrix LCDs and found de minimis margins for HIC plasma displays.[4] [5]

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[3] 56 Fed. Reg. 32376 (July 16, 1991). In our preliminary determination, our like product definition specifically excluded flat panel displays containing less than 120,000 pixels and cathode ray tubes. HIC FPDs at 9. Commerce explicitly excluded such products from the scope of the investigation and no party argues for their inclusion in the like product definition, although some respondents suggest that a finding of one like product should lead to inclusion of low information content displays. We find that the record contains no significant new information on the issue, and therefore exclude from the like product definition displays of less than 120,000 pixels and cathode ray tubes. Any similarity in characteristics and uses between such products and HIC flat panel displays is extremely limited. See generally report at A-18-19.

Also not included in the scope were a number of other display technologies, such as electrochromic, electrophoretic, and field emission spun cathode. The record indicates that these technologies are only in the early stages of research and development. Id. at A-7, n.17.

[4] 56 Fed. Reg. at 32382, 32401.

Although the Commission must accept Commerce's determination as to which merchandise is within the class or kind of merchandise under investigation, the Commission determines what domestic products are like those in the class defined by Commerce.[6] The Commission may find a domestic like product to be broader than the class or kind of imported merchandise described by Commerce, or it may find two or more like products corresponding to one class or kind.[7]

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[5] (...continued)

[5] Commissioner Rohr and Commissioner Newquist note the final determination by Commerce dramatically changed the analytical framework for the Commission's determination in this investigation. Instead of retaining the one product finding made in both the Commission preliminary and its own preliminary phase, Commerce instead found four products when it announced its final determination only 45 days before the end of this investigation.

The single product perspective endured from the petition filing in July 1990, through the Commission preliminary in Sept. 1990, and the Commerce preliminary in Feb. 1991. Unfortunately, a year into the administrative process for this petition Commerce announced its departure from this position. This was a mere three days before the Commission's scheduled hearing in this investigation, well after briefs were filed and after substantial preparatory work by Commission staff for the hearing and the final report which is required by law to be complete within 45 days after the Commerce final determination.

Without reaching the wisdom or the merits of the Commerce approach, they note that the timing and changes resulting from the unexpected shift in the Commerce position forced the parties to drastically restructure the fundamentals of their arguments before the Commission in a compressed time frame. The Commission's hearing is acknowledged as an indispensable, one-time opportunity for both the parties and the Commissioners to address the issues of product, injury, and causation on a give-and-take basis. The Commerce shift in position affected both the parties' and the Commission's preparation for the hearing and the final determination. Such an administrative turn of events does little to promote predictability under U.S. trade laws as they are now administered.

[6] See Sony Corporation of America v. United States, 13 CIT ___, 712 F. Supp. 978, 981 (1989); Algoma Steel Corp., Ltd. v. United States, 12 CIT ___, 688 F. Supp. 639, 644 (1988), aff'd, 865 F.2d 240 (Fed. Cir. 1989), cert. denied, 109 S.Ct 3244 (1989). Mitsui Comtek and In Focus request that the Commission exclude their imports, respectively of computer display components and display glass cells, from the scope of the investigation. Mitsui Comtek's prehearing brief at 13; In Focus Systems' prehearing brief at 2. Such an action may only be taken by Commerce.

[7] 19 U.S.C. § 1677(10). See, e.g., Badger-Powhatan v. United States, 9 CIT 213, 608 F. Supp. 653, 656-657 (1985); Asocoflores, 693 F. Supp. at 1168-

(continued...)

HIC flat panel displays are electronic devices for displaying information or images when integrated into such end user systems as portable computers and aerospace, medical, and military instrumentation. In our preliminary determination, we found that the like product was HIC flat panel displays and subassemblies thereof.[8] Petitioners urge the Commission to adopt that like product definition in its final determination.[9] The Japanese respondents contend that there are two like products, active matrix LCD displays and EL displays, corresponding to the two display technologies used for making the HIC flat panel displays that Commerce found to be dumped.[10] [11] The U.S. respondents argue in the alternative that emissive displays,

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[7] (...continued)
1171; American NTN Bearing Manufacturing Corp. v. United States, 14 CIT ___, 739 F. Supp. 1555 (1990).

We note that Commerce made a "like product" finding as part of its standing determination. As Commerce expressly acknowledged, we are not bound by that finding. 56 Fed. Reg. at 32379-82. As discussed below, we find one like product, and consequently make one determination. 19 U.S.C. § 1673d(b); Cyanuric Acid and Its Chlorinated Derivatives from Japan, Inv. No. 731-TA-136 (Final), USITC Pub. 1513 (April 1984).

[8] HIC FPDs, USITC Pub. 2311 at 8-13.

[9] Petitioner's prehearing brief at 5.

[10] Japanese respondents' posthearing brief at 32. However, a witness for the Japanese respondent lists seven basic HIC flat panel display technologies, two of which are EL. Japanese respondents' prehearing brief, Tannas report at 56, and transcript of the hearing (tr.) at 252. Domestic producers make two types of EL display, AC thin film and DC powder. The two types share such characteristics as electroluminescent material. They both serve the medical and industrial markets. Report at A-21. Although some respondents have questioned the quality of the DC powder approach, e.g., tr. at 201, we do not consider the differences between the EL types to be an adequate basis for a like product distinction.

[11] No party argues that domestically-produced active matrix LCDs and EL displays are not like the corresponding dumped imports. The record indicates that domestic and imported active matrix LCDs have similar characteristics, such as liquid crystal technology, and uses, such as aerospace. Domestic and imported EL displays had similar characteristics, such as electroluminescent technology, and uses, such as medical equipment. Report at A-28-29.

including EL and plasma, are a different like product from non-emissive displays, including passive matrix and active matrix LCDs.[12] Although the parties' submissions and the staff's inquiries have built an extensive record in this final investigation, that record indicates to us that one like product is still appropriate. Accordingly, we determine that the like product in this investigation is all HIC flat panel displays and display glass therefor.[13]

A. There is one like product: all HIC flat panel displays

Active matrix LCDs, passive matrix LCDs, plasma displays, and EL displays share a number of characteristics, although each has certain characteristics unique to its display technology.[14] All display types consist of a display glass panel on the front backed with a matrix of electrodes and a panel of electronics. All are less than 4 inches thick, contain at least 120,000 pixels, and can display at least 25 by 80 characters of text when integrated into end users systems such as computers and other equipment.[15] Although each type uses a distinct medium, i.e., EL material, gas, liquid crystal, or liquid crystal and transistors or diodes, to activate the pixels in its matrix, the displays are distinguishable in appearance mainly by their

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[12] U.S. respondents' prehearing brief at 6. Because pixels in plasma and EL displays emit light, plasma and EL are called "emissive" technologies, as opposed to active and passive LCD which cannot be viewed in the dark unassisted and are termed "non-emissive."

[13] No passive matrix LCD HIC flat panel displays were produced in the United States during the period of investigation, although at least one firm has stated its intention to construct facilities for future production. Report, Table 11, and petitioners' submission of June 17, 1991.

[14] Differences in technical characteristics have not precluded a finding of one like product. See, e.g., Sony Corp. of America v. United States, 712 F. Supp. at 982 (one color picture tube like product appropriate despite differences in shadow mask, electron gun type, shape of faceplate, and production process).

[15] Report at A-5-6.

color: generally red-orange for plasma, yellow for EL, and white or blue for LCD. Only LCDs are currently sold with a full multi-color display, but very few such sales have yet been made.[16]

Respondents have stressed the importance of power consumption as a distinguishing characteristic, whereas petitioners maintain that any differences in power consumption are minor.[17] Although non-emissive displays generally have a power advantage over emissive displays,[18] the power issue is not a simple one. According to one analyst, the new full color active matrix LCDs consume more power than do plasma or EL displays, which are currently monochrome.[19] The power issue is further complicated by the fact that each technology is changing rapidly.[20] According to petitioners, the power consumption of emissive displays has steadily decreased and will continue to

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[16] Monochrome and full color active matrix LCDs are similar products technologically. Id. at A-33. EL technology may succeed in reaching full color in the future. Id. at A-32, n.77.

[17] Id. at A-12, Tr. at 77.

[18] Report at A-12-13.

[19] Id. at A-13. Moreover, although most laptop computers use non-emissive displays, Toshiba claims its plasma-equipped laptop has a battery life of 3 hours, which is an accepted minimum even for LCD-equipped laptops, although respondents claim that Toshiba's product operates at substandard brightness. Petitioner's postconference brief, Attachment C; respondent IBM's posthearing brief, Appendix D at 8.

[20] Technology does advance rapidly in this field, as evidenced by the fact that the number of available display technologies has doubled during the period of investigation. Report at A-13 n.30. The Commission may take into account information concerning impending technological changes. Citizen Watch Co., Ltd. v. United States, 14 CIT ___, 733 F. Supp. 383, 389 (1990) (Commission was justified in considering information that Japanese producers were planning to make LCD televisions with larger screens).

do so.[21] We find that the evidence is too unclear for power consumption alone to form a sufficient basis for distinguishing between types of HIC flat panel displays for like product purposes.

All HIC flat panel displays have the same general end use: providing to an electronic end user system a continuous, visible display of text, images, and graphics. Although some of the specific end uses for a given display type can depend on the technology of the display,[22] two or more technologies are found in computers, medical equipment, aerospace, and control equipment.[23] Certain computer makers, such as GRiD, offer essentially the same computer with a choice of display types.[24] The common applications for emissive and non-emissive displays, such as industrial controls, medical equipment, and monochrome avionics, are small relative to the laptop computer market. Nonetheless, they are of particular importance to the domestic industry, in view of the fact that these areas represent the majority of the sales by the

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[21] Petitioners' prehearing brief at 14-15. Petitioners note that a technologist for respondent IBM has stated that by 1993, EL may surpass LCD in low power consumption. Transcript of Commerce's hearing at 270.

[22] Report at A-17. Overhead projector panels can only use LCDs because emissive technologies do not permit transmission of light through the display. Id. Only emissive displays have been used in ruggedized military applications. Id. at A-26.

[23] Id. at A-25; See also id. at A-80-81, n.182. The report lists groups of end products within which HIC flat panel displays are used. We have used this list with caution, because each group contains a variety of applications that do not always permit the use of more than one technology. For example, the avionics field, in which EL displays and active matrix LCDs are used, could be viewed as being divided into two types of applications. In one category, users have a preference for full color, and only active matrix LCDs will currently meet that need. In the other, monochrome displays are acceptable and both EL displays and monochrome active matrix LCDs have been used. Id. at A-31, n.71, A-86-87, A-95-96, and memorandum INV-0-167 (August 13, 1991).

[24] GRiD's postconference brief at 3-4. See also tr. at 108.

domestic industry.[25]

The record indicates that the different display types lack absolute interchangeability. However, HIC flat panel displays are generally made to order and consequently there is no interchangeability even among displays of the same format and technology.[26]

HIC flat panel displays of all technologies usually share similar channels of distribution. They are generally sold to original equipment manufacturers.[27]

HIC flat panel displays are all produced by building electrical conductors and other components onto glass substrates before liquid crystal material, gas, or electroluminescent material is added. Glass cleaning, assembly, aging, and testing are generic steps common to all technologies.[28] However, such processes as material filling and sealing are unique to each display type.[29] All technologies use clean rooms, although the record is mixed on whether different technologies require different levels of clean

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[25] Report, Table 3, and INV-O-167.

[26] Lack of interchangeability does not preclude a finding of one like product. See, e.g., Digital Readout Systems and Subassemblies Thereof from Japan, Inv. No. 731-TA-390 (Final), USITC Pub. 2150 (January 1989) at 12.

[27] Report, Table 10, A-48-49.

[28] Domestic producers have as a group received a grant from Commerce to do research into areas common to all technologies: automated inspection and repair, and driver interconnections and packaging. Id. at A-40.

[29] Differences in production processes do not preclude a finding of one like product. Although they comprised "two technologies of semiconductor manufacture," Metal Oxide Semiconductors (MOS) of the N-Channel and Complementary types were found to be within the same like product. Erasable Programmable Read Only Memories from Japan, Inv. No. 731-TA-288 (Final), USITC Pub. 1927 at 10 (December 1986)(EPROMs).

room.[30]

No Japanese manufacturer produces two display technologies in the same facility. No domestic producer makes more than one technology, although petitioners claim that this is due to the lack of funding rather than to technological limits.[31] Petitioners provided examples of employees who have shifted from one technology to another. The record indicates that even subcategories of technologies, such as thin film EL and DC powder EL, do not and cannot share manufacturing facilities.[32]

The record is mixed on customer and producer perceptions of the product. Respondents argue that each technology is perceived by producers and purchasers as having totally distinct applications and that a customer will choose only one based on its particular technical needs.[33] However, the purchaser respondents have on several occasions considered a range of technologies before choosing one.[34] Some firms consider different technologies to be comparable.[35] U.S. producers generally perceive the types

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[30] The Commission has found that "all [display types] use similar techniques for applying layers of materials to a glass substrate that must be conducted in a dust-free 'clean room.'" Liquid Crystal Display Television Receivers from Japan, Inv. No. 751-TA-14, USITC Pub. 2042 at A-9 (December 1987). The level of clean room required depends on the size of the features being produced, and most fabrication for HIC flat panel displays is based on features of similar size. Report, Appendix C at B-42.

[31] Id. at A-15, n.37; Tr. at 68.

[32] Tr. at 253.

[33] Report at A-19.

[34] See generally, Id., Appendix I. Numerous buying guides and comparison charts describe different display technologies to purportedly assist purchasers in selecting a display. Id. at A-21.

[35] Id. at A-20, n. 54; A-31, n.69.

as having similar uses.[36]

Prices within each technology can vary widely. Although some display types tended to be priced higher or lower than others during the period of investigation, prices for all types overlapped to what we find to be a significant degree.[37]

B. The Like Product Includes Display Glass

In its notice of initiation, Commerce included dedicated subassemblies of HIC flat panel displays within the imports subject to investigation. We included dedicated subassemblies in the like product in our preliminary determination.[38] In its final determination, Commerce found that the general term "subassemblies" was inadequately defined and determined to include only "display glass" within each class or kind found to be sold at LTFV.[39]

In this investigation, we determine that display glass and finished

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[36] E.g., petitioners' prehearing brief at 34.

[37] Report, Tables 39-43, A-96, and INV-O-167.

[38] HIC FPDs, USITC Pub. 2311 at 13.

[39] 56 Fed. Reg. at 32387. The two types of display glass, one corresponding to each dumped class or kind, are defined as follows:

> Active-matrix LCD FPD display glass, whether or not integrated with additional components, exclusively dedicated to and designed for use in active-matrix LCD FPDs, is defined as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage (i.e., liquid crystal) and contact pads for interconnecting drive electronics.
>
> EL FPD display glass, whether or not integrated with additional components, exclusively dedicated to and designed for use in EL FPDs, is defined as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage (e.g., phosphor) and contact pads for interconnecting drive electronics.

56 Fed. Reg. at 32376.

displays are part of the same like product.[40] This is principally because it is difficult to draw a distinction between the subassembly and the finished product. In general, an HIC flat panel display is composed of several subassemblies: display glass, drive electronics, control electronics, mechanical package, and power supply.[41] However, Commerce's definition of display glass consists of display glass "whether or not integrated with additional components."[42] Imported and domestically-produced flat panel displays are frequently sold without one or more of the five components listed above, although they always include a display glass. Consequently, Commerce's definition of display glass covers the entire range of products in this field, from unadorned display glass through display glass with some components but not all, up to complete flat panel displays.[43] It is therefore not possible to exactly define display glass as something separate from complete flat panel displays.

Display glass is dedicated for use in finished HIC flat panel displays

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[40] When determining whether subassemblies or "semi-finished" products should be included in the same like product as finished products, the Commission has looked at: (1) the necessity for, and costs of, further processing; (2) the degree of interchangeability of articles at different stages of production; (3) whether the article at an earlier stage of production is dedicated to use in the finished article; (4) whether there are significant independent uses or markets for the finished and unfinished articles; and (5) whether the article at an earlier stage of production embodies or imparts to the finished article an essential characteristic or function. E.g., Ball Bearings, Mounted or Unmounted, and Parts Thereof, from Argentina, Austria, Brazil, Canada, Hong Kong, Hungary, Mexico, the People's Republic of China, Poland, the Republic of Korea, Spain, Taiwan, Turkey, and Yugoslavia, Invs. Nos. 701-TA-307 and 731-TA-498-511 (Preliminary), USITC Pub. 2374 at 13 n.34 (April 1991).

[41] Report at A-6-7.

[42] 56 Fed. Reg. at 32376.

[43] Report at A-7, n.16.

and there is no independent market or use for these components. Certain domestic producers sell display glass panels separately, but those panels end up in complete HIC flat panel displays or end products incorporating such a display. All U.S. manufacturers currently in production manufacture the display glass themselves. Display glass possesses or incorporates an essential characteristic of an HIC flat panel display in that it is critical for displaying text and graphics.

Depending on how many additional components are already attached to it when it is sold, display glass may not need further processing, i.e., assembly, before it becomes a flat panel display. A display glass is not always interchangeable with a finished display. As discussed above, however, there appears to be little interchangeability between assembled displays, either, indicating that lack of interchangeability should not be decisive in this case.

We do not include within the like product other subassemblies, e.g., the drive electronics, control electronics, mechanical package, and power supply, that Commerce declined to cover in the scope. The record indicates that those subassemblies variously are not dedicated to HIC flat panel displays or do not impart an essential characteristic to the completed displays.[44]

We find, based on the above considerations, that the one like product consists of all HIC flat panel displays and display glass therefor.

II. Domestic Industry

Section 771(4)(A) of the Tariff Act of 1930 defines domestic industry as

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[44] See preliminary staff report at A-9, n.21; Report at A-6-7. Moreover, each would require significant processing in order to become a flat panel display, because processing would include adding to it a display glass, which usually accounts for half of the value of a display. Report at A-7, n.15.

"the domestic producers as a whole of a like product, or those producers whose collective output of the like product constitutes a major proportion of the total domestic production of that product."[45] Based on our finding concerning the like product, we determine that the domestic industry is composed of the domestic producers of HIC flat panel displays and display glass therefor.

Petitioners argue that several U.S. firms whose operations involve HIC flat panel displays should not be included within the domestic industry primarily because they do not, unlike petitioners, produce display glass themselves. The group in question, including In Focus Systems, Inc., as well as those firms referred to in the report as "integrators" and "assemblers," purchase the display glass from petitioners or the Japanese respondents and add electronics and other components that they variously produce or purchase.[46] No party has argued for the inclusion of the integrators or the assemblers in the domestic industry.[47]

In considering whether a U.S. firm is a producer the Commission has looked to the overall nature of production-related activities in the United States.[48] The Commission has emphasized that no single factor -- including

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[45] 19 U.S.C. § 1677(4)(A).

[46] See generally, Report at A-40-44.

[47] In Focus is the only firm in the group that some respondents argue should be included in the domestic industry. However, a witness for the Japanese respondents opined that even In Focus is not a domestic producer, because it does not produce glass on which electric power is translated into an image. Tr. at 256.

[48] Specifically, the Commission has examined such factors as (1) the extent and source of a firm's capital investment; (2) the technical expertise involved in U.S. production activity; (3) the value added to the product in the United States; (4) employment levels (5) the quantities and types 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, including

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value added -- is determinative and that value added information becomes more meaningful when other production activity indicia are taken into account.[49] The Commission also has stated that it will consider any other factors it deems relevant in light of the specific facts of any investigation.[50]

An HIC flat panel display is essentially a display glass with electronics added. The petitioners (and most Japanese respondents) generally make display glass and sell complete HIC flat panel displays.[51] Display glass is clearly defined and there is no dispute that the operations of those firms constitute production of HIC flat panel displays. In contrast, the amount and nature of the electronics can vary so widely that the record indicates, as Commerce found, that the electronics cannot be specifically defined. Indeed, there is no clear dividing line between the electronics of the end-user system of which the HIC flat panel display is itself a component and the display's own control electronics. Increasingly, the display's electronics are performing functions required by the end-user system in addition to controlling the display.[52]

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[48] (...continued)
where production decisions are made. See, e.g., Generic Cephalexin Capsules from Canada, Inv. No. 731-TA-423 (Final), USITC Pub. 2211 at 10-11 (August 1989). The Commission has also considered whether production involves actual fabrication or merely assembly. Handtools, USITC Pub. 2357 at 17.

[49] See, e.g., Color Television Receivers from the Republic of Korea and Taiwan, Inv. Nos. 731-TA-134 and 135 (Final), USITC Pub. 1514 (April 1984) at 7-8.

[50] EPROMs, USITC Pub. 1927 at 11.

[51] Report at A-43-44, A-68.

[52] Id. at A-40-41, n.96; Prehearing report at A-8, n.16. Industry sources predict that in the future "the screen will become the computer," as all the electronics needed to run a computer will be directly attached to the display glass. Report at A-18, n.47.

As a result, the operations of integrators cannot be defined as the production of HIC flat panel displays as distinct from the production of end-user systems.[53] The integrators generally see the work they perform on purchased display glass as an integral part of their other manufacturing operations and not as the separate production of HIC flat panel displays.[54] Often no separate HIC flat panel display is identifiable at any point, as the display glass is processed by one or more integrators into an end-user system such as an aircraft cockpit instrumentation panel.[55]

We believe that the contrast between the operations of petitioners and those of the firms in question, as well as the lack of a clear dividing line between a display's electronics and the end-user system's electronics, and between the display operations of In Focus and the integrators and their end-user system operations, indicate that In Focus and the integrators should not be included within the domestic industry.[56] Moreover, these firms often add relatively little value.[57] [58] Based on the foregoing, we find that the

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[53] In Focus' operations are similar to those of the integrators, particularly in that it does not produce display glass. Id. at A-40-44.

[54] Id. at A-41, n.96. Even In Focus, which claims to be a display producer, actually has mostly sold overhead projection panels. Id. at A-42-43.

[55] Id. at A-41, n.95.

[56] Additional support for this conclusion can be found in the fact that several of the integrators, including most who work on active matrix LCDs, import their display glass and much of their electronics from Japan. In Focus imports its display glass. Id. at A-40-42. Moreover, In Focus appears to have considerably less investment in its domestic facilities than some of the petitioners. Id. at A-41, n.97, A-61, Table 25, and B-47, Table E-3.

[57] The amount of value added can vary, but often does not account for more than 50 percent, because the display glass generally accounts for half of the value of a complete display. The amount can be considerably less than 50 percent for integrators who purchase display glass from Japan, because they

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domestic industry does not include In Focus, the integrators, or the assemblers.[59]

Petitioners raised the possibility of using material retardation analysis in this case. In light of the factors we consider in that context,[60] we do not find such analysis to be appropriate, because the domestic industry

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[57] (...continued)
receive the product with the drive electronics, and often the mechanical package, already attached. Id. at A-7, n.15; A-17, n.43; A-40-41.

[58] This is even more true of the so-called "assemblers," who generally purchase all display components and perform only the final assembly operation which adds minimal value. These firms generally view themselves as purchasers of complete displays for insertion into the end products they manufacture. Id. at A-41. The nature of their activities indicates that these firms should not be included in the domestic HIC flat panel display industry. See Handtools, USITC Pub. 2357 at 17-18 (companies which "do no more than assemble imported heads with handles purchased from a domestic manufacturer" were not domestic producers).

[59] Because of the nature of the product and the industry, this investigation is clearly distinguishable from other recent investigations in which firms that assemble components into the like product were included in the domestic industry. In such cases, all domestic firms had essentially similar activities, i.e., assembly operations that added U.S. value, and there was no question that assembly constituted production. Here, one group of firms makes both display glass and, generally, complete displays, whereas In Focus and the integrators purchase display glass and often make end-user systems. Compare Minivans from Japan, Inv. No. 731-TA-522 (Preliminary), USITC Pub. 2402 at 21 (July 1991); Certain Personal Word Processors from Japan, Inv. No. 731-TA-483 (Final), USITC Pub. 2411 at 19 (August 1991)(Views of Lodwick and Rohr). Moreover, in those investigations, the Commission emphasized that parts were not in the like product and parts suppliers were not in the domestic industry. USITC Pub. 2402 at 21; USITC Pub. 2411 at 19. In this investigation, display glass is included in the scope and display glass production is part of the domestic industry.

[60] In determining whether an industry is established, the Commission has looked at such factors as: 1) the date production began, 2) whether production has been steady or start-and-stop, 3) the size of domestic production compared to the size of the domestic market as a whole, 4) whether the domestic industry has reached a "break even point", and 5) whether the activities involve the establishment of a new industry or are merely a new product-line of an established firm. Benzyl Paraben from Japan, Inv. No. 731-TA-462 (Final), USITC Pub. 2355 at 8 (February 1991); Fresh and Chilled Atlantic Salmon From Norway, Invs. Nos. 701-TA-302 and 731-TA-454 (Final), USITC Pub. 2371 at 10, n.40 (April 1991).

is established. At least some producers began producing HIC flat panel displays before the period of investigation.[61] Production by those firms has arguably been steady rather than start-stop. Domestic production has accounted for at least some share, albeit small, of the total market during the period of investigation.[62] Most of the domestic producers were principally devoted from the start to the production of HIC flat panel displays.[63]

Based on the foregoing, we determine that the domestic industry comprises the domestic producers of HIC flat panel displays and display glass therefor, and that the condition of the industry should be examined within the context of a material injury, rather than a material retardation, analysis.

III. Condition of the Domestic Industry

In determining whether the domestic industry is materially injured, we consider, among other factors, domestic consumption, domestic production, capacity, capacity utilization, shipments, inventories, employment, market share, financial performance, the ability to raise capital, and investment.[64] In addition, we evaluate all of these factors in the "context of the business cycle and conditions of competition that are distinctive to the affected industry."[65]

Apparent consumption of HIC flat panel displays and display glass

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[61] Report at A-40.

[62] E.g., Id. at A-50, A-77-78.

[63] Id. at A-37.

[64] 19 U.S.C. § 1677(7)(C)(iii). Much of the data concerning the domestic industry and the imports are business proprietary information, and can be discussed only in general terms.

[65] 19 U.S.C. § 1677(7)(C)(iii).

therefor increased steadily between 1988 and 1990.[66] Domestic production rose from 1988 to 1990. Production capacity also increased from 1988 to 1990. However, capacity utilization declined from 1988 to 1990.[67] The quantity of U.S. shipments by domestic producers increased steadily between 1988 and 1990. The quantity of total shipments (including exports) exhibited a similar trend.[68] Domestic producers' inventories increased substantially from 1988 to 1990.[69]

Employment indicators were mixed. Number of workers, hours worked, and total compensation rose from 1988 to 1990, whereas average hourly wages remained stable and productivity declined over that period.[70]

Domestic producers' financial results significantly worsened during the period of investigation. Although net sales increased from 1988 to 1990, the industry experienced heavy operating losses. Those losses deepened between 1988 and 1990. Cash flow also exhibited a downward trend.[71] Respondents' claim that the domestic industry is doing well in its specialized market is clearly refuted by the inability of the industry to sustain adequate profits even in the small market niches they have occupied. It has been suggested

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[66] This is true both for all HIC flat panel displays and for the market comprising active matrix LCDs, plasma, and EL displays, the three types that currently are produced domestically. Report, Table 37, supplemental Table 38a, and INV-0-167.

[67] Report, Table 11, and INV-0-167. We have treated capacity figures with caution, because measurement of capacity is not precise in this industry. Report at A-50.

[68] Id., Tables 12 and 13, and INV-0-167.

[69] Report at A-53.

[70] Id., Table 14.

[71] Id., Table 17.

that the domestic producers would take up to 8 years to reach profitability.[72] In spite of the fact that full production by some U.S. firms began at least that long ago, the financial condition of the industry continued to worsen up to the end of the period of investigation.[73]

The industry's increases in sales, production, and shipments are not surprising. Whereas sales and shipments are important considerations in investigations concerning mature industries, this investigation concerns an emerging industry for which growth and investment are especially important. We would expect positive trends in such indicators as sales and production for an emerging industry making a product for which demand is rapidly rising.[74] More important to our material injury determination is the inability of this particular industry to turn that increasing demand into an improved financial situation. Even more significant is the inability of the industry faced with growing demand to obtain or generate significant financing for increased capital and research investment. Although capital expenditures by the domestic industry rose over the period of investigation, they remain minuscule.[75] Return on investment was negative throughout the period.[76]

In particular, one of the factors we are to consider in determining

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[72] Tr. at 207.

[73] Report, Table 17.

[74] Demand is rising both in terms of volume and variety of applications, as consumers become educated as to the range of uses for HIC flat panel displays. For example, the full color laptop computer is a new product projected to increase rapidly in popularity.

[75] The record indicates that much higher levels of investment are required for large scale commercial production. Tr. at 168. We note that the Japanese display producers reportedly have large investment plans. Report at A-71 and Table 24.

[76] Id., Table 25.

whether a domestic industry is materially injured is "the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the like product."[77] The record shows that the domestic industry's cash flow was inadequate to fund ongoing research and development efforts.[78] After rising from 1988 to 1989, the domestic industry's research and development expenses declined from 1989 to 1990.[79] The record indicates that the domestic industry has actively pursued advanced products such as full color EL displays.[80] In this investigation involving a high-technology product, we find that the inability to conduct adequate research and product development is a particularly clear indication of material injury to the domestic industry.

We consequently conclude that, in light of both the business cycle and all pertinent conditions of competition,[81] the industry is experiencing

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[77] 19 U.S.C. § 1677(7)(C)(iii)(IV).

[78] Report, Table 17. Commissioner Rohr and Commissioner Newquist note that this consideration is similar to one they found important in Certain Laser Light-Scattering Instruments and Parts Thereof from Japan, Inv. No. 731-TA-455 (Final), USITC Pub. 2328 at 23-24 (November 1990)(Views of Rohr and Newquist).

[79] Report, Table 26.

[80] Petitioners' posthearing brief at 14.

[81] The Japanese respondents argue that the statutory provision for examining the domestic industry's performance in the context of its business cycle requires the Commission to look at the condition of each company individually, because the various members of the industry are at very different stages of development. Respondents' prehearing brief at 14. However, the Commission is required to analyze the condition of the industry as a whole, not on a firm-by-firm basis. Sandvik AB v. United States, 13 CIT ___, 721 F. Supp. 1322, 1330 (1989), aff'd, 904 F.2d 46 (Fed. Cir. 1990). We have, however, taken into account the stages of development of the industry in our analysis of the industry as a whole.

material injury.

IV. Material Injury by Reason of LTFV Imports

In making determinations in antidumping investigations, we consider whether the material injury being suffered by the domestic industry is "by reason of" the imports under investigation.[82] We consider the volume of imports, their effect on prices for the like product, and their impact on domestic producers.[83] In doing so, we consider whether import volumes or increases in volume are significant, whether there has been significant underselling by imports, whether imports otherwise significantly depress or suppress prices for the like product, and any other economic factors having a bearing on the state of the domestic industry.[84]

The volume of LTFV import shipments increased sharply from 1988 to 1990. Those imports also gained market share rapidly during the period of investigation.[85] We find that the volume of imports, the size of import penetration, and the increases in volume and import penetration that occurred, when considered in the context of their impact on domestic producers, are significant.

The record indicates that price, while not the most important factor in most sales, is a significant factor in the decision to purchase this product. An indication of this is the fact that "target" prices often have been

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[82] 19 U.S.C. § 1673b(a).

[83] 19 U.S.C. § 1677(7)(B)(i).

[84] 19 U.S.C. § 1677(7)(C).

[85] This is particularly true when examining the market for active matrix LCD, plasma, and EL displays, but is also true in the market for all HIC flat panel displays. Report, Table 37, supplemental Table 38a, and INV-0-167.

discussed during the early stages of the negotiation of supply contracts.[86] Indeed, even the large purchasers who claimed to prefer Japanese displays for non-price reasons admitted that price is an important factor in the decision to purchase a flat panel display.[87] The pricing data in the record[88] indicates that the subject imports have had an adverse effect on the prices of the products sold by the domestic industry during the period of investigation. The record shows instances of underselling by the subject imports. A number of the prices of both domestic products and dumped imports exhibited downward and flat trends.[89] The record thus indicates that the subject imports depressed and suppressed domestic prices.

Commission staff were able to confirm one instance in which a petitioner lost a sale to dumped imports in which cost was important. Another purchaser confirmed that dumped imports were priced lower than domestic products.[90] Although these instances are small compared with the size of the market, they do confirm an important role for price in the marketplace. Moreover, the lost sale information indicates that, in the niche markets critical to the

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[86] Tr. at 113, 186-187.

[87] Tr. at 175-176, 186-88. This is not surprising in view of the importance of price in the laptop computer market. Id. at 161. The display is a key component of the manufacturing cost of a laptop computer. Transcript of the conference at 132.

[88] We have considered the price data in the record with caution because price trends and comparisons are difficult to make in this market. Report at A-91. See Iwatsu Electrical Co. v. United States, 15 CIT ___, 758 F. Supp. 1506, 1515 (1991)("Difficulties with, or even impossibility of, direct price comparison do not mandate a negative determination").

[89] Report, Tables 39 and 44, A-96.

[90] Id. at A-98-99.

industry, dumped imports compete with domestic producers.[91]

We note that the lack of other examples of lost sales and revenue is not surprising in this investigation.[92] Much of the competition in this market takes the form of negotiations for the development of specialized products. A purchase contract makes it possible for a producer to obtain capital and a production base, and to develop efficient production capacity. Domestic firms have often been disqualified from negotiations for these contracts at an early stage. While technical ability, potential production capacity, and supplier availability are all among the factors on which suppliers are evaluated at this stage, often a "target" price is discussed as well. U.S. display producers disqualified at this stage may have difficulty pointing to their disqualification as a "lost sale." Nevertheless, when the domestic firms are disqualified, dumped imports are often a factor, and, each time, domestic producers lose not only a sale but also lose an opportunity to enhance their ability to win future contracts, by, for example, developing productive capacity.[93] [94]

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[91] Indeed, dumped imports were present in such niche markets as medical equipment and control equipment during the period of investigation. Id., Table 4. As discussed above, the domestic industry has not achieved profitability even though its sales have been concentrated in such niches.

[92] We note in this connection that active matrix LCDs have only recently come onto the market, and that there have been lags in their availability. Id., Table 6, and A-11, n.21.

[93] Respondent purchasers such as Apple claim that only prohibitively expensive investment on their part could have given the domestic producers adequate capacity. E.g., Tr. at 125-126. However, the record indicates that had a major purchaser made a commitment to a domestic producer, involving a relatively modest investment or exposure, then other investors would have been encouraged to participate in the financing of the domestic industry. Report at A-46 n.122, Appendix H.

In our view, more important in this investigation than simple pricing and lost sales is lost investment. Several sources confirmed that the domestic industry was unable to raise capital due to the presence of Japanese imports.[95] Because of the substantial investment needed to enter a major market segment in direct competition with some of the largest Japanese corporations, the inability to attract capital is particularly damaging to a producer of HIC flat panel displays.[96] Similarly, lack of funds severely constrains research and development efforts, which are critical to the progress of the industry.

Without substantial funding from internal or external sources, domestic producers, even the non-developmental ones, lack the capacity to achieve initial design wins which are crucial to the future of the industry, and cannot qualify as vendors for large customers outside of certain market niches.[97] Consequently, domestic producers are caught in a cycle that denies them the opportunity to increase their production to a level that would result in economies of scale and increased expertise.[98]

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[94] (...continued)
[94] For a discussion of the dynamic nature of qualification standards in an industry marked by changing technology, see Additional Views of Commissioner Lodwick in Mechanical Transfer Presses from Japan, Inv. No. 731-TA-429 (Final), USITC Pub. 2257 at 59-61 (February 1990).

[95] The sources refer in general to all Japanese imports, e.g., report at A-61 n.149, but more than once specifically refer also to dumped imports. Id., Appendix F.

[96] Tr. at 168.

[97] Although purchasers have rejected domestic products for a variety of reasons, in some cases the rejection was primarily based on lack of capacity to produce commercial quantities. See, e.g., tr. at 125.

[98] Increased production can lead to lower per unit engineering and total costs, as well as economies of scale in production and increased research and development expertise. Mechanical Transfer Presses from Japan, USITC Pub. 2257 at 23, 31; petitioners' posthearing brief, Response F.

We recognize that imports not found to be dumped have a larger share of the overall market for HIC flat panel displays than do imports subject to Commerce's dumping finding, and that the impact of the former cannot be the basis for our affirmative determination. However, we find that any adverse effect that the nonsubject imports may have on the domestic industry does not detract from the conclusion that dumped imports are a cause of the material injury suffered by the domestic industry.[99] Indeed, the presence and dimensions of the nonsubject imports appear to be a condition of trade that has left the domestic industry in a weakened condition and particularly vulnerable to dumped imports.[100]

Based on the foregoing considerations, we determine that the domestic industry is materially injured by reason of imports of LTFV HIC flat panel displays and display glass therefor from Japan.

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[99] The Commission need not determine that imports are the principal or a substantial cause of material injury. S. Rep. No. 249, 96th Cong., 1st Sess. 74-75 (1979). Rather, the imports need only be a cause of material injury. See LMI-La Metalli Industriale, S.p.A. v. United States, 13 CIT ___, 712 F. Supp. 959, 971 (1989). Although other factors may also be causes of material injury, LTFV "importers take the domestic industry as they find it." Iwatsu Electrical Co. v. United States, 758 F. Supp. at 1518.

[100] The Commission is not to determine whether LTFV imports are the principal, a substantial, or a significant cause of material injury. Any such requirement has the undesirable result of making relief more difficult to obtain for industries facing difficulties from a variety of sources; industries that are often the most vulnerable to less-than-fair-value imports."
S. Rep. 249, 96th Cong., 1st Sess., 74-75 (1979); id. at 88 (Commission is to "focus on the conditions of trade, competition, and development regarding the industry concerned").

Dissenting Views of Acting Chairman Anne E. Brunsdale
High-Information Content Flat Panel Displays and
Subassemblies Thereof from Japan
Investigation No. 731-TA-469 (Final)
August 26, 1991

Based on the evidence gathered in this investigation, I dissent from the Commission's finding that the domestic industry producing high-information content flat panel displays and subassemblies thereof (FPDs) is materially injured by reason of dumped imports from Japan. I find two like products in this case, electroluminescent FPDs (ELs) and active matrix FPDs (AMs). The domestic industry producing ELs is not materially injured or threatened with material injury by reason of dumped imports from Japan and the domestic industry producing AMs is not materially retarded by reason of dumped imports from Japan.

Like Product

This investigation changed dramatically from its preliminary phase to its final phase. In the preliminary investigation the Commission examined whether there was a reasonable indication that imports of all FPDs from Japan materially injured a domestic industry. Imports of passive matrix and plasma FPDs made up well over 75 percent of the value of those imports in 1990.[1]

In its final determination, the Department of Commerce found that there were only three classes or kinds of merchandise

[1] Imports of ELs made up less than 5 percent and imports of AMs made up about 15 percent of imports of Japanese FPDs in 1990. See Report at Table 35.

subject to investigation: EL, AM, and plasma displays and that only ELs and AMs were dumped.[2] Commerce considered the two types of dumped displays as distinct like products and therefore calculated their dumping margins separately. As a result of Commerce's determination, the Commission's final investigation focused much more closely on the EL and AM technologies.

Perhaps the most important issue in this case is whether ELs and AMs are the same like product.[3] Petitioner argued that there should be one like product consisting of all FPDs. While there was not a consensus among respondents as to the exact definition of the like product, they all agreed that ELs and AMs should not be considered as one like product. The other like-product distinctions would not affect the final outcome of the case and therefore are essentially irrelevant.

As I have stated before, the most sensible criteria for establishing the like product is substitutability, considered both from the demand side and the supply side. The Commission's six to eight factor test to establish the like product can be thought of as a proxy for the more direct analysis of substitutability.[4] Looking at each factor in isolation or

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[2] Commerce determined that petitioners did not have standing to bring a case against passive matrix displays from Japan.

[3] The inclusion of plasma technology in the domestic like product does not prove to be important to the outcome of the case.

[4] For example, physical appearance, end uses, interchangeability, and customer perceptions are demand side factors, whereas common manufacturing facilities and production employees are supply side factors.

deciding the issue based on a majority of those factors, without some discussion of their relative importance to the particular case can lead to arbitrary or subjective decisions.

For example, in examining physical appearance, it can be argued that all FPDs look alike. After all, they are all screens. On the other hand, they are of different colors, and have different maximum screen sizes and luminescence. This information could be used to determine the like-product issue either way. Similarly, the fact that two products are sold to end users versus distributors is often used to justify a like-product decision.[5] I could give similar examples for most of the other traditional Commission criteria for like product.

In this case there are many distinctions between the two technologies. At present, AMs are the most promising technology for future growth and they are the only subject panels that are available with a full color display.[6] ELs are monochrome or have some gray scale. Monochrome AMs have a much lower power requirement than ELs and are generally brighter when backlit. ELs, on the other hand, are faster, less costly, have a larger maximum screen size, and are excellent for harsh environments.

While the two displays may be used in similar broad categories of products, i.e. computers, medical instruments, or avionics, that does not attest to their substitutability. After

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[5] In this case, almost all AMs and domestic ELs are sold to end users. Sales of imported ELs are split between end users and distributors.

[6] See Report at A-28.

all, no one would argue that CRTs, which are also used in these products, should be included in the like product. Furthermore, even within broad categories, such as avionics, the two screens have different applications and are not substitutable.[7]

Over 90 percent of U.S. consumption of AMs is for computer screens. In particular, the Apple MacIntosh laptop computers accounted for almost all the 1990 shipments of domestic and imported AMs.[8] In addition, overhead projectors can only use AMs. ELs, on the other hand, are used primarily for medical and control equipment. Less than ten percent of ELs were used in portable computers -- none in computers weighing less than 7 pounds.[9]

It is very tricky to make any price comparisons of FPDs because, with a few exceptions, they are custom made. The price depends largely on the requirements of the particular purchaser and the amount of R&D which must be done to fill the order. Domestic producers of AMs are still in the prototype stage, which means that their AMs are extremely expensive. Only Apple's order for imported AMs was large enough to result in economies of scale

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[7] In avionics, AMs are used for applications that require color. They have replaced CRTs, not another FPD technology.

[8] Apple argued that ELs could not be substituted for the AMs it purchased because of the power requirements. The EL display considered for use by Apple in its MacIntosh portable would require enormously more power than the AM it selected. See Report at B-76.

[9] See Report at Table 2.

and a lowering of the unit price of the imported product.[10] The average unit value of domestically produced AMs is substantially higher than the average unit value of domestically produced ELs.

On the supply side there is no substitutability between the two types of domestic FPDs. There is currently no domestic facility in which AMs are commercially produced, so obviously those manufacturers could not produce ELs. Similarly, producers of ELs would not be able to produce active matrix displays in their facilities. Even those Japanese producers that produce more than one technology manufacture them in separate facilities using different machinery.[11] I do not put much weight on the fact that both types of displays have similar channels of distribution, i.e. that they are sold to end users.[12]

Petitioner argued that the technologies should be considered as one like product because they are fluid and may become more similar in the future. While the manufacturers have similar technical aspirations, it is equally possible that their products will become more distinct, and capture the niches for which they are best suited. The Commission must deal with the record as it

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[10] While there is a general feeling that AMs are more expensive than ELs, that is not always the case. AMs that are monochrome and produced in large quantities may cost substantially less than other AMs. Prices of AMs imported from Japan varied considerably. See Report at A-74-75, Table 35.

[11] See Report at A-15, n.37.

[12] While both types of flat panel displays are sold to original equipment manufacturers, so are lots of other products -- CRTs, keyboards, semiconductors, etc. Using such a weak standard, we could include almost anything in the like product.

exists today.

Material Retardation and Material Injury by Reason of Dumped Imports

In assessing both material retardation and material injury, the Commission is required to evaluate all relevant economic factors within the context of conditions of competition that are distinctive to the domestic industry.[13] Specifically, we are instructed to consider in each case (I) the volume of imports of the merchandise which is the subject of the investigation, (II) the effect of those imports on prices in the United States for the like products, and (III) the impact of those imports on domestic producers of the like product.[14]

Active Matrix FPDs. The domestic industry in this case consists of two firms, petitioner OIS and Standish.[15] It is appropriate to consider material retardation in this case because there is no commercial production of AMs in the United States, and there is not even an existing facility at which AMs could be produced in large-scale commercial quantities.

The overwhelming majority of U.S. imports of AMs were sold

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[13] 19 U.S.C. Section 1677(7)(C)(iii)

[14] 19 U.S.C. Section 1677(7)(B)(i).

[15] Confidentiality precludes me from discussing Standish in this opinion. However, my decision about material retardation and all my other findings with respect to AMs are made considering the Standish operation.

to Apple for use in its MacIntosh portable computer by the Japanese firm Hosiden. Based on Hosiden's sale, the Commerce Department determined that all Japanese AMs were sold at 62.7 percent below their fair value from February to July 1990.[16] Therefore, the question of material retardation rests mainly on the analysis of whether the U.S. industry would be established if Hosiden's FPDs had been sold at a price that was 62.7 percent higher.[17] Would OIS have gotten the order from Apple? Would OIS have gotten the financing required to build a plant?

This is not the same as asking whether OIS would be better off if there was no Japanese industry, at all. Obviously, the existence of a strong established industry in Japan, with many firms actively participating, had an effect on U.S. producers and their ability to obtain financing. There must be some link, however, between the dumping and the failure of the domestic industry to become established.

Apple testified that it considered OIS at the initial stage of its three-part vendor evaluation when deciding which FPD to use in its MacIntosh portable.[18] It found that OIS had "zero high volume manufacturing capability, little customer support experience, zero manufacturing flexibility, zero mass production

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[16] Under the statute, we must assume that all the Japanese producers would have dumped AMs into the U.S. market.

[17] Of course, as directed by the statute I have not limited my analysis to the Apple sale. However, confidentiality precludes my discussing any of the smaller sales in detail.

[18] See Transcript at 121-123.

experience and delivery schedule."[19] It eliminated OIS at the first stage of consideration. While confidentiality precludes me from discussing the details of the firms' negotiations, I am satisfied that it would have been extremely risky and costly in terms of both time and money for Apple to buy its AMs from OIS.[20]

At its first stage of consideration, Apple did not discuss price. Only at the final stage did Apple choose Hosiden and then settle on a price. Other computer manufacturers describe similar approaches in choosing a supplier for a new, technologically sophisticated product.

There is no evidence that Apple would have bought AMs from OIS under any circumstances. It simply did not believe that the U.S. firm could deliver the product they needed. A firm like Apple has a lot riding on its good reputation. I find it completely credible that Apple would not go to market with a product it believed was inferior. Furthermore, even if the Japanese product had been sold at the "fair price," it may have still been substantially cheaper than the domestic AM.

Apple is not the only purchaser of AMs that rejected OIS for reasons other than price. In fact, not one of OIS's lost sales or lost revenue allegations was confirmed.[21] One firm rejected OIS for not having the necessary production facilities or

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[19] See Hearing Transcript at 126.

[20] My conclusion is based in part on evidence in the Report at A-73 and Appendix H.

[21] See Report A-98 - A-103.

planning.[22] Another reported that the U.S. firms would not even quote prices or offer samples.[23] Still another purchaser from an avionics firm rejected a domestic firm because it was not considered as advanced as its Japanese competition.[24]

The testimony and documents submitted show that U.S. manufacturers of AMs did not lose any sales to Japanese firms because of price. Rather, they lost out simply because it is very difficult for a firm that has no production facilities and inadequate financing to compete with a group of established, technologically advanced, and adequately financed companies. There is no link between the dumping and the material retardation. I conclude that the U.S. producers of active matrix FPDs are not materially retarded by reason of dumped imports from Japan.

Electroluminescent Flat Panel Displays

In determining the effect of dumped imports on the domestic EL industry, two factors are particularly important--the share of the domestic industry accounted for by the unfairly traded imports and the size of the dumping margin.[25] The greater the

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[22] OIS quoted this particular firm a price for one AM that was much higher than the price quoted by the Japanese competitor. See Report at A-102.

[23] See Report at A-102.

[24] See Report at A-87.

[25] The domestic EL industry consists of two firms, The Cherry Corporation, and Planar Systems, Inc.

share of unfairly traded imports, the more likely it is that any change in the price of those imports will alter demand for domestic products and fairly traded imports. The dumping margin indicates the difference between the dumped price and the price at "fair value."

In the case of ELs, the level of Japanese import penetration is quite low and has fallen over the period of investigation. The share of "fairly traded" imports is substantial, and has also fallen over the period of investigation. U.S. producers, on the other hand, dominate the market and have gained market share during the period of investigation.

The dumping margin was determined to be 7 percent. This means that if Sharp, the only Japanese producer of ELs, was selling at "fair value," the price of its ELs would be 7 percent higher.

In order to determine the magnitude of the injury resulting from the dumping, I use economic analysis to estimate what prices and output of the domestic like product would have been absent the dumping. Then I evaluate whether the decline in prices and output caused by the dumping constitutes material injury. I do this taking into account the existing condition of the domestic industry.

Drawing a conclusion as to the substitutability of the domestic like product and the dumped import is one of the most important determinants of causation. The greater the substitutability between the domestic like product and the

subject imports, the more likely that even a small price change will induce customers to switch suppliers, and therefore the greater the impact of import sales on sales of the domestic like product, all other things being equal.

There is clearly some substitutability between U.S. and Japanese ELs. The Petitioner did not specifically address the substitutability of the various ELs, and instead stressed the substitutability of all domestic and imported FPDs. Respondents and Commission Staff described the products as moderately close substitutes.[26] Staff stressed the importance of the supplier's commitment, experience, and financial condition in the purchaser's decision of which EL to buy.

These products are difficult to compare directly, since they are often custom made to different specifications. Based on the general agreement in the record, however, the products appear to be reasonably good substitutes. Even if I gave Petitioner the benefit of the doubt and assumed the products were close substitutes, my determination would not change.

Another important factor I examine is the relationship between the change in the price of a product and the resulting change in the quantity demanded of that product. If a small decline in the price of a product leads to a large increase in purchases, subject imports would attract additional sales rather than taking sales away from domestic producers. Thus, the effect

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[26] Respondents suggested an elasticity of substitution of between 2 and 3.5, while staff suggested an elastic of substitution between 2 and 4.

of dumped imports on the domestic industry would be mitigated.

Demand for ELs is derived from the demand for medical instruments, control equipment, and specialized military equipment. CRTs can be substituted for ELs in only a limited number of applications. Respondents stressed the substitutability of ELs and CRTs in evaluating price responsiveness.[27] Giving petitioner the benefit of the doubt, I assume that demand would not respond much to price changes.

There seems to be significant excess capacity in the market. Therefore, dumped imports are likely to have had a greater effect of the volume of domestic sales than on domestic prices. Given the small market share of the dumped imports, the relatively low dumping margin, and the substantial presence of fairly traded imports, the dumped imports were not likely to have had a substantial effect on the volume of domestic sales. I conclude that the domestic EL industry is not injured by reason of dumped imports from Japan.

Threat of Material Injury

There is no evidence to support a determination that the domestic EL industry is threatened with material injury by reason of imports of ELs. The level of imports is small and has been falling, there has not been a substantial increase in inventories, and capacity utilization of the Japanese EL

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[27] Petitioner testified that an elasticity estimate was not appropriate in this case, but when pressed described demand as inelastic. See Hearing Transcript at 88-89.

producers has actually increased.[28] Any suggestion that the domestic EL industry is threatened with material injury would have to be based on mere conjecture or supposition.

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[28] See Report, Tables 31 and 34.

INFORMATION OBTAINED IN THE INVESTIGATION

INTRODUCTION

Following a preliminary determination by the U.S. Department of Commerce that imports of high-information content flat panel displays and subassemblies thereof (HIC FPDs)[1] from Japan are being, or are likely to be, sold in the United States at less than fair value (LTFV) (56 F.R. 7008, February 21, 1991),[2] the U.S. International Trade Commission, effective February 21, 1991, instituted investigation No. 731-TA-469 (Final) under section 735(b) of the Tariff Act of 1930 (19 U.S.C. § 1673d(b)) 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 imports of such merchandise. Notice of the institution of the Commission's final investigation and establishment of a schedule for its conduct, including a public hearing to be held in connection with the investigation, 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 on March 27, 1991 (56 F.R. 12741). The Commission's hearing was held in Washington, DC, on July 11, 1991.[3]

Commerce's final LTFV determinations were made on July 8, 1991.[4] In Commerce's final determinations, the products covered by the scope of its investigations were found to constitute three classes or kinds of merchandise: active matrix liquid crystal high information content flat panel displays and display glass therefor ("active matrix LCDs"); (2) gas plasma high information content flat panel displays and display glass therefor ("plasma displays"); and (3) electroluminescent high information content flat panel displays and display glass therefor ("EL displays").[5,6] The applicable statute directs that

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[1] In Commerce's notice of initiation and in its preliminary determination, high-information content flat panel displays were defined as large-area, matrix-addressed displays, no greater than four inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Included were monochromatic, limited color, and full color displays. Displays were defined as using, but were not limited to, the following technologies: liquid crystal (passive matrix or active matrix), plasma, and electroluminescence. The following merchandise was excluded: segmented flat panel displays, matrix-addressed flat panel displays with less than 120,000 addressable pixels, and cathode ray tubes.

In its preliminary determination, Commerce defined subassemblies of a high-information content flat panel display as processed glass substrates, whether or not integrated with additional components.

[2] Copies of Federal Register notices cited in this report are presented in app. A.

[3] A list of witnesses appearing at the Commission's hearing is presented in app. B.

[4] On March 11, 1991, at the request of Toshiba Corporation, a respondent in the antidumping investigation, Commerce postponed its final determination as to whether sales of HIC FPDs from Japan have been made at LTFV from April 2, 1991 to July 8, 1991. (56 F.R. 10236).

[5] Active matrix LCDs, plasma displays, and EL displays are large-area, matrix-addressed displays, no greater than four inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or

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the Commission make its final injury determination within 45 days after the receipt of the final determinations by Commerce, or in this investigation by August 26, 1991.

BACKGROUND

This investigation results from a petition filed on July 18, 1990, by counsel for the Advanced Display Manufacturers of America (Washington, DC) and its individual member companies; Planar Systems, Inc.; Plasmaco, Inc.; OIS Optical Imaging Systems, Inc.; The Cherry Corporation; Electro Plasma;

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[5] (...continued)
incomplete, assembled or unassembled. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video. Active matrix LCDs utilize a thin-film transistor array to activate liquid crystal at individual pixel locations. Plasma displays incorporate a matrix of electrodes that, when activated, excite a gaseous compound, typically neon and argon, causing it to emit light. EL displays incorporate a matrix of electrodes that, when activated, apply an electrical current to a solid compound of electroluminescent material (e.g., zinc sulfide) causing it to emit light.

In its final determinations, Commerce clarified the definition of subassemblies or "display glass of high information content flat panel displays." Such display glass is defined as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage (i.e., liquid crystal, gas plasma, and phosphor) and contact pads for interconnecting drive electronics. Included in the scope of Commerce's final determinations are active matrix LCD display glass, whether or not integrated with additional components, exclusively dedicated and designed for use in active matrix LCDs; plasma display glass, whether or not integrated with additional components, exclusively dedicated and designed for use in plasma displays; and EL display glass, whether or not integrated with additional components, exclusively dedicated and designed for use in EL displays.

The following merchandise is excluded from the scope of Commerce's investigations: passive matrix liquid crystal high information content flat panel displays and display glass therefor ("passive matrix LCDs"), segmented flat panel displays, matrix addressed flat panel displays with less than 120,000 pixels, and cathode ray tubes. Commerce, in its final determination, found that petitioners are not interested parties and do not have standing with respect to an investigation of passive matrix LCDs and, accordingly, rescinded its initiation of its investigation of passive matrix LCDs and dismissed that part of the petition upon which the rescinded initiation had been based.

All types of HIC FPDs described above are currently classified in the following provisions of the Harmonized Tariff Schedule of the United States (HTS): 8543, 8803, 9013, 9014, 9017.90.00, 9018, 9022, 9026, 9027, 9030, 9031, 8471.92.30, 8471.92.40, 8473.10.00, 8473.21.00, 8473.30.40, 8442.40.00, 8466, 8517.90.00, 8528.10.80, 8529.90.00, 8531.20.00, 8531.90.00, and 8541.

[6] Commerce's final LTFV determination with respect to plasma displays was negative; therefore, the Commission is only authorized to make an injury determination with respect to imports of active matrix LCDs and EL displays from Japan.

Photonics Technology, Inc.; and Magnascreen Corporation, alleging that an industry in the United States is being materially injured, is threatened with further material injury, or is materially retarded from being established by reason of imports from Japan of HIC FPDs. In response to that petition the Commission instituted investigation No. 731-TA-469 (Preliminary) under section 733(a) of the Tariff Act of 1930 and, on September 12, 1990, determined that there was a reasonable indication of material injury (55 F.R. 37577).

The Commission has conducted no previous investigations on the subject product.[7]

THE PRODUCT

Product Description

The imported products subject to this investigation are active matrix LCDs and EL displays. The subject displays, along with passive matrix LCDs and plasma displays, show text, graphics, or video when integrated into such end-user systems as laptop and portable computers; aerospace, medical and office equipment; and instrumentation for the military.[8] All HIC FPDs are large-area, matrix-addressed displays, no greater than 4 inches in depth, with a picture element ("pixel") count of 120,000 or greater.[9] HIC FPDs may be monochromatic, limited color, or full color. They may also include such options as backlights, interface cards, and/or touch switches. The subassembly included within the scope of the investigation (display glass) is defined by Commerce as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage and contact pads for interconnecting drive electronics. According to Commerce's definition, such substrates may also be integrated with additional components.

HIC FPDs are technologically sophisticated electronic displays that convert information received as electrical signals from an end-user system into visible images. Displays are subdivided into rows and columns of dot-like pixels which are connected to the edge of the display by grids of very fine electrical conductors. For purposes of this investigation, flat panel displays have "high-information content" if they contain 120,000 or more pixels. Thus, their definition is a function of both pixel density and screen size. That is, a small display having the same pixel density as a large one may not be "high-information content," while the large one may be. Although displays have been built with a diagonal measurement of a meter or more for

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[7] However, liquid crystal display (LCD) television receivers were the subject of a section 751(b) review investigation instituted by the Commission effective August 20, 1987 (inv. No. 751-TA-14). The flat panel displays currently under investigation include LCDs; however, the subject displays are not at present used in LCD television receivers (which use flat panel displays with fewer than 120,000 pixels).

[8] The subject displays (active matrix LCDs and EL displays), together with passive matrix LCDs and plasma displays, are collectively referred to in this report as HIC FPDs.

[9] There are no known HIC FPDs that are not matrix addressed or that are greater than 4 inches in depth.

special applications, the most common are less than 10 inches because of current production technology limitations. However, HIC FPDs are all capable of displaying 25 lines of 80 characters.[10] At this time, almost all HIC FPDs in the U.S. market are monochrome. Monochrome displays may be classified as nongray scale or gray scale.[11] Limited color displays are available and full color displays will be sold commercially in increasing quantities in the near future.

COMPONENTS OF HIC FPDs

Broadly speaking, HIC FPDs consist of display glass (i.e., the display glass assembly which contains the pixels and row-and-column electrodes) and associated electronic systems that drive the electrodes on the display glass and interpret the incoming information-bearing signals. The petition stated that "Common attributes that exist in FPDs" include the display glass, drive electronics (or "drivers"), control electronics, mechanical package, and power supply.[12,13] However, what is sold to a purchaser as a "complete" HIC FPD may also include additional electronic packaging which interconnects the electronic components of the HIC FPD and the end-user system and (for LCDs) such items as backlights. As pointed out by Dr. Elliott Schlam in his address

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[10] Certain applications, such as text and graphics displays for computers, require resolutions in common formats, such as 640 x 200 pixels (CGA resolution), 640 x 400 pixels (EGA resolution), or 640 x 480 pixels (VGA resolution), all of which are high-information content (i.e., 120,000 pixels or more). HIC FPDs for each of the standard display formats are virtually identical in size.

[11] In gray-scale displays, the intensity of each pixel varies, producing "shades of gray" which permit the display of photograph-like images. (In nongray-scale displays, the pixels are simply on or off and can only be used to display text or graphics.) Gray-scale displays are produced with various "levels" of gray scale. Currently, products with up to 16 levels are available.

[12] Petition, pp 8-9.

[13] The key attributes may be defined as follows:

(1) Display glass--a processed glass substrate that typically incorporates patterned row and column electrodes orthogonal to each other, a material that reacts to a change in voltage (e.g., liquid crystal, gas, thin film phosphor, powder phosphor), and contact pads for interconnecting the drive electronics to each row and column electrode.

(2) Drive electronics--integrated circuits which provide voltages to drive the row and column electrodes.

(3) Control electronics--integrated circuits that decode and interpret the signals sent by the end-user system and transmit the signals to the drive electronics.

(4) Mechanical package--the frame which mounts the printed circuit boards for the drive and control electronics to the display glass. The mechanical package also adds strength and protection to the display glass and provides the means whereby the user mounts the display into the end-user system.

(5) Power supply--an electronic circuit that provides appropriate voltages for the HIC flat panel display. Many of the voltages required by the displays are not standard and require customized power supplies.

to the Society for Information Display (May 10, 1991), displays are becoming more sophisticated and are forming a more integral portion of the end-user system. Display manufacturers are now incorporating or adding semiconductor products or "smart" electronics to the display to make it more versatile.[14]

HIC FPDs may also be sold by display glass manufacturers without key components, generally the control electronics or, less frequently, without the mechanical package. Power supplies are often purchased separately by end users. There are also *** amounts of display glass without any electronics sold separately by U.S. producers. Although the display glass is the primary and distinguishing component of HIC FPDs, the electronics comprise a significant portion of the cost of a display and determine some of its performance characteristics, including monochromatic color and extent of illumination.[15,16]

TYPES OF HIC FPDs

HIC FPDs are classified by the technology used to produce the display glass. The most common display technologies, and the ones for which data were collected by the Commission, are liquid crystal displays (LCDs), plasma displays, and electroluminescent (EL) displays.[17,18] There are, however,

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[14] "Overview of flat panel displays," Society for Information Display Seminar Lecture Notes, May 10, 1991. Dr. Schlam, an internationally recognized expert in display technology, is a consultant to the electronic information industry.

[15] Excluding the backlight assembly (which is a significant component in terms of cost), display glass accounts for approximately 50 percent of the value of a "complete" HIC FPD. The electronics and mechanical package account for the remaining 50 percent. (Staff conversation with ***, Mar. 12, 1990). Additional information is presented in the section of this report on "Cost of manufacturing."

[16] Display glass, as defined by Commerce in its final determinations, may or may not be "integrated with additional components." Further, "high information content flat panel displays," of any technology, may be "complete or incomplete, assembled or unassembled." Under these definitions, display glass can be viewed as consisting of products which range from display glass without the drivers or other components to completed HIC FPDs (which, in essence, are display glass that has been "integrated with additional components"). Similarly, the distinction between "display glass" and an "incomplete" HIC FPD is not clear. Because of the lack of a clear dividing line between "display glass" and "high-information content flat panel displays," Commission staff is unable to present comprehensive data separately on "display glass" in this final report.

[17] There are a number of other flat panel display technologies that are being researched or that are in the early stages of development. These include such technologies as electrochromic, electrophoretic, electro-optic-ceramic, electromechanical, field emission spun cathode, etc. One U.S. researcher, Tektronix, has announced an entirely new flat panel display technology called plasma-addressed liquid crystal displays or PALC. (Petitioners' prehearing brief, p. 17.)

further sub-technologies within each of these types. Flat panel display technology can also be more broadly categorized as emissive or non-emissive. Non-emissive displays are those which do not emit light and cannot be viewed in the dark. In emissive displays, each pixel produces light when electrically activated and is therefore visible without natural or ambient light or a backlight. Because emissive displays generate light, they typically require and consume more electricity than do non-emissive panels and thus require more power and are heavier. Plasma and EL displays are emissive technologies; LCDs (whether passive or active matrix) are non-emissive. Diagrams showing each of the key technologies are presented in figure 1.

LCDs

LCD technology is currently being applied to HIC FPDs in two different ways: passive matrix and active matrix. In both technologies, liquid crystals are sandwiched between two sheets of glass, called substrates, where the liquid crystals, in essence, act as optical shutters, which either block or allow polarized light to pass through. In passive matrix LCD technology, the pixel positions are energized by voltages applied via intersecting row and column drivers, which causes the liquid crystal to twist, allowing light to pass through. The light may be a reflection of ambient light or light produced from a backlight or sidelight incorporated into the display.[19] However, as passive matrix LCDs become larger, the contrast of the display decreases and the viewing angle becomes smaller. Also, the liquid crystal used in passive LCDs has a slow response time since the material requires a relatively long period to become fully activated and deactivated. These disadvantages can be overcome, however, by what is known as active matrix technology. Active matrix LCDs employ state-of-the-art semiconductor technology where an active element, usually a thin-film transistor (hence the name thin-film transistor or TFT-LCD), is imbedded in the glass substrate at each pixel cell. The transistor acts as a local switch that, when on, causes the liquid crystal to twist, permitting light to pass through.[20]

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[18] (...continued)

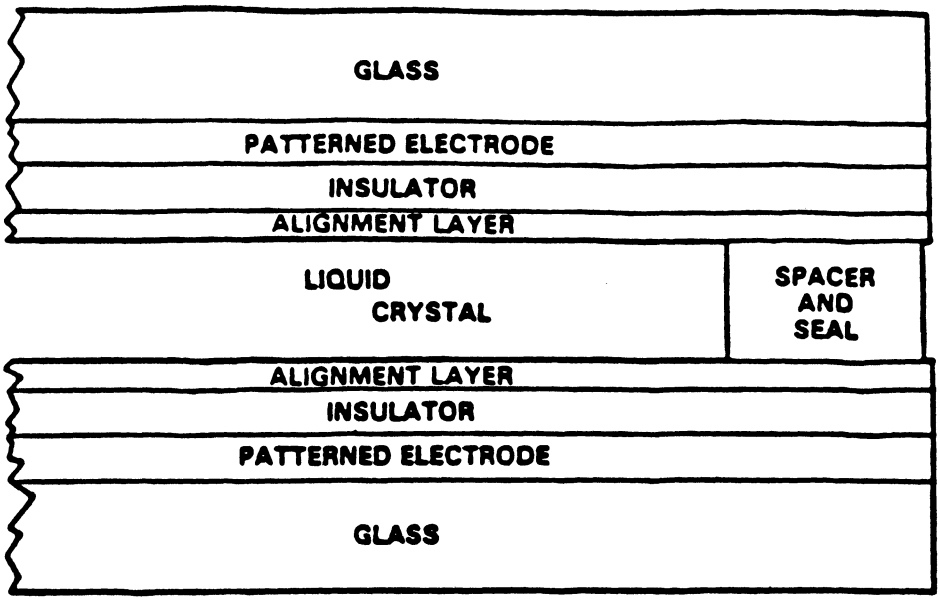
[18] Respondents to Commission questionnaires did not report the manufacture or importation into the United States of HIC FPD technologies other than passive matrix LCDs, active matrix LCDs, plasma displays, and EL displays.

[19] There are a number of variations on the design and chemistry of passive matrix LCDs that affect the performance of the technology. Variations generally add to the complexity of the LCD construction and include twisted nematic (TN), supertwisted nematic (STN), double supertwisted nematic (DSTN) and, most recently, film supertwisted (TSTN) technologies. TN-LCDs were first mass produced in 1975, STN-LCDs in 1986, DSTN-LCDs in 1987, and TSTN-LCDs in late 1989.

[20] Pixels are activated in both passive matrix and active matrix LCDs by a signal that sequentially scans the display's columns and rows. In a passive matrix LCD, each pixel begins deactivating as soon as that signal stops, leading to the relatively inferior contrast that is characteristic of that display type. In an active matrix LCD, the transistor located at each pixel continues to stimulate the liquid crystal after the signal has passed by during the scanning process, leading to the improved contrast quality.

Figure 1.--Diagrams of HIC FPDs

PASSIVE MATRIX LCD



ACTIVE MATRIX LCD (TFT TYPE)

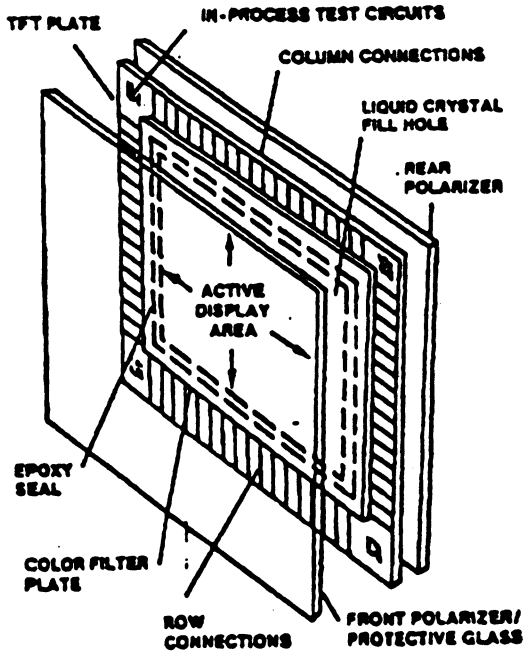
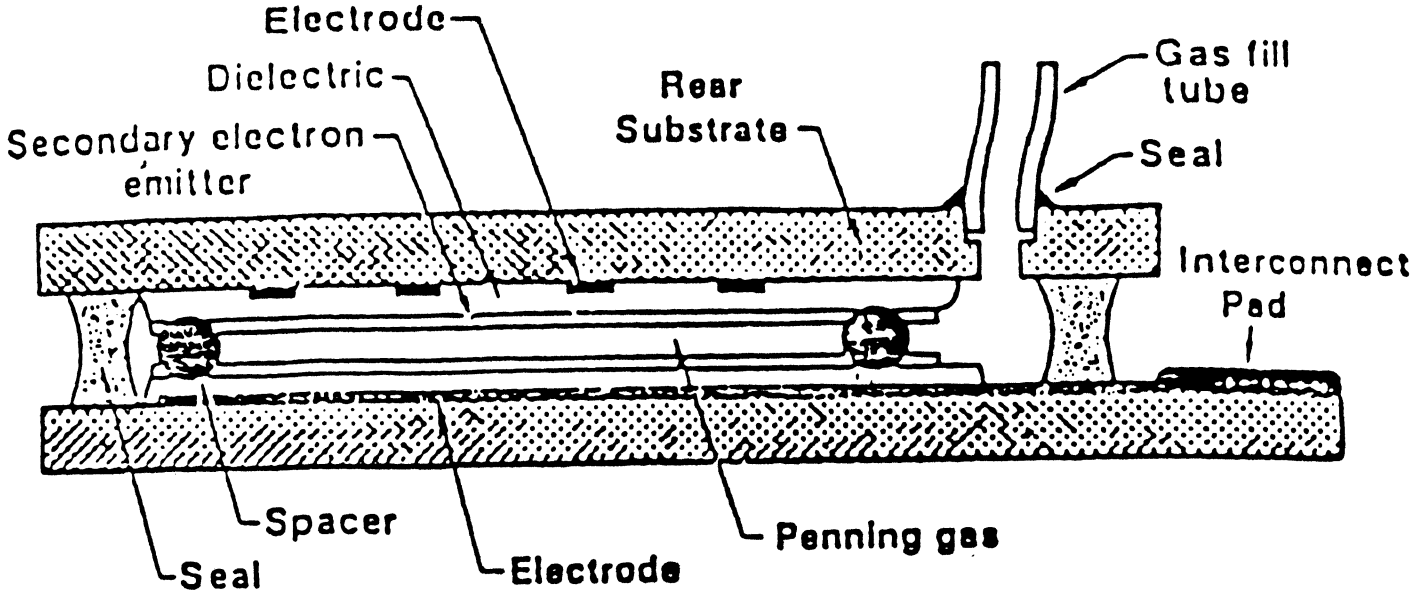


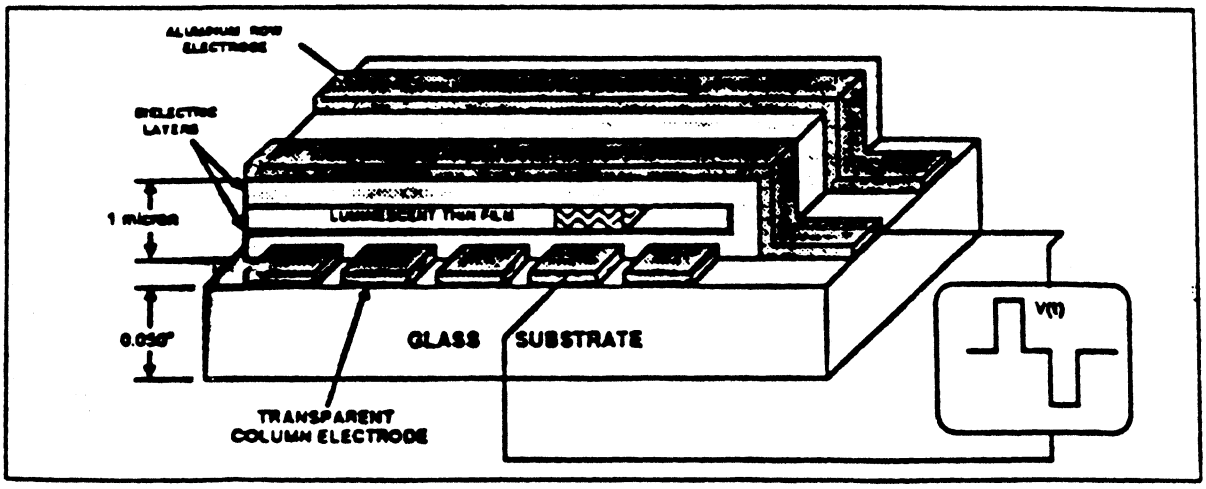
Figure is continued on the following page.

Figure 1.--Diagrams of HIC FPDs (Continued)

PLASMA DISPLAY (AC TYPE)



EL DISPLAY (AC THIN FILM TYPE)



Source: Compaq Computer Corporation submission to Commerce.

Plasma Displays

In plasma displays, the pixels are minute cells of a compound gas sandwiched between two polished glass substrates which give off a red-orange glow when ionized by direct current (DC). There are also more complex variations of plasma displays which involve the use of alternating current (AC) and AC/DC combinations to improve performance and create displays with memory, that is, not requiring refreshing.

EL Displays

EL displays use light-emitting pixels constructed of a solid material on a single substrate. When excited by electricity from the row and column electrodes, the solid material gives off visible light of a color determined by the chemistry of the material used. EL displays are differentiated by whether they use AC thin film (ACTFEL) or DC powder technologies.

KEY HIC FPD TECHNOLOGY ISSUES: COLOR AND POWER

Color

Industry analysts generally agree that the ability to produce high-resolution color at marketable prices is essential for the future wide-spread marketability of any technology and, in fact, often characterize the technologies as being in a competitive race toward this goal. (Color cathode ray tubes (CRTs) now account for about 85 percent of CRT shipments; color will be essential for high-definition television (HDTV) applications.) Only color LCDs are currently available for purchase in commercial quantities.[21,22] However, there have been recent advances in developing color for plasma displays, and both EL technologies--AC thin film and DC powder--"are reporting good progress on color materials, but practical structures and materials with

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[21] In Focus Systems, Inc., a U.S. firm, introduced its "true-color" STN-LCD (passive matrix) projection panel in late 1989. In March 1990, Sharp Electronics and Hitachi America, Inc. publicly committed to the delivery of color TFT-LCDs (active matrix) in the U.S. market. Other color displays are expected from IBM/Toshiba, NEC, and Epson in late 1991. "Color panels coming," Electronic Engineering Times, Mar. 12, 1990. (However, due to production difficulties, there has been a shortfall between announced availability and actual delivery of active matrix LCDs by Japanese suppliers. "Big lag seen on active-matrix LCDs," Electronic News, June 3, 1991.")

[22] There are two technologies for developing color in LCDs--additive and subtractive. In additive-color LCDs, each pixel is divided into three or four subpixels and is coated with a primary color filter making it possible to produce a large range of colors at each pixel location. This technology is most frequently applied in TFT-LCDs, although it can be in passive matrix LCDs. The color TFT-LCD is much more complex and difficult to produce than monochrome TFT-LCDs because of the addition of the color filters and the resulting threefold or fourfold increase in the number of cells and transistors. Subtractive technology (as recently developed by In Focus) involves using three monochrome passive matrix displays arranged so as to obtain one color display.

good life and efficiencies in all colors are still needed." According to Nick Baran in the February 1991 issue of BYTE, "The manufacturing problems associated with color TFT technology ... may keep prices high enough and quantities low enough to create an opportunity for other display technologies."

Power Requirements

Because emissive displays, that is, plasma and EL displays, generate light, they consume more electricity than do non-emissive displays and thus (theoretically, but not necessarily for every specific application) require more power and are heavier. (Required watts per hour largely determine whether a display can be used in a battery-operated portable product and, if so, also dictate operating time before battery recharging. Furthermore, the number of watts required directly determines battery weight which, in turn, is the most critical determinant of the weight of the end-user product.)[23] According to respondents, monochrome LCD technology is in the 1-to-4 watt range; plasma and EL displays require large power supply and converter systems capable of producing 8 to 15 watts. (By comparison, CRTs require about 30 watts.) It is clear that LCDs--whether passive matrix or active matrix--without backlights have an advantage over emissive technologies with reference to power consumption.[24] However, liquid crystal displays often require a backlight, which consumes added power and weight.[25] Monochrome active matrix technology, even when backlit, still consumes less power than do emissive technologies--20 to 30 percent less according to Peter Pleshko, a senior consultant for IBM, in an article entitled "Flat-panel displays for laptop computers," Information Display, March 1989.[26,27] However, due to the addition

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[23] A key question today for end users producing notebook computers is whether displays can be built into a 6-pound system (1-1/2 pounds of which is the weight of the battery). The accepted minimum battery life for a portable computer is now 3 hours, up from 2 hours. The optimum goal is 8 hours. (Staff conversation with ***, Feb. 12, 1991.) Typically, only passive matrix LCDs displays have been used in portable computers with a battery power supply, although plasma displays can be used in some heavier portable models (e.g., Micro Express 5300, TOPPCs LT5300, Fora LP-386sx 50, Compaq Portable Model 20, Compaq Portable Model 40). (Japanese respondents' prehearing brief, app. 6.)

[24] Petitioners agree. (Hearing transcript, p. 99.)

[25] Nick Baran states, "Most LCDs include a backlighting mechanism to provide readability in most lighting conditions. Backlighting, however, is the main source of power consumption in LCDs. Reflective displays are acceptable in black-and-white implementations like the Mac Portable, but backlighting is a must in color LCD applications." BYTE, February 1991.

[26] Petitioners, in their testimony, stated that backlit monochrome active matrix LCDs required "less power ... but not by much" than plasma displays leading to a "slight advantage" (transcript p. 77). Similarly, there is a "small advantage" over an EL display even when the LCD backlight is "strong." (The backlights on LCDs can be adjusted by the user for varying intensities and thus power consumption.) Petitioners noted that using a low-intensity backlight gives monochrome LCDs "an advantage." (Transcript, pp. 72-73.)

of the color filters, color active matrix displays require greater power than do monochrome LCDs. In fact, according to M. Robert Miller of the Army's Technology and Devices Laboratory, color active matrix LCDs consume more power than do plasma and EL displays.[28] And, although not yet available, a color EL display will not require more power than a monochrome EL display.[29]

Manufacturing

MANUFACTURING PROCESSES

The manufacturing and supply of HIC FPDs are influenced by two factors: (1) current and anticipated future technology and (2) availability of capacity and experience in commercial manufacturing.[30,31] The design (and manufacture) of a HIC FPD is highly complex. Within each technology, and indeed often separately for each firm, different technological concepts are designed and manufacturing techniques developed to solve such key HIC FPD problems as the need for color. The development and implementation of the manufacturing

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[27] (...continued)

[27] Respondents comment that "claims that some plasma panels may now approach the same power requirements as passive LCD technologies with backlights are based on unrealistic assumptions. ... (R)eported power consumption for these "advanced" plasma displays generally is based on low power required for some modes of operation, such as displaying limited text. ... Extended battery operation and reduced power supply (also) can be achieved in plasma and EL panels by severely lowering the display brightness, but this obviously diminishes the attractiveness and usefulness of the display." Postconference brief submitted by Japanese manufacturers, pp. 14-15, and "Summary of oral presentation of Richard Knox, Compaq Computer Corporation before the U.S. Department of Commerce on September 19, 1990."

Standard DOS applications require 25 percent "pixel use;" full-screen applications such as Windows utilize 50 percent of the pixels. In LCD technology, the power required is not correlated with numbers of pixels lit. In contrast, in emissive technologies, the power required increases with the number of pixels lit. (Staff conversation with ***, July 25, 1991.)

[28] "Army's display technology emerging to eclipse HDTV," Signal, August 1990.

[29] Testimony of James Hurd, CEO and president of Planar. (Transcript, p. 74.)

[30] Technologies have continued to evolve and become available during the period of investigation. According to the response by U.S. OEM computer manufacturers to the Commission's "like product" questionnaire in the preliminary investigation, the following technologies were available for purchase in the U.S. marketplace by January 1987: TN-LCD, STN-LCD, AC/DC plasma, DC plasma, and AC thin film EL. During the period of investigation, new technologies became available: DSTN-LCD (January 1988), TFT-LCD monochrome (January 1988), TFT-LCD color (April 1989), film STN-LCD (second quarter 1989), and NTN-LCD (March 1990). Research and development efforts continue for each of the major technologies (passive matrix LCDs, active matrix LCDs, plasma displays, and EL displays).

[31] A July 1990 Congressional Budget Office study states, "Given the difficulty that producers of flat-panel displays experience in scaling up to full production, manufacturing experience is likely to be the leading driver of technology."

process (including the design of the equipment) to produce HIC FPDs with acceptable manufacturing yields are sometimes characterized as a greater challenge than the development of the actual HIC FPD technology. (Research and development models of a HIC FPD are generally handbuilt.) Although research in flat panel display technology has been underway for over 20 years, it is only since the early to mid-1980s that applications for wide-scale commercial use have been developed. Most of the development work was pioneered in the United States or Europe;[32] however, it has generally been applied first in Japan.[33,34] Substantial capital investment is required to build manufacturing plants for HIC FPDs.[35]

The production technology for HIC FPDs is principally derived from the processes used to manufacture solid-state integrated circuits and, in fact, a HIC glass substrate (most specifically for active matrix LCDs) can be characterized as being a single, large integrated circuit.[36] The production processes for HIC FPDs can generally be divided into two major parts: (1) display glass production and (2) electronics assembly and testing.

Glass substrates are the building blocks for the display glass assembly or "sandwich." The glass substrates are either purchased by HIC FPD manufacturers as raw or coated glass from precision raw glass producers or purchased from glass finishers. Electrical conductors, insulators, ribs, spacers, and the rest, are built on the substrate to form one half of the glass envelope, which is then filled with either liquid crystal (for LCDs) or

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[32] The petitioners' postconference brief points out that U.S. firms continue to hold key patents on the technology (p. 49).

[33] "The early Japanese domination of markets for wristwatch-sized LCDs and small television receivers established what appears to be an unshakeable lead. (The low end of the market has been taken over by Taiwan, Hong Kong, and other production sites, but the Japanese still have a firm grip on the display market for technology-intensive LCDs)." "Manufacturing hurdles challenge large-LCD developers," IEEE Spectrum, September 1989.

[34] "The strong demand for portable TVs in the Asian markets has spurred TFT technology and helped justify the significant investment dollars required to produce products." "Market analysis: color TFT-LCDs," Information Display, October 1989.

[35] ***, "The startup capital required for a high volume (active matrix) LCD manufacturing plant is in the area of $150 million. Moreover, approximately 5 years is required to raise product yields to the point where production becomes cost effective. The small size of most U.S. firms makes it virtually impossible for them to raise such capital on their own." (However, the startup capital for a passive matrix LCD facility is much less.)

[36] There are, however, important differences between manufacturing HIC FPDs and integrated circuits. The output of a HIC FPD production line is a single substrate; in contrast, the output of an integrated circuit production line is a substrate or wafer that contains multiple integrated circuits which are divided and sold separately. In a HIC glass substrate each pixel or transistor is interconnected and must be operating; the entire glass substrate is scrapped if several are defective. (In contrast, when manufacturing integrated circuits, defective chips can be discarded and the remaining ones encapsulated and sold.) The scrapping of defective substrates reduces the "manufacturing yield" and is one of the more difficult and costly manufacturing problems to solve.

neon gas (for plasma displays). (In contrast, in EL displays a thin film of phosphorescent material and all associated electrodes are placed on a single glass substrate.)

The display glass assembly for the various HIC FPD technologies is generally manufactured using conceptually similar but technologically distinct manufacturing processes in separate production facilities.[37] Although there are several generic manufacturing steps for all types of displays (i.e., glass cleaning, assembly, aging, and testing) that presumably could be accomplished in a common facility, the technology involved and equipment required for the etching or printing of a pattern of electrode lines, electrode formation, material filling, and sealing processes are completely different and in no way interchangeable.[38] In the later stages of production, liquid crystal technology is used for LCDs, vacuum technology is used for plasma displays, and thin-film technology (like that used in the manufacture of solid-state integrated circuits) is used for EL displays. All HIC FPDs are produced in a clean room environment (although the specific class or amount of a specific class of clean room required may differ).[39]

Once the display glass is completely sealed, the drive and control electronics are attached. The drivers can be integrated in the display glass ("chips-on-glass technology") or mounted by contact pads, or mounted on a cable or onto a circuit board. Although the actual attachment is relatively simple, the number of drivers usually increases arithmetically for each pixel added, adding to the cost of manufacture and leading to new technological problems with larger sized displays. Figure 2 depicts the manufacturing steps for the display glass and drivers for each of the technologies. Attachment of the control electronics is relatively simple and, as noted earlier, is often performed by the end user of the display who separately purchases (and sometimes designs) the control electronics.

COST OF MANUFACTURING

The cost of manufacturing HIC FPDs is high relative to other display devices (notably CRTs) and still forms a barrier to the wider use of the product.[40] Manufacturing cost is most directly related to the number of manufacturing steps (the number of which provides an idea of the relative complexity of the design), the cost of materials, and the manufacturing yield. (The manufacturing yield can be defined as the number of finished displays

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[37] No domestic manufacturer of HIC FPDs produces more than one technology type. Japanese manufacturers that do produce multiple technologies manufacture them in completely separate production facilities using different machinery. (OEM end users postconference brief, p. 19.)

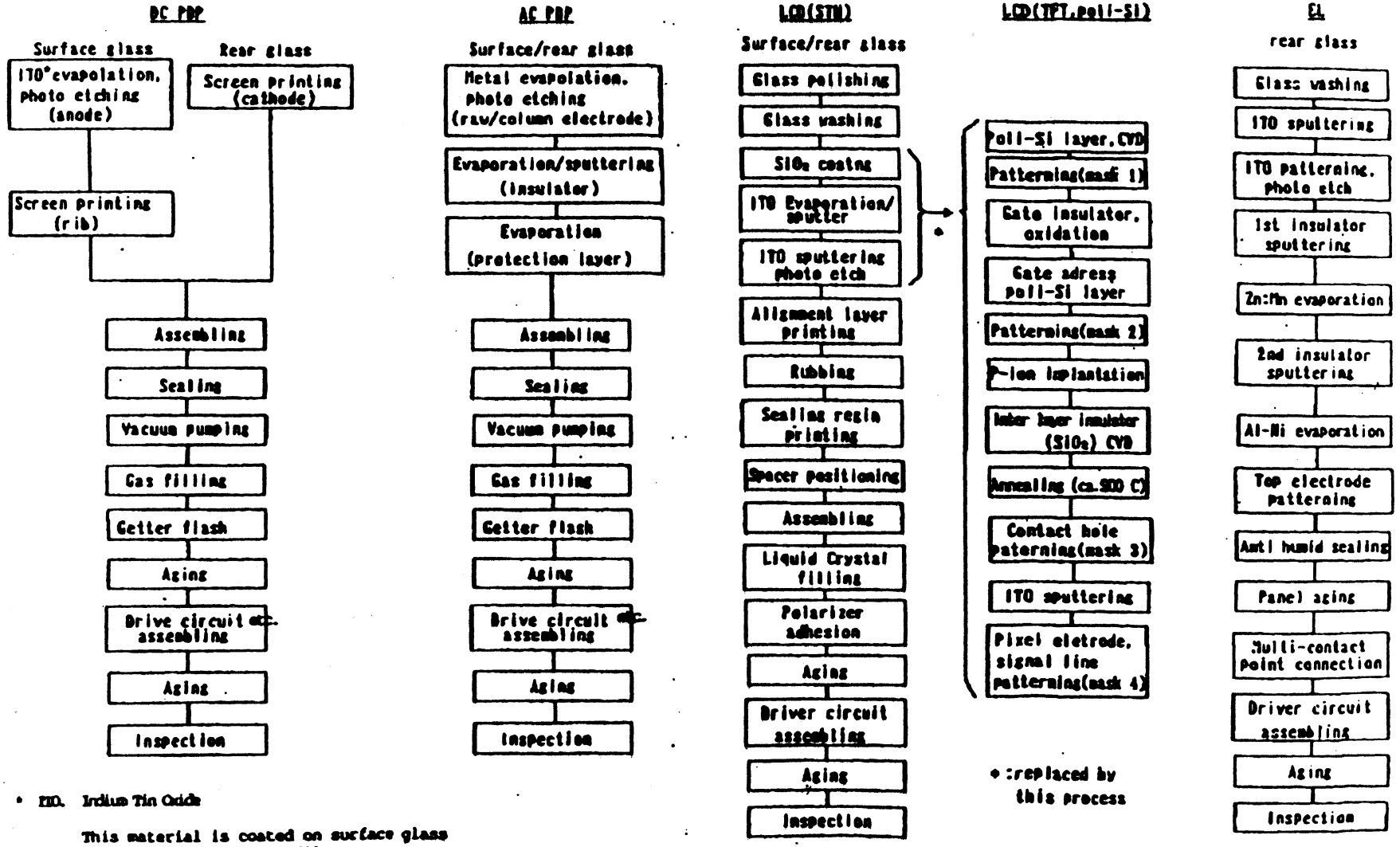
[38] Based on responses to the Commission's like product questionnaires in the preliminary investigation and Attachment D (prepared by James Greeson, IBM) to a letter, dated Oct. 12, 1990, submitted to Commerce by Compaq.

[39] Additional information on clean rooms is presented in app. C.

[40] Report of the National Critical Technologies Panel, March 1991, states, "High-throughput, low-cost production of such displays will require advances in lithography equipment, circuitry patterning, glass sheet production, and thin-film techniques."

Process flow chart of DC/AC PDP/LCD/EL

1990.8.3



* ITO. Indium Tin Oxide

This material is coated on surface glass for making transparent film.

Source: Submitted by Matsushita in response to the Commission's "like product" questionnaire.

produced divided by the number of displays started (i.e., glass starts)).[41] Also relevant are: tooling, time per step, batch vs. in-line, material cost, part value prior to yield loss, facilities (i.e., cleanliness level, special issues), and labor cost per step.[42] The incorporated electronics are the highest single input cost item in a HIC FPD; in contrast, the cost of labor is relatively small.[43] The cost of manufacture varies among technologies: passive matrix LCDs are generally the easiest and least costly HIC FPDs to manufacture; in contrast, the manufacture of active matrix LCDs is the most complex and is currently characterized by low manufacturing yields. Although the technologies are in varying stages of development, significant long-term cost differences between them may continue to exist.[44,45]

Uses of HIC FPDs

Any electronic apparatus that requires a continuous, visible display of text, images, or graphics can use flat panel displays. However, the specific end uses to which HIC FPDs have been put largely depends upon currently available technology. Products that met defined high-information-content text and graphic requirements for computers were first commercially manufactured in the mid-1980s, a development that led to the appearance of the laptop or portable computer market. HIC FPD technology is also used in a new generation of overhead projection panels that are used to project computer images onto

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[41] Co-counsel for the Japanese manufacturers states that "the primary factor affecting ... the cost of those displays per unit is the yield that a manufacturer can obtain. ... Such yields are a function of the initial expertise brought to production, cumulative volume produced, and time in production." (Postconference brief, p. 86.) They are also a function of the complexity of the design; typically the more manufacturing steps performed, the lower the overall yield.

[42] Attachment D (prepared by James Greeson, IBM) to a letter, dated Oct. 12, 1990, submitted to Commerce by Compaq.

[43] The cost of purchased components other than glass and "other costs," as reported by Planar and Electro Plasma in their response to the Commission's questionnaires, was *** percent of the total cost of goods sold for their 3 most recent complete fiscal years. The cost to purchase the display glass materials and manufacture the display glass comprised *** percent of the total cost and HIC FPD assembly accounted for the remaining *** percent.

[44] According to Walter Goede, Northrop B-2 Division, technologies that require high-voltage drives (specifically plasma and EL) use expensive drivers. (However, many of these technologies require fewer drivers for a given panel size.) He identified the cost of drivers as a probable long-term problem area for all plasma and EL technologies. In contrast, the cost of the display glass is viewed as a probable long-term problem area for active matrix LCDs. "Status of electronic displays," Society for Information Display Seminary Lecture Notes, May 6, 1991.

[45] There may also be significant differences in the cost to manufacture among firms. *** has stated that the manufacturing cost for a specific type of technology can vary by a factor of eight depending upon the technological method and process controls used by the manufacturing firm.

wall screens.[46] Military applications and aerospace applications are also important markets, as are small-format applications, such as industrial control and medical equipment.[47]

SUBSTITUTE PRODUCTS

In its preliminary determination, the Commission noted that the scope of the investigation does not include either CRTs or flat panel displays containing less than 120,000 pixels (i.e., low-information content flat panel displays). It found that such products are not part of the like product in that investigation.[48] Like flat panel displays, CRTs[49] are extensively used to display text, images, and graphics. However, except for such specialty applications as radar, aerospace displays, and medical instrumentation,

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[46] Overhead projector panels are typically connected to computers and placed on top of conventional overhead projectors. Because light emitted from the overhead projector must pass through the panel containing the HIC FPD, only non-emissive displays, which permit light transmissivity, can be used.

[47] As the technology is further developed, flat panel displays may be used for the large-screen HDTV. HDTV and display technology are among the 22 technologies deemed critical to national economic prosperity and to national security, as identified by a panel appointed by the Director, Office of Science and Technology Policy, Executive Office of the President. The panel writes, "The potential market for high-definition and related products is enormous, amounting to tens of billions of dollars for direct applications and perhaps hundreds of billions of dollars for indirect impacts in other electronics markets. In addition to potentially replacing much or all of current home video equipment, high-definition imaging and display technology is likely to stimulate a variety of other revolutionary changes in the information and communications field." Report of the National Critical Technologies Panel, March 1991.

Also, industry observers predict that flat panel displays will replace the CRTs currently used in televisions and desktop computers. Even more significantly, as the petitioners note, in the future, "the screen will become the computer" and will be "the key to the entire personal computer market." (Postconference brief, p. 44.) At the Commission's hearing, James Hurd, president and CEO of Planar, testified that "The advent of the high information content flat panel display will revolutionize the design of all future electronic systems by the end of this decade." Its development "will also profoundly alter the structure of the entire electronics industry" and "will be the basic platform on which future electronic systems are built, and the basis for competitive differentiation of a new generation of electronic products." (Transcript, pp. 27-28.)

[48] High-information Content Flat Panel Displays and Subassemblies Thereof from Japan: Determination of the Commission in Investigation No. 731-TA-469 (Preliminary) Under the Tariff Act of 1930, Together with the Information Obtained in the Investigation, USITC publication 2311, Sept. 1990, p. 9.

[49] CRTs are devices in which an electron beam is directed onto a phosphorescent coating on a glass screen, causing the surface to phosphoresce or give off light. They are each composed of a thick-glass envelope, electron gun, and phosphor screen.

Identification of Key Characteristics

The Commission, in its preliminary investigation, sent a "like product" questionnaire to U.S. producers, Japanese producers, and users of HIC FPDs requesting that they discuss the characteristics and uses of each technology. Information comparing passive matrix LCD, active matrix LCD, plasma, and EL displays provided to the Commission is presented in table 1. As shown, all types of HIC FPDs are capable of displaying text, graphics, and images, but each possesses sometimes distinct physical and technological characteristics. There are numerous buying guides and comparison charts which describe the different HIC FPD technologies to purportedly assist purchasers in selecting what is described as the appropriate display for their end use. The following list, drawn from Society for Information Display Seminar Lecture Notes prepared by Walter Goeder, chief engineer of a Special Project at the Northrop B-2 division, (May 6, 1991), summarizes the limitations of each technology:

"AC thin-film EL	DC powder EL	AC plasma
High-voltage drivers	High-voltage drivers	High-voltage drivers
High capacitance	Complex electronics	Complex electronics
Complex electronics	Limited luminance/life	Low-mod. luminous eff.
Cost	High reflectivity	Color needs development
Multicolor needs further development	Cost	Cost
	Few developers	Gray scale complicated

DC plasma	Passive matrix LCD	Active matrix LCD
High-voltage drivers	Slow speed	Slow speed
Complex electronics	Limited temperature range	Limited temperature range
Low-mod. luminous eff.	Poor threshold, appearance and flexibility	Yield
Color life		Size
Cost		Cost"
Few developers		

An associated question to that of whether the differences among the HIC FPD technologies are distinct is whether the end-use applications for HIC FPDs require different performance criteria. In their response to the Commission's "like product" questionnaire, a consensus of end-user respondents identified the following display characteristics as generally required for the following end-use applications:

Table 1
Comparison of HIC FPD technologies

Item	Passive LCD	Active LCD	Plasma[1]	EL[1]
Channels of distribution..	The channels of distribution are similar in that all HIC FPDs are sold by the producer to OEMs that incorporate the HIC FPD in another product. Since the HIC FPD is designed to fit specific uses, marketing efforts to OEM computer manufacturers and others typically precede the design stage.			
Customer/OEM perception...	Widest current use	Most promising technology for future growth	Appropriate for special applications	Appropriate for special applications
End uses.....	Monochrome laptops Overhead projectors Notebook computers Handheld computers Medical instruments	Monochrome laptops Color laptops Some military Medical instruments Avionics equipment	Portable computers Transportable PCs Industrial Large-screen displays Specialized military Medical instruments	Portable computers Laptops Ruggedized PCs Avionics Specialized military Medical instruments
Manufacturing.....	Although there are structural similarities among all types and certain common production steps, LCDs are produced using liquid crystal technology, plasma displays using vacuum technology, and EL displays using thin-film technology.			
Manufacturing costs.....	Least expensive	Most expensive	Medium low	Medium high
Physical characteristics:				
Brightness.....	Medium to high with backlighting	Medium to high with backlighting	Low (DC) to medium (AC)	Low (DC) to medium (AC)
Color.....	Monochrome and gray scale (poor multi-color 3/)	Monochrome and gray scale (multi-color available)	Monochrome and gray scale	Monochrome and gray scale
Contrast.....	Low	Medium	High	High
Environmental stress....	Sensitive to heat and humidity	Sensitive to heat and humidity[2]	Good for harsh environment	Excellent for harsh environment
Power requirements.....	Low	Low to moderate High (for backlit color)	High	Medium to high
Response time.....	Slowest (no animation)	Moderate (animation)	Fast	Fast
Screen size (lines).....	Moderate (800)	Smallest (480)	Largest (2048)	Moderate(864)
Transparency.....	High	High	None	None
Viewing angle.....	Narrow	Medium	Wide	Medium
Weight/volume.....	Low	Low (monochrome) High (multi-color)	Medium to high	Medium to high

[1] Information was collected on the subcategories, AC and DC, but due to the similarities reported on each item, the subcategories were consolidated.
[2] Can be ruggedized for specialized military use by additional production steps.
[3] But see discussion of product manufactured by In Focus.

Source: Compiled from data submitted in response to the Commission's "like-product" questionnaire in the preliminary investigation.

applications that use flat panel displays cannot use CRTs.[50] The specific end-use application dictates whether a CRT or flat panel technology is chosen.

There are also a number of low-information content (LIC) flat panel display technologies, including segmented LCD displays,[51] character LCD modules,[52] and LIC display modules. LIC display modules are similar to high-information content (HIC) displays in that they have the ability to address individual pixels (i.e., are matrix addressed, with a series of semiconductors attached to the rows and columns of the electrodes). They typically range in pixel count from 16,000 to 64,000 pixels and are used in calculators, hand-held televisions, and other instruments that do not require high-information content. Whether a LIC or HIC display is used depends upon the amount of information to be presented and the resolution needed. The resolution of the LIC flat panel display is too coarse to be commercially acceptable for the presentation of large amounts of text and graphics. Also, such displays do not have a sufficient number of addressable rows and columns to be compatible with the standard software packages currently being used in computer systems. Although a HIC FPD could theoretically be used in place of a LIC display (e.g., for a calculator), it would be unnecessarily expensive and thus not commercially viable.

Finally, as noted earlier, the only types of HIC FPDs that are subject to this investigation are active matrix LCDs and EL displays. Petitioners argue that other types of HIC FPDs, notably passive matrix LCDs and plasma displays, are substitute or "like" products.

LIKE PRODUCT CONSIDERATIONS AND COMPARISON OF TECHNOLOGIES

Responses to Commission questionnaires by respondents have emphasized that the various HIC FPD technologies have unique features or performance characteristics that are matched to or correlated with the requirements for

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[50] However, as the performance of HIC FPDs improves in the future and their cost declines, they are (as noted earlier) projected to replace CRTs in more and more applications, including televisions and desktop workstations. This interchangeability, however, is expected to be "one-way." CRTs cannot be substituted for flat panel displays in laptop computers, which require the small size, light weight, and low power requirements of a flat panel display. Nor can they be substituted for flat panel displays in overhead projectors, which require light transmissivity. Respondents to Commission questionnaires in the preliminary investigation noted that if flat panel display technology had not been developed, products such as laptop computers simply would not exist.

[51] Segmented flat panel displays are units that typically display segmented digits in one-line formats. These displays are used in such items as watches and automotive instrument panels.

[52] Such dot-matrix displays are limited in format by 5 x 7 and 5 x 10 dot character fonts. They are available in sizes ranging from 1 to 4 lines and used in such office automation equipment as printers, fax machines, and calculators.

the varying applications or end-user systems.[53] Petitioners (each of whom manufactures only active matrix liquid crystal, plasma, or EL displays) have reported that each of their products competes for sale with all the major technologies used to produce HIC FPDs.[54,55] Any overall assessment of substitutability among the types of technologies is made difficult by the complexity of the technology and by its ongoing development (making generalizations over time hazardous). Thus it may be most appropriate to make such comparisons on an individual basis (i.e., at the point-of-sale). Technological assessments were requested from purchasers at the point-of-sale, and information submitted to the Commission is presented in the section of this report entitled "Selection of HIC FPD Technology and Vendor." The following section addresses the issue from a broader perspective, identifying general qualitative differences between the technologies, and is followed by a statistical analysis of sales for each of the major technologies within different end-use markets.

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[53] A typical response is one submitted in response to the Commission's like product questionnaire by Matsushita. Matsushita, discussing computer applications, a primary HIC FPD end use, stated: "The OEM design process selects out possible technologies based on the desired performance characteristics of the computer. Principal considerations in order of importance are:

(1) whether the computer will be battery or non-battery operated
(2) response time (e.g., capability of FPD to use high-speed 386 or 486 chips where desired)
(3) format/gray scaling
(4) reliability (i.e., pixel defect rate)
(5) cost.

Both ELs and PDPs are generally inappropriate for use in battery operated laptop computers because they consume too much energy. Thus, OEMs designing a battery operated laptop will eliminate ELs and PDPs from consideration. If the OEM is designing a high-speed transportable computer, a PDP or EL will generally be chosen because of the inability of passive LCD technologies to take full advantage of the high-speed 386 or 486 chips. Factors (1) and (2) dictate the choice between LCD on the one hand and EL or PDP on the other. If the manufacturer desires the industry standard VGA format with gray scaling, the EL and AC PDP will be eliminated from consideration, as neither has the gray-scaling necessary to exploit fully the VGA format. In addition, both ELs and active LCDs may be inappropriate in uses requiring very low pixel defect rates. Cost competition takes place primarily among comparable technologies offering similar performance features."

[54] Planar, a petitioner in this investigation, has begun supplying EL HIC FPDs to *** for use in computer workstations. In a letter dated Aug. 6, 1990 to the Commission, *** stated that "***."

[55] In rexamining the class or kind of merchandise, Commerce stated in its final LTFV determinations that "Our analysis shows that the technology of the FPD determines or limits the FPD's functional capabilities (e.g., power consumption, viewing angle, brightness, and weight). In turn, these capabilities establish the boundaries of the FPD's ultimate use and customer expectations." (56 F.R. 32376, July 16, 1991.)

End-use application	Display characteristic
"Monochrome laptops and notebooks..	Low power requirement Light weight/low volume Gray scale capability
Color laptops.....	Color capability Low power requirements Light weight/low volume
Overhead projectors.....	Transparency (to light) Light weight/low volume
Industrial.....	Brightness High contrast and resolution Rapid response time
Military/ruggedized.....	High contrast Rapid response time Sustain environmental stress Reliability.

A wide viewing angle can also be essential for certain applications (i.e., medical equipment, avionics, fixed industrial controllers)."

The state of HIC FPD development is extremely volatile, characterized by the evolution of the "state of the art" in both technology and manufacturing processes for each type of HIC FPD technology. Although there have been dramatic changes in the last two years, none of the different HIC FPD technologies have reached their theoretical potential.[56] However, with the movement toward higher performance display technologies, the appearance and power requirements of the HIC FPDs may be converging, erasing historically dichotomous relationships. It is reported that:

> LCDs have continually mutated to meet the market's readability requirements, albeit at the cost of higher price, bulk and power. Certain plasma and EL panels have implemented power conservation or reclamation schemes and, with plasma's success in high-volume markets, economies of scale have come into play. What was formerly a low-end/high-end market has become a continuum.[57]

Determining whether a display has become competitive with another for a specific end use is complicated by the reported difficulty in converting research and development models into products suitable for commercial production.[58] Some experts believe the technologies that succeed in the

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[56] In its response to the Commission's questionnaire, *** labelled (1) the increase in the numbers of pixels per display (i.e., the industry standard resolution has grown from 128K pixels (640 x 200) to 307K pixels (640 x 480)); (2) the introduction of color display technology; and (3) the introduction of active matrix technology as significant changes that have occured since 1988.

[57] "Flat-panel technologies go for gray scale, color," Electronic Engineering Times, July 17, 1989.

[58] Dr. Elliot Schlam notes: "There is still considerable confusion in distinguishing between items that are just laboratory developments as opposed to manufactured products. In addition, much of the potential user community is still on the sidelines waiting to find which technology will be the

(continued...)

future may be predetermined by the amount of investment and the number of companies researching and developing the technology. Active matrix LCDs are currently receiving a disproportionate amount of attention and investment capital.[59]

Statistical Presentation

The validity of analyses based on statistical data can depend on how precisely the categories are defined--a problem that is especially acute for this product where arguments can be made that a specific display design or manufacturer's offering can, for some end uses, constitute a technological "grouping." Furthermore, statistical data reflects what actually happened, not what could have happened (i.e., what sales could have been made) and show only a "snapshot" in time (data on end uses for the major technologies was gathered only for 1990 in the Commission's questionnaires). However, several points seem clear from the data presented in tables 2 and 3. (Table 2 presents the types of displays used for key end uses for U.S.-produced and imported displays combined; table 3 identifies the end-use markets into which U.S. producers and importers (separately) sold.) As shown in table 2, certain applications used either one specific technology (i.e., passive matrix, active matrix, plasma, or EL) or one type of technology (i.e., non-emissive or emissive). Other applications used multiple technologies. Only passive matrix LCDs were used for computers weighing less than 7 pounds (and, according to respondents, in computers weighing less than 13 pounds); only

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[58] (...continued)
'winner.'" "Overview of flat panel displays," Society for Information Display Lecture Notes, May 10, 1991.

[59] Speaking of active matrix LCDs, Joseph Castellano, president of Stanford Resources, Inc., has stated, "There's so much money going into it that it almost has to work." "The new, improved color computer," Forbes, July 23, 1990.

Table 2
HIC FPDs: Share of quantity of U.S. shipments of U.S. producers and importers in 1990, by types of displays 1/ 2/ 3/

(Units)

End use	Quantity of U.S. shipments in 1990	Type of display: Passive matrix LCD	Active matrix LCD	Plasma display	EL display
Computers weighing less than 7 pounds 4/	***	***	***	***	***
Computers weighing 7 to 20 pounds 4/ 5/	***	***	***	***	***
Computers weighing over 20 pounds 4/	***	***	***	***	***
Overhead projectors	***	***	***	***	***
Medical equipment	***	***	***	***	***
Consumer entertainment	***	***	***	***	***
Aerospace	***	***	***	***	***
Control equipment 6/	***	***	***	***	***
Specialized military	***	***	***	***	***
Other	***	***	***	***	***
Total	***	***	***	***	***

1/ Includes shipments of prototypes.
2/ Excludes shipments of ***.
3/ ***.
4/ Includes only stand-alone computers not incorporated into other equipment.
5/ There also appear to be significant differences within the 7-20 pound category. In its response to the Commission's questionnaire, *** stated that it believes the category "computers weighing 7-20 pounds" actually includes at least two categories of computers: computers weighing 7-14 pounds ("transportable" computers) and computers weighing 14-20 pounds ("luggable" computers). In their prehearing brief, Japanese respondents gathered and further analyzed data on computers in the 7- to 20-pound range. They report that passive matrix LCDs were used in all of the displays placed in products weighing 7 to 13 pounds. Of displays used for products in the 13-20 pound category, *** percent were DC plasma, *** percent were passive matrix LCDs, *** percent were active matrix LCDs, and *** percent were EL and AC plasma. (Japanese manufacturers' prehearing brief, pp. 58-59.)
6/ Includes office, industrial, and test and measurement equipment not categorized above.

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

Table 3
HIC FPDs: Quantity of U.S. shipments of petitioners and importers in 1990 and share of U.S. shipments by source 1/

End use	Quantity of U.S. shipments in 1990 (units)	Share for each end use-- U.S. produced 2/ (percent)	Imported from Japan 3/ (percent)
Computers weighing less than 7 pounds 4/	***	***	***
Computers weighing 7 to 20 pounds 4/	***	***	***
Computers weighing over 20 pounds 4/	***	***	***
Overhead projectors	***	***	***
Medical equipment	***	***	***
Consumer entertainment	***	***	***
Aerospace	***	***	5/
Control equipment 6/	***	***	***
Specialized military	***	***	***
Other	***	***	***
Total	***	100.0	100.0

1/ Includes shipments of prototypes.
2/ Excludes shipments of ***.
3/ ***.
4/ Includes only stand-alone computers not incorporated into other equipment.
5/ ***.
6/ Includes office, industrial, and test and measurement equipment not categorized above.

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

non-emissive displays were used for overhead projectors; and only emissive displays were used for specialized military applications.[60,61] However, for

[60] The lighter weight computers required the low power consumption (i.e., lighter batteries) of passive matrix LCDs (although, as noted below, low-power plasma displays are now being developed); overhead projectors require the light transmissivity of non-emissive displays; and the rugged emissive displays are the best suited for military applications (although LCDs can be somewhat "ruggedized").

[61] However, plasma displays can be and are used in portable computers. They appear in the higher end of the "computers weighing 7 to 20 pounds" category and, in fact, are the display type most frequently used in computers that weigh over 20 pounds. (The latter category of computers accounted, though, for only *** percent of total U.S. shipments in 1990.) Very few EL displays were used in computer applications.

(continued...)

other applications, specifically medical equipment, aerospace, control equipment, and "other," more than one specific or type of technology was used in 1990.

As shown in the data presented in table 3, there is some separation in the markets where U.S-produced and Japanese-produced displays (including nonsubject HIC FPDs) are sold. The majority (almost *** percent) of imported HIC FPDs (mainly nonsubject passive matrix LCDs) were used for computers and overhead projectors where there were few sales of displays produced in the United States. In contrast, the most important display markets for U.S. producers were control equipment (*** percent of U.S. producers' shipments in 1990), medical equipment (*** percent of shipments), specialized military equipment (*** percent of shipments), and "other" (*** percent of shipments).[62] Although U.S. manufacturers generally shipped EL displays into these markets, as shown in table 2, other types of technologies (mainly non-subject passive matrix LCDs and plasma displays) are also commonly used for these end products and are supplied by Japanese imports (the only source of passive matrix LCDs).[63]

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[61] (...continued)

Petitioners, in their prehearing brief (pp. 11-12), characterize the use of plasma displays in portable computers as a replacement for LCDs: "The superior optical performance of DC plasma (brightness) made it a good solution for many of the portable computer manufacturers who felt that, with increasing power requirements and inferior optical performance of LCDs, the market was ripe for replacement. In the 1986-87 period, many computer companies started using plasma displays. Today, companies like Compaq and Toshiba offer plasma displays in many of their portable computer models."

There have been, however, clear distinctions in weight between portable computers that use passive matrix LCDs and those that use other technologies. Japanese respondents present a summary of portable computer specifications in their prehearing brief (app. A) drawn from "PC Laptop" (May 1991, June 1991), "Laptop Buyer's Guide & Handbook," and conversations with manufacturers and other industry sources that shows that the lightest model with a plasma display weighs 13.2 pounds. In contrast, there were 129 models shown weighing from 11 ounces to 13 pounds that used only passive matrix LCDs. However, once a certain "weight" threshhold is passed, LCDs (both passive matrix and active matrix) and plasma displays were all used. The lightest model with an active matrix LCD weighed 13.75 pounds; passive matrix LCDs were used in "lunchboxes" weighing as much as 30 pounds. There were no portable computer models shown that used EL displays.

Restrictions in the ability to use plasma displays in lower weight portable computers may be less pronounced in the future. Petitioners cite very recent announcements by Toshiba of notebooks with plasma displays that weigh between five and six pounds and state that innovations by Plasmaco and others will lead to a new generation of plasma displays that will consume even less power than the current generation of backlit LCDs. (Petitioners' prehearing brief, pp. 14-15.)

[62] ***. Planar produces EL HIC FPDs.

[63] However, such generalizations do not necessarily translate into what is technologically feasible or desirable for a specific sale. For example, Japanese manufacturer respondents in their prehearing brief (pp. 64-66) note that stationary medical monitors, requiring greater brightness, wider viewing angles, and superior display quality, often use EL or plasma displays where portable, battery-operated devices require LCDs.

With reference to subject imports, EL displays manufactured in Japan are also used in many of the same applications as those produced in the United States, namely, heavier portable computers, medical equipment, and control equipment (table 4).[64] (However, no Japanese-produced EL displays were used in aerospace, specialized military, and "other" applications.) Subject active matrix LCDs were mainly used in computers weighing 7 to 20 pounds, although this primarily reflects only one sale (i.e., the Apple portable Macintosh). The 1990 imports, while still numerically small, show some appeal of active matrix LCDs for users in three other market segments: overhead projectors, aerospace, and control equipment.[65,66] Although still small, the aerospace market is projected to be a major area of opportunity in the early 1990s (especially for small-volume manufacturers) as airlines retrofit their cockpits with HIC FPDs. As shown on table 2, in 1990, aerospace applications almost always used active matrix LCDs and EL displays.

In summary, although nonsubject imports sold into market segments not served by U.S. producers dominate the total U.S. HIC FPD marketplace, subject imports are present in the market niches served by U.S. firms. If the active matrix LCDs used in computers are excluded (***), subject imports of the remaining *** units represent a *** percent market share of the active matrix LCDs and EL displays shipped in the United States in 1990 (table 4 and estimated U.S. shipments of *** EL displays from Finland). (However, if passive matrix and plasma technologies were considered competitive and the nonsubject imports used for control, medical, and "other" equipment and U.S. producers' shipments of plasma displays were included in "consumption," the market share of subject imports would be significantly lower.)

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[64] *** of the EL displays imported from Finland in 1989 were used for industrial control equipment. Others were used in "computers other than laptops" and medical instruments.

[65] Petitioners testified that sales of Japanese-manufactured active matrix LCDs will "position them not only to maintain their total domination of computer applications, but to increase their penetration into the industrial, control, medical, avionics, and militarized markets as well. ... AMLCD will put the Japanese in the same ball game as the EL and plasma displays in terms of brightness, contrast, responsive time and viewing angle. The AMLCD technology is a threat to the few sales Petitioners currently do make in those sections of the U.S. market." (Transcript, p. 44-45.)

With reference to threat, the color to be offered by active matrix LCDs (if available at prices comparable to monochrome emissive HIC FPDs either through future lowered manufacturing costs or LTFV pricing) is viewed as having an impact on future sales. Color will be of interest to users whose applications currently do not use or absolutely require it. In a July 25, 1991 submission to the Commission, Lawrence Tannas estimated that "the full color active matrix display should be expected to cost approximately three times the cost to manufacture the monochrome active matrix display." An aggregate response from the Japanese manufacturers in the same submission predicted that color displays will account for over 90 percent of active matrix LCD capacity in 1991.

[66] With reference to *** equipment, although active matrix displays are of some appeal, nonsubject passive matrix displays from Japan (as well as nonsubject EL displays from Finland) were used most frequently in such equipment (table 2).

Table 4
HIC FPDs: Quantity of U.S. shipments of subject displays, by sources and types of displays, 1990 1/ 2/

End use	EL displays Produced in U.S.	EL displays Produced in Japan	Active matrix LCDs Produced in Japan
Computers weighing less than 7 pounds 3/	***	***	***
Computers weighing 7 to 20 pounds 3/	*** 4/	*** 5/	*** 6/
Computers weighing over 20 pounds 3/	*** 7/	***	***
Overhead projectors	***	***	*** 8/
Medical equipment	***	***	***
Consumer entertainment	***	***	***
Aerospace	***	***	***
Control equipment 9/	***	***	***
Specialized military	***	***	***
Other	***	***	***
Total	***	***	***

1/ Includes shipments of prototypes.
2/ Excludes shipments of ***.
3/ Includes only stand-alone computers not incorporated into other equipment.
4/ The majority of U.S. shipments in this category reflects sales by Planar to Data General, ***, and a number of other companies. Shipments shown in 1990 consist *** to Data General. Data General, ***, purchased EL displays from Planar after discontinuing use of passive matrix LCD displays due to customer dissatisfaction. (Staff conversation with ***, July 18, 1991, and petitioners' prehearing brief, p. 10 and p. 31.)
5/ The reported use of imported EL displays in portable computers was by Tandy for its GRiD Tempest system, which is designed to meet the U.S. Government's "Tempest" standards. GRiD reportedly uses EL for this application because that technology preserves good picture quality even with Tempest containment shielding. (U.S. Computer Systems Manufacturers Group (CSMG) prehearing brief, p. 33.) George Washburn, program director for laptop products, GRiD Systems Corp., testified at the hearing that Tempest laptop computers containing EL panels tolerate more severe environmental conditions than other HIC FPDs. (Transcript, pp. 139-140.)
6/ *** of the imported U.S. shipments in this category were of monochrome active matrix displays by Apple for use in its Macintosh laptop. Apple has stated that it required active matrix for its fast response time (necessary for the full-screen graphics around which Apple's mouse (cursor) products are built); black-and-white screen (for readability); and low power needs (i.e., long battery life). ***. EL displays also did not provide the needed screen color and, additionally, could not provide low enough power requirements. (Response by Apple to Commission questionnaires (see table I-1) and hearing transcript, p. 128.)

Footnotes continued on the following page.

Footnotes to table 4--Continued

7/ U.S. shipments in this category reflect the sale of *** displays to *** for use in computer workstations. In the August 6, 1990 letter to the Commission described earlier, a *** representative stated that ***. Petitioners point out in their prehearing brief (p. 29) that Toshiba selected an LCD display for a similar workstation.
8/ Only non-emissive displays can be used for this product.
9/ Includes office, industrial, and test and measurement equipment not categorized above.

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

The subject imports (***) may possess limited substitutability with HIC FPDs produced by U.S. manufacturers (which are primarily monochrome emissive displays) for the majority of end-uses.[67] However, that substitutability, although "limited," could have a distinct future impact on the operations of domestic manufacturers. The monochrome (emissive) EL displays (regardless of the source of production) cannot be technically substituted for non-emissive displays in overhead projectors or for color displays in the new color applications. Furthermore, they could not have been substituted, in a practical sense, for the vast majority of U.S. shipments of active matrix LCDs in 1990 (i.e., Apple testified at the Commission's hearing that they would not have proceeded with development of the portable Macintosh without an active matrix LCD (transcipt, p. 130)). However, the converse is not necessarily true. Especially as color becomes available, active matrix displays (assuming a reasonable level of price comparability) are likely to be somewhat competitive with monochrome EL displays for many of the applications served by the domestic industry.

Interplay of Technology and Investment

Although, as stated earlier in this report, technologies have been constantly changing, making specific assessments difficult, there are several constant themes: HIC FPDs are products whose manufacture is capital intensive, HIC FPDs are products whose development is spurred by the hope of replacing CRTs in computers and televisions, and HIC FPDs are products characterized by various and sometimes distinct technological strengths and weaknesses. The last of these themes assumes great importance to current purchasers and end users; each of the themes, however, is correlated with the investment necessary to place the capacity on-line and achieve the low manufacturing costs necessary to create markets and sales. The ongoing and future technological development (whether real or perceived) of HIC FPDs influences not only what can be purchased after 1991, but played a role in the investment[68] and purchasing decisions made from the early 1980s through the period of investigation.[69]

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[67] This characterization excludes, of course, the impact of subject EL displays on plasma and EL displays produced domestically.

[68] Factors other than technological development are also, of course, correlated with investment. Petitioners, for example, emphasize LTFV sales.

[69] In a letter to the Commission dated June 17, 1991, *** stated, "I think the reaction of prospective investors is driven by a number of concerns ... In

(continued...)

The improvements in screen readability resulting from the development of STN-LCD technology in the mid-1980s and the inherent low-power needs of passive matrix LCDs spurred the market for (and investment in) displays for laptops. It is color, though, that provides the key to the HDTV and CRT-replacement arena.[70,71]

Respondents are prepared to now characterize active matrix LCDs as the "display technology of the future ... because of video and full color," indicating that petitioners have focused on the "wrong technology."[72] IBM has also addressed this issue.[73] Petitioners state that all participants in the

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[69] (...continued)
fairness, there is still some concern in the market over which high information content display technology (i.e., AMLCD, electroluminescent or gas plasma) will ultimately satisfy the broad user markets."

In a June 26, 1987 letter referring to a proposal by Planar, a U.S. manufacturer of EL displays, that Compaq use its displays, Gaylon Kornfuehrer of Compaq stated "In addition to the cost issue, we are concerned about the highly fluid situation in flat panel technology at the present. For example, we have seen recent advances in LCD technology that could pose a serious threat to both EL and plasma displays. Manufacturers have seen flat panel displays used in large volumes for the first time during the past year. As a result investment in technology development is increasing sharply and the race among competing technologies is getting much harder to call. In an environment like this, we think it would be unwise for both Compaq and Planar to enter into a development program of this cost and duration."

[70] A 1983 IBM task force that was created to develop a long-term strategy "determined that in order to reach the goal of replacing the CRT for general computer applications, flat panels would have to develop full color capacity and reduce their manufacturing costs." (CSMG prehearing brief pp. 11-12.)

In a July 18, 1991 letter to the Commission, Scott McNealy, president and CEO of Sun Microsystems, a $3 billion computer workstation manufacturer, stated "We believe the trend towards portability (in notebook computers) will carry over to workstations, but only when the key enabling technologies are available to provide full-featured workstations. ... Portable workstations will require the additional technology needed to provide high performance color flat panel displays to be successful."

[71] Although it is this "arena" whose market importance will justify the level of investment required by HIC FPDs, color is also important to numerous future applications. For example, new aerospace cockpit displays are viewed as requiring color (Aug. 7, 1990 statement of John A. Rupp, Commercial Flight Systems Group, Honeywell, to the Commission; staff conversation with ***, July 19, 1991; staff conversation with ***, July 16, 1991). Color will also be a significant factor in the rapidly expanding overhead projector panel and video projection display markets (July 16, 1991 letter from James Vogeley, CEO of nVIEW).

[72] Testimony of Lawrence Tannas. Mr. Tannas further stated that "For the time being, however, passive matrix will remain the display of choice. Eventually, active matrix will become a major factor in the flat panel display market, as production problems are solved, yields improved, and costs come down." (Transcript, pp. 201-2.)

[73] In its posthearing brief (Attachment D, pp. 6-7), IBM stated that, "Although the ultimate goal of each FPD technology has been to replace the cathode ray tube ("CRT") -- i.e., to achieve the CRT's viewability without its size and power consumption, each technology follows its own track and three of those technologies (PM LCD, EL, and plasma) have characteristics that prohibit

(continued...)

industry, regardless of technology, are working toward the commercial feasibility of color in HIC FPDs (and label color HIC FPDs as a "derivative product" of the current monochrome standard).[74,75] Work in color for all technologies (including passive matrix LCDs) is proceeding, apparently in the hope of achieving a color display in a lower cost technology than active matrix.[76,77]

However, perceptions in the differences between technologies and their ability to achieve color have influenced investment and technology decisions that have already been made--both by U.S. firms[78] and Japanese manufacturers. As is shown in the section of this report entitled "Data reported by Japanese manufacturers on their operations for subject HIC FPDs" and by the tables in appendix G, Japanese manufacturers (having ready access to investment capital) have largely invested in LCDs (both passive and active matrix).[79,80]

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[73] (...continued)
the achievement of the goal in the foreseeable future. PM LCD has been a stop gap measure but is unlikely to resolve its response time, viewing angle, and color (or lack thereof) problems and achieve the CRT standard. EL has been unable to develop a practical true blue phosphor and there is no predictable likelihood that such development is real or imminent. Finally, plasma has no realistic potential for developing a commercial color capability."

[74] Posthearing brief. Response to Commissioner Newquist's request for additional information on the derivative products amendment.

[75] The acquisition of Finlux by Planar may encourage future success: "Analysts generally applauded the deal. However, they added, it will take a heroic effort by Planar to compete with the Japanese, who are pouring billions of dollars into the display market. ... The single biggest obstacle to Planar becoming a major competitor at this point may be its failure to date to produce a full-color display. ... Sharp and other Japanese companies currently have a lock on the color flat-panel display market with their liquid crystal display screens, though they are small and have other limitations. And that's precisely why analysts see the Planar-Finlux merger as so promising. Both companies have strong technical development staffs that have worked long and hard on the color issue." Jeff Manning, "Acquisition doubles sales, gives Planar top spot in industry," The Business Journal-Portland, July 23, 1990.

[76] Letter dated July 22, 1991, by Lawrence Tannas, to the Commission. Letter dated Feb. 13, 1989, by *** to ***.

[77] M. Robert Miller, a U.S. Army scientist, in a paper presented before the Society for Information Display (May 6, 1991), stated that the capability to produce full-color thin-film EL displays is very near reality.

[78] Further information on the technology decisions IBM and GTE made is presented in the section of this report entitled "U.S. firms that have exited the HIC FPD industry."

[79] As stated earlier in this report, the focus of the Japanese on LCDs came out of their earlier experience in LIC LCDs and availability of semiconductor expertise. In a July 25, 1991 submission to the Commission by Japanese manufacturers and during a staff meeting with *** (July 17, 1991), respondents indicated that there are distinct physical differences between the technologies. Achieving success in the manufacture of active matrix LCDs was perceived to be a matter of building on already existing principles, although manufacture would and has required solving difficult engineering problems. In contrast, work in EL (color in EL comes from combining red, green, and blue phosphors into the display) required discovering phosphors of sufficient brightness (now, apparently only the blue) in the laboratory and was thus viewed as involving more risk and different variables.

As shown in table 5, the majority of the Japanese-produced active matrix displays currently shipped are monochrome.[81] However, active matrix liquid crystal is often characterized as a "color" technology with investment in it justified by the expectation of full-color video displays. At this time, monochrome active matrix LCDs and color active matrix LCDs are conceptually similar products, except that color displays require the addition of filters.[82] As stated earlier in this report, the majority of Japanese capacity to produce active matrix displays is expected to be used for color products.

Table 5
HIC FPDs: U.S. shipments by producers and importers, by types of displays, 1988-90

* * * * * * *

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

TYPES OF HIC FPDs SHIPPED

Table 5 shows shipments by U.S. producers and importers for additional product groupings. As shown in table 5, the increasing importance of plasma and EL HIC FPDs with gray scale is evident. Also, the entry of color displays (mainly active matrix LCDs) from Japan is growing. The HIC FPDs shipped by the U.S. industry were *** nongray-scale monochrome AC plasma and AC EL. Importers from Japan also shipped AC EL displays (*** percent of which were gray scale in 1990),[83] and imported DC plasma, AC plasma, and AC/DC plasma displays (the majority of which were gray scale in 1989 and 1990).

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[80] (...continued)

[80] There are currently three manufacturers of plasma displays in Japan (Fujitsu, Matsushita, and NEC) and only one producer of EL displays, Sharp. ***. ***. ***.

[81] The *** majority of these shipments have been to Apple for its Macintosh portable. In its questionnnaire response, Apple indicated that one of the reasons it chose active matrix LCDs was "***."

[82] Lawrence Tannas testified that the addition of color affects only one substrate and does not represent a completely new technological approach. (Transcript, p. 254.) The major investment in active matrix LCD factories consists of the machinery and process technology used to make the active matrix substrate. Most of the added cost of color displays comes from the larger number of pixels required on the substrate. The cost of the color filters, which are sometimes purchased, is secondary. (Response submitted by Japanese manufacturers, July 25, 1991.)

[83] The only supplier to ship DC EL displays was Cherry, a U.S. manufacturer.

U.S. Tariff Treatment

Imports of HIC FPDs are provided for in the following provisions of the Harmonized Tariff Schedule of the United States (HTS): 8543, 8803, 9013, 9014, 9017.90.00, 9018, 9022, 9026, 9027, 9030, 9031, 8471.92.30, 8471.92.40, 8473.10.00, 8473.21.00, 8473.30.40, 8442.40.00, 8466, 8517.90.00, 8528.10.80, 8529.90.00, 8531.20.00, 8531.90.00, and 8541.[84]

THE NATURE AND EXTENT OF SALES AT LTFV

Effective July 16, 1991, Commerce determined that imports of active matrix LCDs and EL displays from Japan are being, or are likely to be, sold in the United States at LTFV (56 F.R. 32376, July 16, 1991). Commerce's final margins are presented in the following tabulation (in percent ad valorem):

Firm	LTFV margin
Active matrix LCDs:	
Hosiden Corp	62.67
All others	62.67
EL displays:	
Sharp Corp	7.02
All others	7.02

The period of investigation was February 1, 1990 through July 31, 1990. As stated previously in this report, Commerce also determined that plasma displays are not being, and are not likely to be, sold in the United States at LTFV, finding de minimus weighted-average margins of 0.23 percent for Matsushita Electric Industrial Co., Ltd. and 0.32 percent for Toshiba Corp. Commerce did not make a determination of sales at LTFV for passive matrix LCDs because it rescinded its initiation of investigation for such displays owing to the petitioners' lack of standing to bring an investigation on that product.

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[84] In order to not incur the special 100-percent rate of duty on certain computers having non-CRT displays imported from Japan (HTS subheadings 9903.41.15 and 9903.41.20), it has been a practice for importers to enter the major subassemblies of these computers (which include HIC FPDs) in separate shipments and on different days. The subassemblies are then assembled into a complete computer in the United States. The special 100-percent rate of duty, however, was suspended effective August 1, 1991.

THE U.S. MARKET FOR HIC FPDs

Apparent U.S. Consumption

The data on apparent U.S. consumption of HIC FPDs presented in table 6 are composed of the sum of U.S. producers' U.S. shipments (domestic and intracompany) and U.S. importers' U.S. shipments (domestic and intracompany) reported in response to the Commission's questionnaires. Data are thus understated to the extent that all producers or importers did not respond to the questionnaires.[85]

As shown in table 6, consumption of HIC FPDs increased steadily. Domestic consumption of all HIC FPDs (whether LCD, plasma, or EL) almost *** from 1988 to 1990. The following tabulation shows the share (by quantity) of total apparent U.S. consumption accounted for by the various types of HIC FPDs (in percent):

Item	1988	1989	1990
Passive matrix LCDs...	***	***	***
Active matrix LCDs....	***	***	***
Plasma displays.....	***	***	***
EL displays.....	***	***	***
Total.....	100.0	100.0	100.0

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[85] Producer questionnaires were received from all known U.S. manufacturers of HIC FPDs that have display glass production capability. (These firms were identified in the petition and comprise the petitioning group.)

Additional producer questionnaires were sent to over 50 firms that do not have display glass production capability, but instead purchase display glass and add electronic components that they manufacture or purchase separately. The majority of these firms responded that they either produced LIC displays, purchased and added value to what they considered to be complete HIC FPDs, or were still in the evaluation stages with HIC FPDs, experimenting with a limited number of research and development units. These firms are discussed further in the next section of this report.

Also, questionnaires were sent to several firms that are currently involved in HIC FPD research and development activities. With the exception of letters submitted by Magnascreen Corp., a petitioner in this investigation, ***, and ***, no responses were received from any of these firms.

Importer questionnaires were sent to the companies identified in the petition as importers of HIC FPDs from Japan. Additional importer questionnaires were sent to significant U.S. importers from Japan that reported imports into the United States under the two principal HTS classifications where HIC FPDs are entered (i.e., flat panel displays (non-CRT) as output peripherals: 8471.92.30 and 8471.92.40). All importers responded to the Commission's questionnaires and it is believed that the data received represent the great majority of imports of HIC FPDs from Japan and all imports from Finland. There are no significant imports of HIC FPDs from countries other than Japan and Finland.

Table 6
HIC FPDs: Apparent U.S. consumption, by types of displays, 1988-90

(In units)

Type and period	U.S. producers' shipments	Shipments of imports	Apparent consumption
Passive matrix LCDs: 1/			
1988	0	***	***
1989	0	***	***
1990	0	***	***
Active matrix LCDs: 1/			
1988	0	***	***
1989	***	***	***
1990	***	***	***
Plasma displays: 1/			
1988	***	***	***
1989	***	***	***
1990	***	***	***
EL displays: 1/			
1988	***	***	***
1989	***	***	***
1990	***	***	***
Total (passive matrix LCD, active matrix LCD, plasma, and EL displays): 1/			
1988	***	***	483,407
1989	***	***	666,711
1990	***	***	824,001
Total (passive matrix LCD, active matrix LCD, plasma, and EL displays): 2/			
1988	***	***	***
1989	*** 3/	***	*** 3/
1990	*** 3/	***	*** 3/

1/ Includes only U.S. producers' shipments for firms that manufacture the display glass assembly for commercial sale (i.e., the petitioners).
2/ Includes U.S. producers' shipments for firms that manufacture the display glass assembly for commercial sale and U.S. shipments for In Focus.
3/ The passive matrix LCD display glass imported for use by In Focus is reported both in shipments of imports and in U.S. producers' shipments. (However, the amount reported as U.S. producers' shipments is *** than one-third of the number of units imported.) Thus, apparent U.S. consumption is slightly overstated.

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

The bulk of the U.S. market consists of LCDs and plasma displays; EL displays have accounted for *** percent of domestic consumption since 1988. The share of plasma displays, however, has steadily declined, deceasing from *** percent in 1988 to *** percent in 1989 to *** percent in 1990. In contrast, LCDs (both passive matrix and active matrix) have increased their market share relative to plasma and EL displays. In 1990, LCDs of both types accounted for over *** percent of domestic consumption.

Imports of displays (almost all of which are manufactured in Japan) play a major role in supplying the U.S. market: imports accounted for *** percent of the quantity of domestic consumption of all HIC FPDs from 1988 through 1990. However, the majority of imports consist of non-subject passive matrix LCD and plasma displays from Japan. (There were also a number of non-subject EL displays imported from Finland.) EL displays are the only technology where U.S. manufacturers play a significant role, capturing *** percent of the quantity of U.S. shipments of EL displays during the 1988-90 period.

U.S. Producers

OPERATIONS OF PETITIONERS

The petition identifies two groups of U.S. manufacturers of HIC FPDs: (1) producers that produce for the civilian commercial market (Cherry, Electro Plasma, Planar, and Plasmaco); and (2) producers that specialize in military sales (Photonics and, to a degree, OIS and Electro Plasma). These firms, all of which are petitioners, are involved in researching flat panel display technology in addition to producing for commercial sale. With the exception of Cherry, the petitioners focus their business operations on the development and/or manufacture of only flat panel displays (including, however, LIC displays).[86,87]

Producing firms, their plant locations, types of HIC FPD produced, and position on the petition are shown in table 7. As shown in table 7, no domestic manufacturer produces more than one type of major HIC FPD technology.

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[86] Petitioners' postconference brief, p. 48.

[87] The petition also named three firms that are attempting to finance development activities or commercial-volume manufacturing facilities (specifically, Coloray, Magnascreen, and Standish (Hamlin LCD Division)). In addition, the petition cited domestic manufacturers that ceased producing HIC FPDs prior to 1988 or which were researching HIC FPDs but failed to move from research and development to commercial production. Information on these firms is presented in the sections of this report entitled "Firms still in the developmental stages of production" and "U.S. firms that have exited the HIC FPD industry."

Table 7
HIC FPDs: Current U.S. producers, plant locations, types produced, and position on the petition

Firm	Plant location	Type of HIC FPD	Position on the petition
The Cherry Corp.....	Waukegan, IL	EL	Supports
Electro Plasma, Inc.....	Millbury, OH	Plasma	Supports
OIS Optical Imaging Systems, Inc.....	Troy, MI	Active matrix LCD	Supports
Photonics Technology.....	Luckey, OH	Plasma	Supports
Planar Systems, Inc.....	Beaverton, OR	EL	Supports
Plasmaco, Inc.....	Highland, NY	Plasma	Supports

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

Also, no petitioning firm produces passive matrix LCDs.[88] A discussion of the various producers follows:

The Cherry Corp.--Cherry and its subsidiaries manufacture electro-mechanical devices, electronic assemblies and displays, and semiconductor devices. Unlike other EL producers (namely, Planar, Sharp, and Finlux), Cherry manufactures EL displays using DC powder technology and not AC thin-film technology. It is currently developing ***. Cherry also produces LIC FPDs.

Electro Plasma, Inc.--Electro Plasma is ***-percent owned by Grossenbacher Elektronik, St. Gallen, Switzerland. It is currently developing ***.

OIS Optical Imaging Systems, Inc.--As of June 30, 1990, OIS was ***-percent owned by Energy Conversion Devices, Inc. OIS is also ***-percent owned by IRITECH, Rome, Italy. On May 23, 1991, OIS announced the signing of an agreement with Guardian Industries Corp. (Guardian), Northville, MI and William Manning, Rochester, NY. According to the agreement, Guardian will invest $10.5 million for a 29-percent equity position in OIS, with an option, exercisable at any time over a three-year period, to invest an additional $10.5 million for a 51-percent equity position in OIS. (Actual consummation of the agreement is still pending.) Guardian is a manufacturer and fabricator of flat glass products used in construction and automotive applications.

[88] For the purposes of determining whether the petitioners have standing, Commerce determined that HIC FPDs constitute four like products, active matrix LCDs, passive matrix LCDs, plasma displays, and EL displays. Because petitioners do not produce one of the four like products, i.e, passive matrix LCDs, Commerce rescinded its initiation of investigation of passive matrix LCDs and subasemblies thereof.

OIS has also entered into an agreement with New York State agencies to finance a factory for the production of active matrix LCDs in a location near Rochester, NY. (The manufacturing facility is estimated to cost over $30 million.) The factory will primarily produce displays for military and avionic applications. Customer shipments are planned to begin in ***.[89] ***. ***.[90]

In addition, OIS has entered into numerous licensing and development agreements, including a July 1989 agreement with Samsung, a South Korean firm, for development of flat panel displays for televisions. Under the terms of the agreement, OIS granted Samsung a worldwide royalty-bearing license.[91,92]

Photonics Technology.--Photonics was founded in 1978. *** have been to the military market. Photonics is developing ***.

Planar Systems, Inc.--Planar was incorporated in April 1983 to commercialize EL technology for HIC FPD products. The firm is an industry leader spearheading the development of EL technology (using thin-film AC). Planar has has recently introduced its first multi-color display ***. Effective January 1, 1991, Planar acquired Lohja Corp.'s EL manufacturing operations in Finland. (HIC FPDs produced by Lohja Corp. were imported into the United States by Finlux during the period under investigation.) The new firm, Planar International, Olarinluoma, Finland, is ***-percent owned by Planar Systems, Inc.

Plasmaco, Inc.--Plasmaco is ***-percent owned by Grossenbacher AG (St. Gallen, Switzerland), ***-percent owned by University Patents (Westport, CT), ***-percent owned by Globus Growth Group, New York NY, ***-percent owned by Crown Life (Toronto, Ontario, Canada), and ***-percent owned by New York State Science & Technology Foundation, Albany, NY). Plasmaco was founded in August 1987. The Highland, NY company acquired its manufacturing equipment and a patent license for the plasma technology from IBM. (Mr. Kehoe, the CEO and President of Plasmaco, was the program manager responsible for the production of plasma displays at IBM.)[93] It is currently developing ***.

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[89] Conference transcript, p. 48.

[90] Staff conversation with ***, Aug. 1, 1991.

[91] At the Commission's hearing, Zvi Yaniv, CEO and president of OIS, testified that the technology transfer demonstrates that OIS' technology can be used for commercial applications and that, moreover, a key milestone to the agreement was a demonstration of high yields on trial production runs. (Transcript, p. 21.)

[92] OIS has stated that its PIN diode approach "***" ***. (Attachment to Mar. 24, 1988 letter submitted as App. 12 to CSMG prehearing brief.) Respondents, in their testimony and in documentation submitted to the Commission, have both praised and expressed reservations regarding OIS' technology. OIS also developed a TFT-LCD display for Samsung. ***.

[93] IBM ceased manufacturing plasma displays in 1986; additional information on IBM's operations is presented in the section of this report titled "U.S. firms that have exited the HIC FPD industry."

The petitioners, along with Standish and Tektronix, have formed a joint venture to propose a series of linked research programs. The research will focus on areas that are applicable to the manufacture of any type of flat panel display technology, namely automated inspection and repair technology and two generic technologies for driver interconnections and packaging. In April 1991, the group was granted $7.5 million under Commerce's new Advanced Technology Program. (Individual petitioning firms have also received research and development funding from the Department of Defense, including the Defense Advanced Research Projectors Agency (DARPA).) In July 1991, the group of U.S. manufacturers joined with the Microelectronics and Computer Technology Corporation (MCC), Austin, TX, to form a consortium called the American Display Consortium (ADC). (MCC is a cooperative R&D enterprise that will administer the ADC.)

The following tabulation shows the markets served by each U.S. producer (as identified by that producer in response to the Commission's questionnaire) and the dates the firm began developing HIC flat panel technology and operating its production facilities:

Firm	Identified markets served	Date firm began developing technology	Date firm decided to enter commercial market	Date firm began full commercial production
*	*	*	*	*	*	*

In the Commission's questionnaire, producers were also requested to identify new market segments and specific end-use applications into which they have unsuccessfully attempted to expand since January 1, 1988. Also, producers were requested to describe and document the steps taken to become viable suppliers of HIC FPDs for new market segments or end-use applications. The information supplied by reporting firms is itemized in the following tabulation:

Firm	Markets into which firm has unsuccessfully attempted to expand	Actions taken
*	*	*	*	*	*	*

OPERATIONS OF HIC FPD INTEGRATORS AND ASSEMBLERS

The petitioners maintain that to be considered a manufacturer of finished HIC FPDs, a firm must, at minimum, have display glass production capability.[94] However, there are also firms known as "integrators" that purchase display glass (either from the petitioners or from Japanese sources), fabricate or assemble purchased electronic components, and perform the final HIC FPD assembly. These firms generally concentrate on HIC FPDs designed for military

[94] Petition, p. 10.

and aerospace applications and, in some cases, also produce the end product into which the flat panel display is inserted.[95] The "incomplete" HIC FPD that is purchased by such firms is packaged in various forms. If purchased from U.S. sources, it generally consisted of ***; in contrast, *** "incomplete HIC FPDs" imported from Japan included at least the drive electronics and, often, the mechanical package.[96]

A second group of firms (referred to here as "assemblers") purchase HIC FPDs that are complete except for what is broadly defined as the "control electronics," which they add, before inserting the display into the end products they manufacture. These firms include medical instrumentation manufacturers, producers of overhead projector panels, and some portable computer manufacturers. Although assemblers may also design their own control electronics, the electronics are often produced for them either by a separate vendor or, in some cases, by the manufacturer from which the display glass was purchased. In general, these firms view themselves as purchasers of a complete display where they perform the final HIC FPD assembly operation or even, more simply, "hook it up," adding minimal value.

OPERATIONS OF IN FOCUS SYSTEMS, INC.

Generally, only the petitioners have the capability of manufacturing display glass in the United States and thus meet their proposed criteria of what constitutes HIC FPD manufacturing activity. However, another U.S. firm, In Focus Systems, Inc. (In Focus), Tualatin, OR, could be considered by the Commission to be a producer of passive matrix LCDs.[97]

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[95] In other instances, there are multiple layers of subcontractors and thus of sales of display glass before the "incomplete" HIC FPD is converted into final form as a "finished" display and inserted into an end-user system.

[96] The following is a list of those HIC FPD integrators that received Commission questionnaires: ***. Firms which did not return completed questionnaires were interviewed by Commission staff on the size and extent of their operations.

Integrators were unable to provide data on their capacity, employment, or financial operations, and were only able to estimate the numbers of display glass purchased (and thus HIC FPDs "completed"). For these firms, the work they performed on the purchased display glass was an integral part of their other manufacturing operations and, in the view of the integrators, did not constitute separate "HIC FPD manufacturing activity." (As noted earlier in this report, there is an increasing trend, especially for high-performance applications, to marry the control electronics of the HIC FPD to the host system and not simply "plug" the display into the system. Rather, the end-user system is designed around and integrated with the HIC FPD.)

[97] The petitioners object to the classification of In Focus as a producer of HIC FPDs (prehearing brief, p. 54), labeling the firm an "assembler of imported LCDs and other components." They state that its investment of less than a million dollars in equipment "nowhere nearly approaches the level of investment needed to product HIC FPDs" (prehearing brief, pp. 56-57).

Dr. Lawrence Tannas testified at the Commission's hearing that he would not consider In Focus to be a manufacturer of displays since they do not meet the test criteria of changing "the electrons to some kind of electro-optic effect" on the glass or, in other words, making actual glass where electric power is turned into an image. (Transcript, p. 256.)

(continued...)

In Focus views itself as the only U.S. producer (and only low-cost, high-volume producer in the world) of color HIC FPDs.[98] In Focus developed, and holds the U.S. patent for a color passive matrix ("TSTN") technology that it hopes will enable it to leap into the burgeoning market for color displays for portable computers ahead of active matrix LCDs: "Our plan is to be equivalent to, or better than, thin-film AMLCD, which will always be twice as expensive as our solution."[99,100] Subtractive color technology, as developed by In Focus, involves the stacking of three STN-LCD panels that are purchased by In Focus from Kyocera, a Japanese manufacturer.[101] Each panel is manufactured by Kyocera to In Focus' specification to subtract color from a specific part of the color spectrum. In Focus then vertically aligns the pixels of each panel so that the color of a pixel is determined by which colors each of the three panels subtracts from the spectrum at that pixel location.[102]

In Focus, which was founded in 1987 and has expanded rapidly since, is primarily known as a manufacturer of overhead projection panels. Until it introduced its "true-color" projection panel in late 1989 using its TSTN-LCD technology, the panels it produced were monochrome and, like those of other manufacturers of such panels, were produced in an assembly operation using purchased display glass and purchased electronics.[103] In Focus views its color projection panels as comparable to and, in essence, the same as a HIC FPD (i.e., and not primarily an end-user system in which a display is placed). According to ***, *** are added to the HIC FPD to form a finished overhead

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[97] (...continued)
Because Commerce, in its final determination, determined that the petitioners did not have standing with respect to passive matrix LCDs, it did not go further to examine whether In Focus is a producer of subject merchandise.

[98] In its response to the Commission's questionnaire, In Focus stated that it *** the petition.

[99] Steve Hix, Chairman and Chief Executive Officer of In Focus, Electronic News, June 3, 1991.

[100] Nick Baran in "LCDs and beyond" (BYTE, Feb. 1991) writes: "The passive-matrix display technology introduced by In Focus Systems has promise. Because it uses conventional LCD panels, it does not have the manufacturing problems that currently plague TFT technology. On the other hand, the passive display system requires a complex optical backlighting scheme involving mirrors and reflectors, which adds to the bulk and power requirements of the display. According to Mentley (of Stanford Resources Institute), the display has considerable potential for desktop presentation applications, but it needs to be refined for use in laptop computers. There is also some question about the response time of stacked-panel passive-matrix displays. Currently, the response time (about 250 milliseconds) is not fast enough to display moving images on the screen, but In Focus says that it's working on a threefold reduction in response time."

[101] Each "panel" meets the structural definition of display glass, as defined by the petitioners and the Commission's questionnaire, in that it essentially consists of sandwiched glass substrates and a material that reacts to a change in voltage. ***. ***. (***.)

[102] An itemization and description of each production step are presented in app. C to this report.

[103] ***.

projector panel.[104] In addition to selling overhead projection panels, In Focus has also developed, and is now marketing, a "direct view" HIC FPD using its color TSTN technology with which it plans to enter the portable computer market.[105]

COMPARISON OF OPERATIONS OF PETITIONERS AND IN FOCUS

Table 8 presents information on the production and U.S. shipments of the petitioning firms and In Focus. As shown, Planar is *** the largest of the petitioning firms, accounting for *** percent of production and *** percent of U.S. shipments in 1990. If classified as U.S. production by the Commission, the operations of In Focus accounted for *** of production and *** of U.S. shipments in 1990. (As noted, In Focus only introduced its color TSTN-LCD displays in late 1989; its share of 1989 production was ***.)

Table 8
HIC FPDs: Quantity of production and U.S. shipments, and shares of production and U.S. shipments, for petitioners and In Focus, by companies, 1990

Firm	Quantity in 1990 Units	Share of total excluding In Focus Percent	Share of total including In Focus Percent
* * * * * * *			

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

The manufacture of a "complete" HIC FPD is a process that involves multiple industries and technologies and substantial design input from the end user (especially for aerospace and military applications) as well as the display glass producer. A key raw material for the display glass is the glass substrate, the processing of which is not particularly complex, but which does result in a degree of dedication to flat panel displays. Planar, which is the largest in size of the petitioners, ***.[106] ***.[107,108] These operations involve distinct and sophisticated "wet chemistry" manufacturing processes and

[104] Staff meeting with ***, May 30, 1991.

[105] In March 1990, In Focus opened a new plant in Portland, Oregon. In its response to the Commission's questionnaire, In Focus stated that the plant "***. ***." ***.

[106] ***. ***.

[107] The petitioners' prehearing brief states that "Magnascreen would prefer to manufacture the active matrix substrates, but the company 'has been unable to secure the investment funds to acquire the capital equipment required to produce them'" (p. 48).

[108] ***. ***. ***.

are capital intensive.[109] In Focus, in contrast, purchases a product which has been *** by Kyocera in Japan.[110] However, the firm, in an assembly operation, performs ***.[111,112]

The second major stage in the manufacture of HIC FPDs is the design, fabrication, and addition of the electronics (and mechanical package) to the display glass. As discussed in the section of this report entitled "Cost of manufacturing," the drive and control electronics represent the majority of the value of the materials in a HIC FPD. ***. ***. Actual display assembly is relatively minor in terms of both the value of capital equipment required and labor time (and cost).[113]

FIRMS STILL IN THE DEVELOPMENTAL STAGES OF PRODUCTION

A large number of firms are involved in flat panel display research and development activities. Some firms which are no longer manufacturing for commercial sale have continued with internal HIC FPD research. The key hurdle for such firms is moving from research and development to production for commercial sale. Because of the large infusions of capital required both for manufacturing facilities (specifically for technologies other than passive matrix LCDs) and the manufacturing experience necessary for reduced manufacturing costs and economies of scale, technological progress is not necessarily correlated with competitiveness in the marketplace in this industry.[114]

Developing firms identified by the petitioners include Coloray, Standish (Hamlin LCD Division), and Magnascreen. Coloray is the leader in the commercial development of field-emission displays. Magnascreen, a petitioner in this investigation, was founded in July 1988 for the purpose of ***.[115]

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[109] The capital costs for the clean room are a significant component, with higher class (higher numerical rating) clean rooms costing more per square foot than lower graded rooms.

[110] ***. ***. ***. ***. (***.) ***.

[111] Petitioners object to this statement, stating that it "cannot possibly be true" (prehearing brief, p. 56).

[112] Response by In Focus to Commission questionnaires.

[113] In its response to the Commission's questionnaire, Planar states: "***. ***."

[114] Using information submitted by Japanese manufacturers as an example, research and development expenses comprised 23.2 percent of the total of the research and development and capital expenditures made by and projected to be made by the manufacturers from 1988 to 1992. In addition to the development of new or improved products and pure research, the reported research and development expenditures also included testing of competitors' products, development of new or improved manufacturing methods, development of new or special equipment, and testing of new materials. Additional information on investment by Japanese manufacturers is presented in the section of this report entitled "Investment by Japanese manufacturers for HIC FPDs."

[115] Dr. Peter Brody, until recently president of Magnascreen, was an early pioneer of active matrix technology in the 1970s at Westinghouse Research Laboratories. In 1975, he reportedly coined the term "active matrix." (Petitioners' prehearing brief, p. 65.)

***. Standish is *** U.S. manufacturer of instrument-type LIC passive matrix LCDs. ***. ***. ***.[116,117]

U.S. Firms That Have Exited the HIC FPD Industry

As noted above, the petition states that during the last several years, U.S. firms have ceased manufacturing operations or been unable to move from research into production of HIC FPDs.[118] In a report to the Commission entitled "Development of the Flat Panel Display Industry" submitted by Japanese respondents, Lawrence Tannas characterizes the move away from HIC FPD development as follows (pp. 20-21):

> "The largest American electronics firms, many of them quite successful as producers of CRTs, had decided that FPD research was simply not a wise investment. In part, this reflected the corporations' judgment that FPD technology was unlikely to produce a commercially-viable replacement for the CRT, but the decision was also based upon a basic change in corporate strategy: the large U.S. electronics firms decided to get out of the business of developing product components, to scale back their commitment to consumer electronics, and to reduce their expenditures on long-term research-and-development projects. All of these considerations helped to push large U.S. firms away from FPD research, and left the field in the U.S. almost entirely to small, specialized firms."

Petitioners, in contrast, attribute the failure of domestic producers to obtain adequate investment financing and thus complete capacity expansion plans and penetrate new markets to the drying up of investment capital because of unfair pricing practices by Japanese manufacturers.[119] During its preliminary and final investigations, the Commission contacted representatives from those firms that the petitioners cited as having ceased work in the field since 1986.[120]

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[116] ***. ***. (***.) ***. ***. (***.)

[117] ***.

[118] A Congressional Budget Office study, dated July 1990, states, "Unlike the DRAM business, which was a market created and then relinquished by U.S.-owned firms, a U.S. flat-panel industry never existed. The U.S. industry largely moved out of solid-state displays while they were still relatively simple. The Japanese firms took over this market by making simple consumer displays."

[119] Petition, p. 36. Petitioners' prehearing brief, pp. 70-74, 100-102.

[120] ***. ***. ***. ***. ***. ***. ***.

Alphasil, Inc.--***. ***.[121] ***. ***. ***.[122] ***.[123] ***. ***. ***.[124] ***. ***.[125]

AT&T.--***. ***.

Babcock Display.--***. ***.

Dale Electronics, Inc.--***. ***. ***.

GTE.--***. ***.[126]

General Electric (GE).--***. ***.[127]

IBM Corporation.--After several years of research and development, IBM began manufacturing HIC plasma displays in 1974. Manufacturing operations ceased in 1986 after IBM determined that plasma technology was

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[121] ***. ***. ***. (***.)

[122] ***. ***. (***.) Volume 19, number 2 (copyright 1990) of Stanford Resources, Inc.'s Electronic Display World states that Hosiden, the first large-scale Japanese manufacturer of active matrix LCDs, "has made many promises and predictions about its ability to supply panels to customers and it has been unable to meet its promises" and cites Hosiden's "historical pattern of audacious claims."

[123] ***. ***. (***.) (***.)

[124] ***. According to Hosiden, it was not aware of the relationship between Sperry and Alphasil during the 1986-87 time period. (***.) Hosiden further states that, in approximately 1989, Honeywell informed it that Alphasil had "consistently failed to develop acceptable specifications for potential avionics displays, and was unable to manufacture acceptable and functional prototypes of a full color active matrix LCD." ***. ***. (Exhibit 9 to Hosiden's posthearing brief and staff conversation with ***, Aug. 1, 1991.) Hosiden's comments were confirmed by ***. (Staff conversation, Aug. 1, 1991.)

[125] ***. (***.) In a public editorial regarding the antidumping petition, Richard Flasck wrote that:

> "As the former founder of Alphasil ... I have been on the front lines and the trenches of this battle for almost 10 years. In general, the U.S. flat panel manufacturing industry is strangling. But not due to Japanese competition--fair or unfair. The problems come from three basic causes:
> (1) Profound lack of leadership at the national level by both government and large private industry.
> (2) Total lack of understanding by the average citizen and by our government concerning the devastating impact of losing such a strategic manufacturing industry.
> (3) The incredibly short-term profit perspective of the U.S. financial industry."

[126] ***. ***.

[127] Letter dated Aug. 7, 1990 from ***. *** further notes that, ***. ***. (***). ***. ***. ***. ***. ***. ***. (***.) (***.)

"not the technology of the future."[128] (As noted earlier, in July 1987, its AC plasma patents and production equipment were tranferred to Plasmaco.) ***. In ***, IBM *** formed a joint venture with Toshiba to manufacture a wide variety of TFT-LCDs with diagonals of at least 9 inches.[129]

Lucitron, Inc.--***. ***.

Sigmatron Nova.--***. ***. ***.

Representatives from LC Systems could not be located by the Commission. However, information on the firm was provided as part of the Commission's investigation on Liquid Crystal Display Television Receivers from Japan (inv. No. 751-TA-14). The following is drawn from the Commission's December 1987 report in that investigation.

LC Systems.--***. ***. ***. (***.)

U.S. Importers

Most of the imports are by U.S-owned original equipment manufacturers (OEMs) or by wholly owned U.S. divisions of Japanese HIC FPD manufacturers that import HIC FPDs for use in their (primarily computer) manufacturing facilities.[130,131] The importers and their respective shares of imports in 1990 are presented in table 9 for all technologies. As shown in table 9, the majority of imports by the U.S. divisions of Japanese HIC FPD manufacturers were produced by their Japanese parent.

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[128] IBM's decision came out of a 1983 task force that was created to develop a long-term strategy for its plasma technology. According to the prehearing brief of the CSMG (pp. 11-12), "The task force determined that in order to reach the goal of replacing the cathode ray tube ("CRT") for general computer applications, flat panels would have to develop full color capacity and reduce their manufacturing costs. The task force created road maps for the various technologies being developed (not just AC plasma) to study the feasibility of achieving full color capability. From those road maps, the task force identified active matrix LCD as the technology of the future because active matrix LCD had the best potential for better brightness, lower power needs, and the achievement of gray scale and full color. IBM further notes (p. 13) that it "***."

[129] ***. ***. ***. (***.) In testimony before the Commission, Paul Low, vice president and general manager for IBM, stated that IBM chose to work with a partner because it concluded the marketplace it had at its disposal was insufficient to provide the volumes needed to obtain the low manufacturing costs and prices required to further generate demand. (Transcript, p. 134.)

[130] Japanese-owned firms that import HIC FPDs for use in their U.S. computer manufacturing facilities include ***.

[131] Increasingly, U.S. importer end users of laptop computers are forming partnerships with Japanese suppliers of the components for the computers, including HIC FPDs. Enrico Pesatori, president and chief executive of Zenith Data Systems Corp., is quoted in Business Week (March 18, 1991): "You can't shop around for components in this market, you have to have strategic alliances. ... You don't fight with them, you work with them."

Table 9
HIC FPDs: U.S. imports and shares of U.S. imports from Japan in 1990, and sources of such imports, by firms

(Imports in units; shares in percent)

Firm	Quantity of U.S. imports from Japan in 1990	Share of 1990 U.S. imports of HIC FPDs from Japan	Japanese manufacturer(s)
*	*	*	*	*	*	*

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

Importers reported shipments from Japan of both "complete" and "incomplete" HIC FPDs. Also, several importer/purchasers reported that they negotiate for the purchase of a complete laptop and import HIC FPDs as a subcomponent of that laptop. As a minimum, all of the reported imports contain display glass.

Channels of Distribution

HIC FPDs (for all technology types) manufactured by U.S. firms were shipped directly to nonrelated end users. No U.S. manufacturer reported any intracompany consumption of the displays it produced. In contrast, U.S. importers (specifically, computer manufacturers) are themselves significant end users and almost *** percent of the HIC FPDs imported from Japan in 1990 were utilized by a "related end user" (table 10). The overhead projector panels and direct-view HIC FPDs produced by In Focus were sold through dealers, distributors, and private-label arrangements.

Table 10
U.S. shipments of HIC FPDs imported from Japan, by channels of distribution, 1990 1/

(In percent)

Item	Type of display: Passive matrix LCD	Active matrix LCD	Plasma display	EL display	Total HIC FPDs
Shipments to related distributors	***	***	***	***	***
Shipments to unrelated distributors	***	***	***	***	***
Shipments to related end users	***	***	***	***	***
Shipments to unrelated end users	***	***	***	***	***
Total	100.0	100.0	100.0	100.0	100.0

1/ Excludes prototypes.

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

CONSIDERATION OF ALLEGED MATERIAL INJURY OR MATERIAL RETARDATION TO AN INDUSTRY IN THE UNITED STATES

The products subject to this investigation are shipped both as "complete" and "incomplete" HIC FPDs. (For the purposes of the Commission's questionnaires, complete displays were defined as consisting of the display glass, drive and control electronics, and mechanical package. Incomplete displays contain the display glass, but lack at least one and possible all of the other components). Also, displays are commonly classified as prototypes or as commercial production.[132] Data in the following sections are shown, unless otherwise indicated, for all HIC FPDs combined, including complete, incomplete, and prototypes.

U.S. Production, Capacity, and Capacity Utilization

Data for the U.S. production, capacity, and capacity utilization of the firms producing HIC FPDs are summarized in table 11. For all HIC FPDs, end-of-period capacity to produce increased by *** percent from 1988 to 1990. For plasma displays alone, U.S. firms *** their production capacity by ***

[132] Prototypes are used for evaluation purposes by customers to examine both the technology and production feasibility of the HIC FPD. Customers generally purchase the prototypes, sometimes under a development agreement, and also may pay non-recurring engineering costs. Prototypes are sold in small quantities relative to displays in "commercial production," a term which refers to mature products where the specifications are fixed.

percent; this reported *** is due to ***. ***. ***.[133] Capacity to produce EL displays which, as reported in table 11, *** over *** percent from 1988 to 1990, includes ***. Planar alone reported capacity to produce *** units in 1988, *** to *** units in 1989 and to *** units in 1990. The reported *** in capacity by Planar resulted from ***. ***.[134] Capacity utilization for Planar was ***.

Table 11
HIC FPDs: U.S. capacity, production, and capacity utilization, by types of displays, 1988-90

* * * * * * *

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

It should be noted that measurement of capacity is not precise for this industry. Capacity is defined by the ability of the firm to produce display glass and will vary according to the sizes of the glass substrates and the current manufacturing yield. (The manufacturing yield is the number of finished displays produced divided by the number of displays started (i.e., glass starts)).[135,136]

Capacity to produce HIC FPDs reported by In Focus ***. Capacity utilization in 1990 for In Focus *** percent. The manufacturing yields reported by In Focus were *** (*** percent to *** percent for color TSTN-LCDs in 1990) than those reported by the petitioners, reflecting the different nature of its operations. (However, some of the Japanese manufacturers producing passive matrix LCDs reported manufacturing yields *** those of In Focus.)

Production of HIC FPDs by petitioners rose steadily from 1988 to 1990, increasing by *** percent from *** units in 1988 to *** units in 1990. The trends are ***: the number of *** displays it produced *** percent from 1988 to 1990. Production of plasma displays was ***, *** from *** units in 1988 to *** units in 1989, then *** to *** units in 1990. All production of active

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[133] As noted in a footnote to table 11, ***, in response to the Commission's questionnaire for the final investigation, chose to report only "proven" capacity or its actual production of *** displays as end-of-period capacity in 1990.

[134] Planar stated in its questionnaire response that ***. ***. ***.

[135] Also, firms reported production of products other than HIC FPDs on the same equipment and machinery used to produce the HIC product. Specifically, Cherry reported ***; Planar also produced ***. (In its preliminary questionnaire response, Planar noted that production of ***.) In addition, firms based their estimate of capacity upon a varying number of operating hours.

[136] Manufacturing yields reported by U.S. manufacturers *** from 1988 through 1990 and were *** those reported by Japanese producers.

matrix LCDs is by OIS, which currently manufactures custom-designed active matrix LCDs and develops prototypes under long-term customer development agreements.

***. Capacity utilization *** from *** percent in 1988 to *** percent in 1989, then *** to *** percent in 1990. ***.[137]

The U.S. industry does not currently have sufficient capacity in place to "replace" imports from Japan, and end-user respondents maintain that lack of capacity influenced their purchasing decisions. During the period of investigation, the ratio of U.S. capacity to U.S. apparent consumption of all HIC FPDs (excluding In Focus) ranged from *** percent in 1988 to *** percent in 1989 and to *** percent in 1990. The United States has no capacity in place to supply passive matrix LCDs to the commercial market, if In Focus is not considered, and *** capacity to produce active matrix LCDs. In contrast, however, for EL displays, U.S. capacity to produce ***.[138]

U.S. Producers' Shipments and Inventories

The quantity and value of U.S. shipments of HIC FPDs by petitioners remained relatively constant from 1988 to 1989, then increased *** by *** percent (for quantity) and *** percent (for value) from 1989 to 1990 (table 12). The trends demonstrated for all HIC FPDs *** those for shipments of EL displays, which accounted for *** percent of U.S. shipments of all displays in 1990. ***, U.S. shipments of plasma displays *** by *** percent from *** units in 1988 to *** units in 1990. (The number of active matrix LCDs shipped ***). The only U.S. shipments of passive matrix LCDs were for the overhead projector panels and direct-view HIC FPDs reported by In Focus.

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[137] For example, production of AC thin-film EL displays require a vacuum deposition chamber; a single chamber costs more than $1 million. (Development of the Flat Panel Display Industry, July 2, 1991, Lawrence Tannas.)

[138] Petitioners state that it is possible to "ramp up" capacity for a particular product during the period between the time of contract negotiation and the date of expected delivery. Mr. Hurd, president of Planar, testified at the conference that "Growth of the HIC flat panel market is mainly driven by major design wins and new improved products. Quite often, with Japanese manufacturers, major design wins are negotiated and committed to well before facilities are in place, or products are in production." (Transcript, pp. 34-35.) Counsel for the petitioners added that at the "design win" stage, U.S. capability to supply is at the very same position as that of the Japanese manufacturers. (Transcript, p. 63.)

Co-counsel for the Japanese manufacturers replies that "although capacity has been added over time, most, if not all, Japanese producers of FPDs were experienced in servicing commercial FPD markets at the time of entering the U.S. market. Furthermore, capacity is rarely, if ever, added simply to supply a specific customer. Capacity is added to supply expected demand, not specific orders." (Postconference brief, pp. 89-90.)

The question of whether the Japanese had in place the capacity to produce when they received orders is addressed further in the section of this report on "Ability of Japanese producers to generate exports and availability of export markets other than the United States."

Table 12
HIC FPDs: U.S. shipments, by types of shipments and by types of displays, 1988-90

* * * * * * *

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

Unit values for HIC FPDs, as reported in table 12, vary sharply: in 1990 the average unit value of U.S. shipments of plasma HIC FPDs was $*** and the average unit value of EL displays was $***. The unit values reported by OIS for its active matrix LCDs were over $***; the unit value of U.S. shipments of the color TSTN-LCDs sold by In Focus were $*** in 1989 and $*** in 1990. The values, as reported, are a function of the following factors: (1) whether a firm is in full production and (2) the number of customized displays or special products sold. A number of U.S. firms are still in the start-up stages; the products of most firms also include high-unit-value ruggedized displays designed for military use.[139]

No intracompany consumption of HIC FPDs was reported by either petitioners or In Focus.[140] There are, however, *** export shipments for *** (table 13). Exports, which accounted for *** percent of total shipments from 1988 through 1990, were made to ***. Such shipments accounted for approximately one-half of total shipments in 1990 by both *** and ***, and almost all of those by ***.[141] *** and *** also export displays.

Table 13
HIC FPDs: U.S. producers' export shipments, by types of displays, 1988-90

* * * * * * *

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

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[139] The petitioners note that prices of flat panel displays vary "depending upon the size of the panel, number of pixels, and complexity of the display technology used--in addition to the relative advancement of the HIC FPD producer along the cost/production curve." (Postconference brief, p. 18.)

[140] In Focus considers its sale of overhead projector panels to be equivalent to the sale of a HIC FPD.

[141] ***. ***.

During the period of investigation, displays were shipped as both "complete" and "incomplete" by the petitioners to their U.S. customers. The following tabulation provides the share of the quantity of U.S. shipments for each construction (in percent):

* * * * * * *

End-of-period inventories for the petitioners, which were reported ***, are shown below:

* * * * * * *

U.S. Employment, Wages, and Productivity

Data on employment and productivity for the petitioning firms are shown in table 14. The number of workers, hours worked, and total compensation paid to workers producing HIC FPDs increased steadily by *** percent, *** percent, and *** percent, respectively, from 1988 to 1990. In contrast, hourly wages paid *** from 1988 to 1990, as did productivity. Productivity ***, however, by type of display produced.

None of the workers for the U.S. producers are represented by a union. In response to a question on the Commission's questionnaire, *** reported reducing its work force by *** employees in *** due to economic difficulties.

Table 14
Average number of production and related workers producing HIC FPDs in establishments that produce display glass, hours worked, 1/ total compensation paid, 2/ hourly wages, and productivity, by types of displays, 1988-90 3/ 4/

Item	1988	1989	1990
* * * * * * *			

1/ Consists of hours worked plus hours of paid leave time.
2/ Consists of wages and contributions to Social Security and other employee benefits.
3/ Excludes data for In Focus. In 1990, In Focus reported that *** production and related workers worked *** hours producing passive matrix LCDs. The workers were paid $*** in wages and received total compensation of $***.
4/ In 1990, firms providing employment data accounted for 100 percent of reported total shipments of HIC FPDs (for manufacturers of display glass).

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

Financial Experience of U.S. Producers

Six companies,[142] representing, in 1990, *** percent of U.S. HIC FPD production, 100 percent of active matrix LCD HIC FPD production, *** percent of plasma HIC FPD production, and 100 percent of EL HIC FPD production, submitted financial data. All companies except Cherry[143] provided financial data on overall operations. OIS provided research and development data on HIC active matrix LCDs. Two companies (Electro Plasma and Plasmaco) provided financial data on HIC plasma displays, and two companies (Cherry and Planar) provided financial data on HIC EL displays. Planar provided separate financial data on research and development agreements with other entities for the development of HIC EL displays. These data are presented in appendix D.[144] Data for In Focus, ***, are presented in appendix E.

Data for Planar, accounting for approximately *** percent of total net sales of HIC EL FPDs for 1990, were verified by the Commission's staff. Planar submitted revised data for capital expenditures and employment as a result of the verification.

Data for In Focus were also verified by the Commission's staff. As a result, In Focus submitted revised employment data and allocated selling, general, and administrative expenses, other income and expense, property, plant, and equipment, and capital expenditures among products.

Generally accepted accounting principles state that a development-stage company is one in which principal operations have not commenced or principal operations have generated an insignificant amount of revenue. During the development-stage, a company devotes most of its activities toward establishing a new business. Plasmaco was designated as a development-stage enterprise by its independent auditors for the first year included in this report. OIS was designated as a development-stage enterprise for all periods in this report. Cherry is an established corporation (net sales of $208.4 million for its last fiscal year); however, Cherry considers flat panel displays to be in the development stage and has so indicated in its notes to the financial statements. Data for the non-development-stage and the development-stage companies are presented combined and separately throughout the financial section of this staff report.

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[142] The companies are Cherry Corporation; Electro Plasma, Inc.; In Focus Systems, Inc.; OIS Optical Imaging Systems; Planar Systems, Inc.; and Plasmaco, Inc. Cherry reported income-and-loss data for the years ended the last day of February 1989, 1990, and 1991; Electro Plasma and In Focus reported data for the years ended December 31, 1988, 1989, and 1990; OIS reported data for the years ended June 30, 1988, 1989, and 1990; Planar reported data for the years ended the last Friday in September 1988, 1989, and 1990; and Plasmaco reported data for the years ended July 31, 1988, 1989, and 1990.

[143] Cherry is developing flat panel displays in ***. Cherry presented flat panel display operations as total operations because company personnel believed that total operations for *** would not be meaningful.

[144] The data on research and development agreements for EL displays are presented separately because the revenue and expenses are not directly related to the production of EL displays. ***.

OVERALL ESTABLISHMENT OPERATIONS

Income-and-loss data of U.S. producers on the overall establishment operations in which flat panel displays are produced are shown in table 15. Net sales, operating ***, net ***, and the operating and net *** margins for overall establishment operations are presented in table 16 for each company, separated as non-development-stage and development-stage companies. Net sales on overall establishment operations for the non-development-stage companies increased each year from $*** in 1988 to $*** (*** percent) in 1989 and to $*** (*** percent) in 1990. Net sales for the development-stage companies increased each year from $*** in 1988, to $*** (*** percent) in 1989, and to $*** (*** percent) in 1990. However, *** of the development-stage companies' net sales (*** percent in 1988, *** percent in 1989, and *** percent in 1990) were from *** research and development agreements. Operating *** decreased for the non-development-stage companies from $*** in 1988 to $*** in 1989 and $*** in 1990. Operating *** for the development-stage companies decreased *** percent from $*** in 1988 to $*** in 1989, but then increased *** percent to $*** in 1990.

Table 15
Income-and-loss experience of U.S. producers on the overall operations of their establishments wherein HIC FPDs are produced, fiscal years 1988-90

* * * * * * *

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

Table 16
Income-and-loss experience of U.S. producers on the overall operations of their establishments wherein HIC FPDs are produced, by firms, fiscal years 1988-90

* * * * * * *

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

HIC FPD OPERATIONS

Income-and-loss data on combined HIC active matrix LCD, HIC plasma display, and HIC EL display operations are shown in table 17. Net sales of flat panel displays increased *** percent from $*** in 1988 to $*** in 1989, and increased an additional *** percent to $*** in 1990. The combined companies incurred operating losses of $*** in 1988, $*** in 1989, and $*** in 1990. Operating loss margins were *** percent in 1988, *** percent in 1989, and *** percent in 1990.

Table 17
Income-and-loss experience of U.S. producers 1/ on their operations producing HIC FPDs, fiscal years 1988-90

Item	1988	1989	1990
	Value (1,000 dollars)		
Net sales	***	***	***
Cost of goods sold	***	***	***
Gross profit or (loss)	***	(***)	(***)
Selling, general, and administrative expenses	***	***	***
Operating loss	(***)	(***)	(***)
Startup or shutdown expense	***	***	***
Interest expense	***	***	***
Other income, net	***	***	***
Net (loss) before income taxes	(***)	(***)	(***)
Depreciation and amortization	***	***	***
Cash flow 2/	(***)	(***)	(***)
	Ratio to net sales (percent)		
Cost of goods sold	***	***	***
Gross profit or (loss)	***	(***)	(***)
Selling, general, and administrative expenses	***	***	***
Operating (loss)	(***)	(***)	(***)
Net (loss) before income taxes	(***)	(***)	(***)
	Number of firms reporting		
Operating losses	***	***	***
Net losses	***	***	***
Data	4	4	5

1/ The producers are Cherry, Electro Plasma, OIS, Planar, and Plasmaco.
2/ Cash flow is defined as net income or loss plus depreciation and amortization.

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

Net sales, operating ***, net ***, and the operating and net *** margins for HIC FPD operations are presented in table 18 for each company, separated as non-development-stage companies and development-stage companies.

Table 18
Income-and-loss experience of U.S. producers on their operations producing HIC FPDs, by firms, fiscal years 1988-90

* * * * * * *

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

Net sales of HIC FPDs for the non-development-stage companies increased *** percent from $*** in 1988 to $*** in 1989, and increased *** percent to $*** in 1990. The combined non-development-stage companies *** operating *** in each year; $*** in each of 1988 and 1989, and $*** in 1990. The operating *** as a share of sales were *** percent in 1988, *** percent in 1989, and decreased to *** percent in 1990.

Net sales of HIC FPDs for the development-stage companies were ***; $*** in 1988, $*** in 1989, and $*** in 1990. *** far exceeded ***, resulting in operating *** of $*** in 1988, $*** in 1989, and $*** in 1990.

OPERATIONS ON HIC ACTIVE MATRIX LCDs

OIS reported that ***, as shown in table 19. OIS did report that it had $*** of revenue from HIC active matrix LCD research and development agreements in 1989 but was ***. OIS reported $*** in net sales from HIC active matrix LCD research and development agreements in 1990 and incurred an operating *** of $*** on those sales.

Table 19
Income-and-loss experience of OIS on its HIC active matrix LCD research and development agreements, fiscal years 1988-90

* * * * * * *

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

OPERATIONS ON HIC PLASMA DISPLAYS

Net sales of plasma displays (table 20) *** percent from $*** in 1988 to $*** in 1989, and *** an additional *** percent to $*** in 1990. Operating *** in 1988. Operating *** in 1989 and $*** in 1990. Operating *** as a

share of sales *** percent in 1988, *** percent in 1989, and *** percent in 1990. Net sales, operating ***, net ***, operating *** margins, and net *** margins for plasma displays are presented in table 21 for Electro Plasma (a non-development-stage company) and Plasmaco (a development-stage company) separately.

Table 20
Income-and-loss experience of U.S. producers on their operations producing HIC plasma displays, fiscal years 1988-90

* * * * * * *

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

Table 21
Income-and-loss experience of U.S. producers on their operations producing HIC plasma displays, by firms, fiscal years 1988-90

* * * * * * *

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

It should be noted from table 21 that the main reason for the operating *** margins is that Plasmaco is a development-stage enterprise and ***.

OPERATIONS ON HIC EL DISPLAYS

Net sales of HIC EL displays (as shown in table 22) *** percent from $*** in 1988 to $*** in 1989, and *** an additional *** percent to $*** in 1990. Operating *** in 1988, $*** in 1989, and $*** in 1990. Operating *** as a share of sales *** percent in 1988, *** percent in 1989, and *** percent in 1990. Net sales, operating ***, net ***, and the operating and net *** margins for EL displays are presented in table 23 for Planar (a non-development-stage company) and Cherry (development HIC EL display operations) separately.

Table 22
Income-and-loss experience of U.S. producers on their operations producing HIC EL displays, fiscal years 1988-90

* * * * * * *

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

Table 23
Income-and-loss experience of U.S. producers on their operations producing HIC EL displays, by firms, fiscal years 1988-90

* * * * * * *

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

It should be noted from table 23 that Cherry's operating *** margins are ***. Cherry's EL HIC FPD production is in the development-stage and the company ***.

BREAKEVEN ANALYSIS

The breakeven point[145] for a firm is that level of sales at which total revenues and total expenses are equal. Profits result when sales exceed this level and losses occur when this point is not achieved. Therefore, a net loss indicates that a firm did not break even and net income indicates that a firm surpassed the breakeven point. A summary of the net income (loss) for U.S. producers is presented in the following tabulation (in thousands of dollars) for the fiscal years of 1988, 1989, and 1990:

* * * * * * *

***. ***.

[145] Breakeven analysis is often performed using production costs and quantities in conjunction with sales; however, as detailed production cost data are not available, especially for any specific product type, income statement information (sales, cost of goods sold, and SG&A) is used in this report. The difference between beginning and ending inventory is not significant, making sales a good proxy for production.

BUSINESS PLANS

Three companies (Electro Plasma, Planar, and Plasmaco) provided their budgets for accounting years 1988-90.

OIS provided ***. ***. ***. ***. ***.

Electro Plasma's actual sales were *** in each year and actual *** was *** in each year. Electro Plasma's data are presented in the following tabulation (in thousands of dollars except as noted):

* * * * * * *

Planar's actual sales were *** in each year and actual *** budgeted *** in 1988 and 1989. Planar budgeted an operating *** in 1990 of $*** but incurred *** of $***. *** of Planar stated that the budget for 1990 ***.[146] Planar's data are presented in the following tabulation (in thousands of dollars except as noted):

* * * * * * *

Plasmaco's actual sales were *** budgeted sales in each year and actual *** was *** in 1989 and 1990. The company ***. *** of Plasmaco stated[147] that actual performance was *** because it ***. Plasmaco's data are presented in the following tabulation (in thousands of dollars except as noted):

* * * * * * *

CAPITAL EXPENDITURES

Capital expenditures for land, buildings, and machinery and equipment used in the manufacture of HIC FPDs are shown in table 24. Capital expenditures are considerably *** for the development-stage companies compared with the non-development-stage companies during the years 1988-90.

Table 24
Capital expenditures by U.S. producers of HIC FPDs, fiscal years 1988-90

* * * * * * *

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

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[146] ***. ***.

[147] Telephone conversation, May 24, 1991.

INVESTMENT IN PRODUCTIVE FACILITIES

The investment in productive facilities and the annual return on total assets are presented in table 25 for overall establishments, HIC EL displays, HIC plasma displays, and all HIC FPDs combined.

Table 25
Value of assets and return on assets of U.S. producers' establishments wherein HIC FPDs are produced, fiscal years 1988-90

* * * * * * *

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

RESEARCH AND DEVELOPMENT EXPENSES

Research and development expenses are presented in table 26. ***. Research and development expenses are *** for the combined development-stage companies compared with the combined non-development-stage companies.

Table 26
Research and development expenses of U.S. producers of HIC FPDs, by products, fiscal years 1988-90

* * * * * * *

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

SOURCES OF CAPITAL

The flat panel display producers were requested to provide their sources for capital expenditures and research and development expenses. Their responses[148] are shown in the following tabulation (in thousands of dollars):[149]

* * * * * * *

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[148] Plasmaco stated in its questionnaire response "***. ***."

[149] Joseph Castellano, president of Stanford Resources, Inc., a displays research firm, stated that "The investment community in the U.S. is just not willing to invest the money. There's a lack of confidence in the ability to compete with Japan." "The new, improved color computer," Forbes, July 23, 1990.

An analysis of the balance sheets of each company[150] as of the end of their fiscal years of 1988, 1989, and 1990 reveals a reasonable indication of the capital obtained by the companies in 1989 and 1990. Summary balance sheets are presented in tables 27, 28, 29, and 30 to highlight changes in working capital;[151] investment in property, plant, and equipment; changes in long-term debt; sources of capital; retained earnings; and retained deficit.

Table 27
Assets, liabilities, shareholders' equity, and current ratio of Electro Plasma's U.S. establishment operations, as of December 31, 1988-90

* * * * * * *

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

Table 28
Assets, liabilities, shareholders' equity, and current ratio of OIS' U.S. establishment operations, as of June 30, 1988-90

* * * * * * *

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

Table 29
Assets, liabilities, shareholders' equity, and current ratio of Planar's U.S. establishment operations, as of the last Friday of September, 1988-90

* * * * * * *

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

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[150] ***.

[151] The current ratio is computed by dividing total current assets by current liabilities. This ratio is a rough indicator of a firm's ability to service its current obligations. Generally, the higher the current ratio, the greater the "cushion" between current obligations and a firm's ability to pay them. However, the composition and quality of current assets is also a critical factor in the analysis of an individual firm's liquidity.

Table 30
Assets, liabilities, shareholders' equity, and current ratio of Plasmaco's U.S. establishment operations, as of July 31, 1988-90

* * * * * * *

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

Electro Plasma (a non-development-stage company) increased *** in 1989 by $***, as shown in table 27, and then decreased *** by $*** in 1990. However, Electro Plasma *** in 1990 to $*** compared with $*** in 1989, resulting in a *** its working capital ratio from *** in 1989 to *** in 1990. Electro Plasma realized *** in *** of $*** in 1989 and *** in 1990 as a result of *** from operations.

OIS[152] (a development-stage company) increased *** by $*** from $*** in 1988 to $*** in 1989, as shown in table 28. OIS acquired additional *** of $*** in 1990. OIS continued to *** from its *** operations, increasing the *** by $*** in 1989, and by $*** in 1990, contributing to the total *** of $*** at the end of fiscal year 1990. Current liabilities *** current assets in 1990, resulting in a current ratio of ***.

Planar[153] (a non-development-stage company) attracted *** of $*** in 1989, as shown in table 29. Planar obtained *** of $*** in 1990. Planar incurred *** of $*** in 1989 and $*** in 1990 as a result of *** from operations. Planar was, however, able to *** working capital ratios of *** in 1988, *** in 1989, and *** in 1990.

Plasmaco (a development-stage company) obtained *** of $*** in 1989 and *** in 1990 (table 30). Plasmaco incurred *** of $*** in 1989 and $*** in 1990 as a result of *** from operations. Plasmaco's working capital ratio was *** as of the end of the fiscal year of 1990.

IMPACT OF IMPORTS ON CAPITAL AND INVESTMENT

The Commission requested U.S. producers to describe any actual or potential negative effects of imports of flat panel displays from Japan on their growth, development and production efforts (including efforts to develop

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[152] OIS issued a news release on May 23, 1991 stating that Guardian Industries Corp. will invest $10.5 million for an equity position in OIS of 29 percent, with an option, exercisable at any time over a three-year period, to invest an additional $10.5 million to attain a 51 percent equity position in OIS.

[153] Planar stated in its questionnaire response, "***. ***."

a derivative or advanced version of their products), investment, and ability to raise capital.[154] Their comments are presented below and in appendix F.

Planar provided *** in its attempts to raise capital as follows:

* * * * * * *

*** commented in the questionnaire response ". . . I cannot attribute one specific event as the cause. But I can contribute the general hopelessness of competing against the Japanese as the cause."

*** refers to its comments in appendix F, which include ". . . as *** sought financing, it time and again experienced the frustration of hearing its ability acknowledged, its business plan praised, and the caliber of its team admired, only to be told that it would not be funded. In some cases, potential sponsors were frank enough to say why. Given the scale of the Japanese commitment to building plant for the manufacture of flat panel displays, and the successful domination of many electronics markets for which the Japanese are known, it was felt that *** might never recover investment, no matter the quality of its products."

*** commented that potential investors and current investors did not invest in *** because "Japanese manufacturers are widely perceived to have already wiped out the domestic base of FPD manufacturers." Further comments by *** and a listing of potential investors are included in appendix F under actual negative effects.

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[154] Petitioners were requested to provide documentation, including names and phone numbers of investors who allegedly did not invest in the respective companies because of imports from Japan. Comments on documentation received have been included in app. F.

CONSIDERATION OF THE QUESTION OF THREAT OF MATERIAL INJURY

Section 771(7)(F)(i) of the Tariff Act of 1930 (19 U.S.C. § 1677(7)(F)(i)) provides that--

> In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of any merchandise, the Commission shall consider, among other relevant factors[155]--
>
> (I) If a subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the subsidy is an export subsidy inconsistent with the Agreement),
>
> (II) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports of the merchandise to the United States,
>
> (III) any rapid increase in United States market penetration and the likelihood that the penetration will increase to an injurious level,
>
> (IV) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices of the merchandise,
>
> (V) any substantial increase in inventories of the merchandise in the United States,
>
> (VI) the presence of underutilized capacity for producing the merchandise in the exporting country,
>
> (VII) any other demonstrable adverse trends that indicate the probability that the importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of actual injury,
>
> (VIII) the potential for product-shifting if production facilities owned or controlled by the foreign manufacturers, which can be used to produce products subject to investigation(s) under section 701 or 731 or to final orders under section 736, are also used to produce the merchandise under investigation,

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[155] Section 771(7)(F)(ii) of the act (19 U.S.C. § 1677(7)(F)(ii)) provides that "Any determination by the Commission under this title that an industry in the United States is threatened with material injury shall be made on the basis of evidence that the threat of material injury is real and that actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition."

> (IX) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both), and
>
> (X) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the like product.[156]

Information on the volume, U.S. market penetration, and pricing of imports of the subject merchandise (items (III) and (IV) above) is presented in the section entitled "Consideration of the causal relationship between imports of the subject merchandise and the alleged material injury;" and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts (item (X)) is presented in the section entitled "Consideration of alleged material injury or material retardation to an industry in the United States." Item (I), regarding subsidies, and item (IX), regarding agricultural products, are not relevant in this case. Parties and staff are unaware of any dumping findings in third countries concerning HIC FPDs or display glass therefor. Available information follows on U.S. inventories of the subject product (item (V)); foreign producers' operations, including the potential for "product-shifting" (items (II), (VI) and (VIII)); and any other threat indicators, if applicable (item (VII) above).

U.S. Inventories of HIC FPDs from Japan

U.S. importers' inventories of HIC FPDs that were held in the United States are reported in table 31. ***.

Table 31
HIC FPDs: U.S. importers' end-of-period inventories of displays produced in Japan, by types of displays, 1988-90

* * * * * * *

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

---

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

Ability of Japanese Producers to Generate Exports and Availability of Export Markets other than the United States

The Commission requested and (with the exception of one firm, ***, a current manufacturer of plasma displays) obtained information on the operations and future investment and product-development plans from all known significant manufacturers of HIC FPDs in Japan. As shown in the following tabulation, a number of Japanese manufacturers produce more than one type of HIC FPD technology:

Firm	Technology 1/ 2/ 3/
Citizen Watch Co, Ltd....	Passive matrix LCD (monochrome)
Fujitsu Ltd.....	Passive matrix (monochrome, color)
	AC plasma (monochrome)
Hitachi, Ltd.....	Passive matrix LCD (monochrome)
	Active matrix LCD (color)
Hosiden Corp.....	Passive matrix (monochrome)
	Active matrix LCD (monochrome, color)
Kyocera Corp.....	Passive matrix LCD
Matsushita Electric Industrial Co., Ltd....	Passive matrix LCD (monochrome)
Matsushita Electronics Corp.....	DC plasma (monochrome)
NEC Corp.....	AC plasma (monochrome)
	Active matrix LCD (full color)
Optrex Corp.....	Passive matrix LCD (monochrome)
Sanyo Electric Co., Ltd..	Passive matrix LCD (monochrome, limited color)
Seiko Epson Corp.....	Passive matrix LCD (mainly monochrome)
	Active matrix LCD (monochrome, limited color)
Seiko Instruments.....	Passive matrix LCD (monochrome)
Sharp Corp.....	Passive matrix LCD
	Active matrix LCD
	AC thin-film EL
Toshiba Corp.....	Passive matrix LCD (monochrome)
	Active matrix LCD (monochrome, color)

1/ Includes only types of HIC FPDs produced for sale in commercial quantities.
2/ As noted earlier in this report, Japanese firms producing more than one type of major technology (i.e., passive matrix LCDs, active matrix LCDs, plasma displays, or EL displays) do so in separate manufacturing facilities.
3/ Individual firms that manufacture passive matrix LCDs frequently employ more than one passive matrix LCD technology (generally a combination of TN, STN, DSTN, FTN, and/or NTN technologies). Use of both thin-film active matrix (i.e., TFT) and metal-insulator-metal (MIM) technologies were reported.

*** began developing its *** technology in 1966, and *** and *** began work on passive matrix LCDs in 1975 and 1979, respectively. The other firms became involved with the development of HIC FPD technology in the early 1980s and all firms had begun full commercial production of at least one type of display by the mid-1980s.

Japanese manufacturers reported assembling HIC FPDs from a variety of manufactured and purchased components. Like the U.S. petitioners, the vast majority of display glass is actually manufactured by the reporting producer from glass that is purchased in its raw or coated form. There are, however, exceptions.[157] Japanese producers also reported both in-house fabrication and purchase of the drivers, control electronics, and mechanical packages.

The following tabulation shows total production and the share of total production from 1988 to 1990 and the number of firms reporting such activity in 1990 for each of the key technology types:[158]

Type of display	Production (Units)	Share (Percent)	Number of firms 1/
Passive matrix LCDs.....	***	***	12
Active matrix LCDs.....	***	***	6
Plasma displays.....	***	***	3
EL displays.....	***	***	1
Total.....	12,279,310	100.0	14

1/ Does not add to total since some firms produce more than one type of HIC FPD.

Production of passive matrix LCDs has dominated Japanese (and thus worldwide) manufacturing activity. Plasma display production has historically assumed lesser importance and *** production of EL displays in Japan. Active matrix LCDs are just entering the Japanese marketplace.

DATA REPORTED BY JAPANESE MANUFACTURERS ON THEIR OPERATIONS FOR SUBJECT HIC FPDs

Data received by the Commission for the combined active matrix LCD and EL HIC FPD operations of Japanese manufacturers are presented in table 32.[159] Because the majority of the absolute indicators on which data were reported vary dramatically between active matrix and EL displays, these displays are discussed separately in the following sections.

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[157] *** reported purchasing display glass for some models of its HIC FPDs, as did ***. "On some occasions," *** also purchases glass that has the electrodes attached to it.

[158] Reported HIC FPD prototypes include passive matrix LCDs with reduced size and weight, and increased contrast, resolution, and gray scale. Work in color passive matrix LCDs also continues. Active matrix LCD prototypes are increasing in size compared to those currently available as commercial production. (***.) A *** is available from *** and *** is prototyping ***.

[159] Data received by the Commission on the passive matrix LCD and plasma HIC FPD operations of Japanese manufacturers are presented in app. G.

Table 32
Active matrix LCD HIC FPDs and EL HIC FPDs: Japanese capacity, production, inventories, capacity utilization, and shipments, 1988-90, and projected 1991 and 1992

* * * * * * *

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

Operations on Active Matrix LCD HIC FPDs

The data presented in table 33 for active matrix LCDs reflect the surge of this technology into the world market. Production of active matrix LCDs in 1990 (*** units) was over *** times what was reported for 1988 (*** units). By 1992, production is expected to rise to *** units. Although capacity to produce is also expected to increase dramatically in the next 2 years, increases in production will outstrip the rate of increase in capacity, with a subsequent expected increase in capacity utilization rates from *** percent in 1990 to *** percent in 1991 and *** percent in 1992.[160] (Capacity utilization data reported for the period under investigation largely reflects that of Hosiden, the largest producer. Capacity utilization for the other four producers in 1990, Hitachi, NEC Technologies, Seiko Epson, and Sharp, ranged from *** percent to *** percent.)

Table 33
Active matrix LCD HIC FPDs: Japanese capacity, production, inventories, capacity utilization, and shipments, 1988-90, and projected 1991 and 1992

* * * * * * *

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

Unlike the other HIC FPD technologies (including the subject EL displays), ***. (The U.S. shipments of active matrix LCDs reflect the Hosiden sale of the product to Apple.) ***. Hosiden was the largest Japanese producer of active matrix LCDs in 1990 (producing *** units); ***, the smallest, reported the manufacture of *** units. Hosiden's dominance should change as the other Japanese manufacturers bring capacity on-stream. ***.

---

[160] As is the case of the domestic industry, the measurement of capacity is not precise and will vary according to the sizes of the glass substrates and the current manufacturing yields.

Operations on EL HIC FPDs

Sharp is the only manufacturer of EL displays in Japan. Data for its operations are reported in table 34. Home market shipments *** from 1988 to 1989, then *** in 1990. In contrast, shipments to the United States were *** throughout the period under investigation, *** from *** units in 1988 to *** units in 1989, then *** to *** units in 1990. ***.

Table 34
EL HIC FPDs: Japanese capacity, production, inventories, capacity utilization, and shipments, 1988-90, and projected 1991 and 1992

* * * * * * *

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

INVESTMENTS BY JAPANESE MANUFACTURERS FOR HIC FPDs

Japanese manufacturers of HIC FPDs are vertically integrated firms that produce a wide variety of other electronic products. The percentage of each firm's total sales in its most recent fiscal year represented by sales of HIC FPDs was *** percent or less for all but 2 firms. Information gathered by the Commission on the capital expenditures and research and development expenses for all HIC FPDs by Japanese firms, including nonsubject passive matrix LCDs and plasma displays, is presented in the following tabulation (in thousands of U.S. dollars):

				Projected--	
Item	1988	1989	1990	1991	1992
Capital expenditures 1/ 2/	175,647	332,221	691,145	618,671	777,358
Research and development expenses 3/ 4/ 5/.....	87,604	115,760	175,424	202,311	203,893
Total.....	263,251	447,981	866,569	820,982	981,251

1/ Includes land and land improvements, building and leasehold improvements, machines, equipment and fixtures.
2/ Does not include projections for capital expenditures in 1991 and 1992 for ***.
3/ Includes the development of new or improved products, testing of competitors' products, development of new or improved manufacturing methods, development of new or special equipment, testing of new materials, and pure research.
4/ *** included research and development expenses for LIC FPDs.
5/ Does not include projections for research and development expenses in 1991 and 1992 for ***.

Total actual or planned investment for all types of HIC FPD technologies for the period from 1988 to 1992 exceeds $3 billion.[161] Most of this investment is for active matrix LCDs.

Awareness of and information on Japanese investment plans are widespread. The following tabulation, drawn from a February 15, 1990 Nikkei Sangyo Newspaper survey on active matrix LCDs, has been widely reprinted and quoted.[162]

Company	Investment plan	Production plans/display size
Sharp.....	$700 million from 1990 to 1993	3,000 to 5,000 per month from April 1990; 10 inches and above
Hitachi.....	$210 million in 1991	500 units of 10 inches and above from April or May 1990
Toshiba/IBM..	$140 million	Beginning production in April 1991
NEC.....	$70 million	8 inches in August 1990 10 inches in November 1990
Mitsubishi...	$70 million	Sampling in 1991
Hoshiden.....	$140 million by 1992	10-inch color units in 1990
Matsushita...	$350 million by 1992	Not available
Sanyo.....	$560 million by 1992	Not available

There are reportedly two joint government-industry development projects involving active matrix LCDs that began in Japan in 1989. In the first project, Tokyo-based GTC Co.--established by the Ministry of International Trade and Industry (MITI) and 17 private Japanese enterprises (reportedly including firms such as Sharp, Hitachi, Seiko Epson, NEC, and Fujitsu)--intends to develop the basic technology required to build an active matrix 40-inch LCD containing 6 million pixels for use in HDTV. The joint venture was budgeted at 2.8 billion yen (of which 70 percent was to be funded by the Japan Key Technology Center (JKTC)), which is under the control of MITI and the Ministry of Posts and Telecommunications (MPT)) to cover costs over a 5-year period. In the second project, Tokyo-based HDTEC, established by MITI, the MPT, and five private companies (reportedly including Seiko Epson and NEC), intend to develop a "projection-type" 50-inch active matrix LCD containing over 2 million pixels for use in HDTV. The project was budgeted at 3.4 billion yen (also apparently 70-percent provided by the JKTC) to cover costs over a 5-year period.[163]

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[161] In response to a Commission inquiry, *** firms reported using returns from sales of products other than HIC FPDs as a source of their funding for capital expenditures and research and development expenses for HIC FPDs. Firms also cited returns from sales of HIC FPDs, debt and equity financing, and corporate capital expenditures as sources of revenue. ***. (There are, however, payments made to HIC FPD manufacturers from their customers for non-recurring engineering costs and tooling charges.)

[162] This information was also cited in the petition.

[163] Nihon Keizai Shimbun, Sept. 20, 1988 and Oct. 2, 1989. Also see "Flat panel displays," a Jardine Fleming Securities LTD industry review dated Dec. 15, 1989.

PLANS FOR THE EXPANSION OF CAPACITY AND OTHER RELATED ISSUES

The following plans to expand capacity to produce HIC FPDs were reported in response to the Commission's questionnaires.

* * * * * * *

***. In late 1991, Sharp Microelectronics Technology, Inc., in Camas, WA, will begin the assembly of passive matrix LCDs from imported display glass and electronics.[164]

The issue of whether Japanese manufacturers had sufficient capacity to produce HIC FPDs available prior to receiving contracts from U.S. customers or whether they developed needed capacity during the period between the start of negotiations and the beginning of full commercial production has been raised. The time required for initial inquiries, purchase and evaluation of prototypes, and the negotiation of a production agreement to be made by a customer typically ranges from a couple of months to a year or more. Throughout the entire period of investigation, Japanese capacity to produce HIC FPDs has been expanding rapidly. In its questionnaire to Japanese manufacturers, the Commission requested that firms list all negotiations that resulted in development and/or production agreements to purchase HIC FPDs by their U.S. customers from 1988 to date and, for each stage of the negotiation, itemize the number of HIC FPDs the customer proposed to purchase and the amount of capacity currently available.[165] In their responses to Commission questionnaires, Japanese firms reported that ***. Firms stated that, in general, plans to expand capacity are based on overall projections and noted that the U.S. market accounts for a relatively small share of worldwide demand for all HIC FPD technologies. However, as noted earlier, this is less true for active matrix HIC FPDs, a subject product, than for the other technologies. Hosiden, the largest producer of active matrix displays during the period of investigation, indicated in its response to the Commission's questionnaire that ***.[166]

Petitioners state in their prehearing brief (p. 88) that "... the long prototype-evaluation-preproduction-production process was done before Hosiden had capacity in place, and that the price negotiations were settled and the contract signed well before Hosiden built capacity." As noted above, the production agreement between Apple and Hosiden was ***. Apple further responds in its posthearing brief (p. 11) that it ***. Furthermore, Apple

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[164] News reports state that the Camas, WA plant will be able to produce 500,000 screens with a diagonal of 10 inches by the end of 1993. "Sharp, under attack by U.S. regulators, to build laptops' thin screens in U.S.," The Wall Street Journal, Feb. 22, 1991. ***. (***.)

[165] "Available" capacity was defined as the number of units that could be manufactured on existing production lines with only minor tooling changes to be made to those lines after the receipt of the order. Capacity that was already committed to the production of displays for other customers was to be excluded.

[166] Construction of Hosiden's active matrix LCD plant for mass production began in *** based upon *** construction plans. The plant was completed *** and was ***. (***.) (Hosiden's posthearing brief, pp. 9-10.)

"did not have to invest in a new production facility or even an entirely new product" (posthearing brief, p. 7).[167]

The decisions made by Apple beginning in 1986 as to which firms it would work with to obtain the active matrix LCD technology were significant ones--both for Apple itself and for the active matrix LCD industry.[168] In 1986, Apple apparently represented the world's only high-volume, commercial user that would eventually choose the technological characteristics offered by active matrix LCDs.[169] (In 1989, the year commercial shipments began, Apple purchased *** percent of the total number of active matrix LCDs shipped worldwide by all Japanese manufacturers; by 1990, that percentage ***.) Apple's interest was key not so much in terms of the money it invested in prototypes and non-recurring engineering expenses--which was less than $***--but because its participation in the development and anticipated future commitment to buy justified the investment by manufacturers (or their investors) in production capacity.[170] ***. ***.

Although Apple signed the development agreement with Hosiden on ***, it continued to examine other possible suppliers, including OIS and Planar.[171] (Apple was willing to consider a second source, especially one located in the United States.)[172] Both OIS and Planar have named Apple as a "lost sale" in their questionnaire responses, a claim rejected by respondents. Further information on discussions held between Apple and OIS and Apple and Planar is presented in the section of this report entitled "Consideration of the causal relationship between imports of the subject merchandise and the alleged material injury." Also, a discussion of the documentation provided in support of the claims by petitioners and respondents is presented in appendix H to this report.

WORLD MARKET

The same forces which have driven the U.S. market are found on a world-wide basis. In its response to the Commission's questionnaire in the preliminary investigation, *** stated:

> "The change in the HIC flat panel market worldwide since 1987 can only be termed revolutionary. The growth in demand attributable to portable, laptop, and notebook computers is astronomical. The producers of portable computers have become giant consumers of HIC flat panel displays, including Japan, Korea, Taiwan, and the United States, though the lion's share of HIC flat panel manufacturing has been captured by Japan."

---

[167] ***. ***. ***. ***. ***. ***. ***. (***. ***.) ***. ***.

[168] ***. ***. (***.)

[169] Unlike the other U.S. manufacturers of portable computers, Apple did not choose a passive matrix LCD for its laptop version of the Macintosh since ***.

[170] ***. ***. (***.)

[171] ***. ***. ***. ***. ***. ***. ***.

[172] Testimony of Randy Battat, vice president of portable computers, Apple. (Transcript, p. 125.)

Countries other than Japan are setting up production lines for HIC FPDs.[173] Both Korea and Taiwan are reportedly planning manufacturing operations and, as noted earlier in the report, Thomson-CSF began production operations in *** in France using active matrix LCD technology acquired from General Electric.

CONSIDERATION OF THE CAUSAL RELATIONSHIP BETWEEN IMPORTS OF THE SUBJECT MERCHANDISE AND THE ALLEGED MATERIAL INJURY

U.S. Imports

IMPORTS FROM JAPAN

The quantity of subject imports from Japan rose *** from *** units in 1988 to *** units in 1989 and *** units in 1990, or by over *** percent (table 35). The increase is *** due to shipments of active matrix LCDs, which began in significant numbers during the fall of 1989. Such shipments are expected to increase throughout the 1990s (table 33) as Japanese manufacturers bring capacity on-stream and new applications are developed or users of other monochrome displays switch to the color active matrix product. (The magnitude of the increase during the period of investigation, however, is *** due to one sale, that of displays sold by Hosiden to Apple for the Macintosh portable. Imports of active matrix LCDs by firms other than Apple increased from *** units in 1988 to *** units in 1989 and then to *** units in 1990.) *** imports of subject EL displays ***.

Table 35
HIC FPDs: U.S. imports from Japan, by types of displays, 1988-90

* * * * * * *

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

The quantity of imports of all types of HIC FPD technologies from Japan increased from *** units in 1988 to *** units in 1990, or by *** percent (table 35). The value of U.S. imports of HIC FPDs imported from Japan followed a similar trend as the quantity of U.S. imports from 1988 to 1990, increasing by *** percent. The increase in imports is *** due to imports of LCDs (including nonsubject passive matrix LCDs) from Japan: such imports rose from *** units in 1988 to *** units in 1990, an increase of over *** percent. Imports of nonsubject plasma displays decreased irregularly by *** percent from *** units in 1988 to *** units in 1990. Shipments of imported HIC FPDs primarily consisted of the nonsubject passive matrix LCDs and plasma technologies: subject imports comprised *** percent of total U.S. imports from Japan (based on quantity) in 1988, *** percent in 1989, and *** percent in 1990.

---

[173] Currently, complete laptops imported into the United States include Japanese-manufactured HIC FPDs. ***.

Based on value, those shares were *** percent in 1988, *** percent in 1989, and *** percent in 1990.

Unit values of U.S. imports of HIC FPDs, in aggregate, remained relatively constant. However, reported unit values for the four types of displays vary somewhat: in 1990 the average value of U.S. imports of passive matrix LCDs from Japan was $***, the average value of active matrix LCDs was $***,[174] the average value of plasma displays was $***, and the average value of imported EL displays was $***. Individual firms reported unit values for active matrix LCDs that varied widely, from $*** per display (for ***) to $*** per display (for ***).

HIC FPDs are imported from Japan as both "complete" (i.e., consisting of the display glass, drive and control electronics, and mechanical package) and as "incomplete" displays. (As noted earlier, incomplete displays contain the display glass, but lack at least one and, by definition, possibly all of the other components). *** reported "incomplete displays" from Japan contained the drive electronics (along with the display glass). Frequently the mechanical package was also included. The control electronics, however, were not included in any of the "incomplete" units.[175]

An undetermined number of imports of HIC FPDs during the period covered by the investigation were imported separately because of the special 100-percent duty rate applicable to certain computers imported from Japan having non-CRT displays. The HIC FPDs were subsequently assembled into complete computers in the United States. The suspending of the 100-percent duty, effective August 1, 1991, may affect the importation mix of HIC FPDs and the completed computers in which they are used.

IMPORTS FROM OTHER SOURCES

The only additional source of imports reported (and then only of EL displays) was Finland. The following tabulation shows the quantity, value, and unit value of U.S. imports of EL displays from Finland:[176]

* * * * * * *

. (.)

Imports from all sources (including Finland) are reported in table 36.

---

[174] This unit value is based almost completely on monochrome active matrix LCDs.

[175] Because of difficulties in precisely defining the electronic components (most specifically the control electronics) the distinction between a "complete" HIC FPD and an "incomplete" HIC FPD is not clear.

[176] Data are reported on a fiscal-year basis (Mar. 1 to Feb. 28). Data for the remainder of 1990 are not available.

Table 36
HIC FPDs: U.S. imports from all countries, by types of displays, 1988-90

* * * * * * *

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

U.S. Market Penetration by Imports

Data on penetration by subject imports into the U.S. market for all HIC FPDs are presented in table 37. The market shares of active matrix LCDs and EL displays are also presented separately in table 38. As shown in table 37, nonsubject imports from Japan dominate the U.S. market for HIC FPDs. (The market shares of imports of passive matrix LCDs and plasma displays from Japan do not fall below *** percent (based on quantity of U.S. shipments) during any period.) Subject imports account for a small, but growing market share, increasing (based on quantity) from *** percent in 1988 to *** percent in 1989 to *** percent in 1990. The share of the domestic market accounted for by the domestic industry (whether or not In Focus is included) is also small, ranging between *** percent and *** percent of the quantity of total U.S. shipments during the period under investigation. (However, as shown in table 37, domestic producers' share of the value of U.S. shipments is significantly larger.) The share of the market accounted for by U.S. producers' shipments decreased from 1988 to 1989, then rose in 1990 (whether measured by quantity or value and whether or not including In Focus). If production data for In Focus are included, the market share of domestic producers was higher in 1990 (for both quantity and value of U.S. shipments) than it was in either 1988 or 1989.

As shown in table 38, shipments from Japan of active matrix LCDs *** the U.S. market; only *** units manufactured by OIS were sold domestically. The market shares accounted for by imports from Japan of EL displays, in terms of quantity, have *** from *** percent in 1988 to *** percent in 1989, then to *** percent in 1990. The *** from 1988 to 1989, however, ***, as imports from Finland *** from *** percent in 1988 to *** percent in 1989. Because the data on imports from Finland are estimated for 1990 (based upon only 4 months reporting), comparisons for 1990 are questionable although believed to be a reasonable approximation of actual U.S. shipments of such imports. However, it is clear that for EL displays, U.S. producers' supplied approximately *** of the market for such displays (in terms of quantity) in 1988, *** in 1989, then, in 1990, *** percent.

Table 37
HIC FPDs: Producers' and importers' U.S. shipments, apparent consumption, and market shares, 1988-90

Item	1988	1989	1990
	Quantity (units)		
The industry without In Focus:			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	483,407	666,711	824,001
The industry with In Focus:[2]			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	***	***	***
	Value (1,000 dollars)		
The industry without In Focus:			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	127,899	190,130	222,174
The industry with In Focus:[2]			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	***	***	***

See footnotes at end of table.

Table 37--Continued
HIC FPDs: Producers' and importers' U.S. shipments, apparent consumption, and market shares, 1988-90

Item	1988	1989	1990
	Market share by quantity (percent)		
The industry without In Focus:			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	100.0	100.0	100.0
The industry with In Focus:[2]			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	100.0	100.0	100.0
	Market share by value (percent)		
The industry without In Focus:			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	100.0	100.0	100.0
The industry with In Focus:[2]			
Producers' U.S. shipments	***	***	***
U.S. shipments of imports from--			
Japan:			
Subject imports	***	***	***
Nonsubject imports	***	***	***
Subtotal	***	***	***
Finland[1]	***	***	***
Total	***	***	***
Apparent U.S. consumption	100.0	100.0	100.0

[1] The only imports from sources other than Japan that were reported were imports of EL displays from Finland. Data on shipments of imports of EL displays from Finland are reported on a fiscal-year basis (March 11 to February 28) for 1988 and 1989 and were annualized for 1990 by Commission staff based upon 4 months reporting (March 1, 1990 to June 30, 1990).
[2] The passive matrix LCD display glass imported for use by In Focus is reported both in shipments of imports and in U.S. producers' shipments. (However, the amount reported as U.S. producers' shipments is *** than one-third of the number of units imported because about 3 of the imported display glass units are incorporated into each In Focus unit produced.) Thus, apparent U.S. consumption is slightly overstated.

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

Table 38
Active matrix LCDs and EL displays: Producers' and importers' U.S. shipments, apparent consumption, and market shares, 1988-90

* * * * * * *

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

Selection of HIC FPD Technology and Vendor

For reasons addressed in greater detail earlier in this report, analyses of the competitiveness and interchangeability of different technologies are complex. The often extensive background research and engineering evaluations required prior to the selection of a display for commercial use demonstrate the technical nature of both the displays, the end products in which they are used and, thus, the purchasing decision itself. The rapid changes in HIC FPD technology during the period of investigation compound the difficulty of assessing or evaluating past purchasing decisions based on discussions of currently available technology. Furthermore, "currently available technology" may still be in the research or development stages and conversion of research units into production-model displays is an uncertain process. For end products designed around the HIC FPD, the display selection assumes such importance to the success of the product that such factors as the financial stability of the HIC FPD producer and its ability to continue production and technical development of the display are significant.

The multiplicity of HIC FPDs is matched by a multiplicity of markets which have likewise varying characteristics, needs, and, thus, purchasing criteria. For OEMs of computers the design of the display assumes great importance for "leading-edge models."[177] The technical and design aspects of the display are equally important to users with military and aerospace applications, except here the display accounts for a small portion of the value of the end-user system. (In contrast, the display is the *** component of a portable computer.) A third key market is comprised of the small-volume users who purchase off-the-shelf models, mainly for industrial and medical applications.

To permit such issues to be addressed or considered at the point where the individual purchasing decision actually occurred, the Commission included a section in its questionnaires requesting purchasers of HIC FPDs to describe their selection processes for both the HIC FPD technology and display vendor for all of their negotiations which would have led to HIC FPD deliveries after January 1, 1988. Because purchasers, in briefs submitted to the Commission during its preliminary investigation, characterized their purchasing process as consisting of multiple stages (generally, (1) initial inquiry and evaluation, (2) evaluation of prototypes leading to a development agreement,

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[177] This is less true, of course, for computers which are designed to appeal to consumers for reasons other than state-of-the-art technology (namely, price).

and (3) negotiations leading to production agreement), the Commission further requested that purchasers provide relevant information separately for each of their discussion or negotiation stages.

The information received is presented in tables I-1 and I-2 in appendix I to this report. The following discussion is general and does not attempt to address or assess the role played by price; more specific information on the negotiation processes undertaken by individual firms is presented in the next section of this report.

Table I-1 details the selection of the HIC FPD technology for each end product for which a purchasing decision was made; table I-2 provides further information on vendor selection for each of the purchasing decisions.[178,179] As shown in table I-1, firms typically reported that they either reviewed or assessed the potential of different HIC FPD technologies (and, on occasion, CRTs) during what the Commission labelled the "initial inquiry and evaluation" or what firms sometimes described as the design or model stage.[180] These evaluations were made through general research, reviews of data sheets, display demonstrations and test-use, and visits to suppliers. The number of vendors and offerings reviewed varied, but usually included several sources (see table I-2, where firms listed the early stages). As shown in table I-1, the reasons provided by respondents for selecting a specific technology generally mirror the performance characteristics commonly ascribed to each technology and discussed earlier in this report.[181,182] The technology decision

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[178] Some of the purchasing decisions identified in tables I-1 and I-2 were also cited as "lost sales" by U.S. producers. Further identification and analysis of specific sales are provided later in this report.

[179] The Commission received a response from all known importers (most of which are computer manufacturers) to its importer/purchaser questionnaires. As stated earlier in this report, such firms almost exclusively purchase imported HIC FPDs from Japan. However, a smaller number of the firms that purchase HIC FPDs for use in products other than computers (specifically, aerospace/military and industrial and medical applications) responded. These firms purchase both domestically produced and imported displays.

[180] Exceptions include end products where there were what firms considered clear barriers to the use of other technologies (specifically, ***.)

[181] Although a limited number of such purchasers are included in tables I-1 and I-2, firms using displays for end uses other than portable computers also reported identifying and selecting a specific HIC FPD technology early in the decision process. Specifically, *** selected EL displays for a *** before the product was designed, *** selected passive matrix LCDs for a *** before the initial inquiry to vendors, *** selected EL displays for *** before the design of the product, *** selected active matrix LCDs for a *** during initial design, *** selected passive matrix LCDs for *** without conducting a full technology search; *** selected LCDs for a *** at the end of the model stage, *** chose passive matrix LCDs at the beginning of the formal design stage, *** chose EL for a *** at its conceptual stage, *** selected passive matrix LCDs for *** during product design, and *** chose plasma displays for *** during the proposal stage (table I-1). None of these firms reported "negotiations" with vendors offering other technologies.

[182] Such patterns do not, however, necessarily demonstrate absolute differences among technologies. For some applications, alternate technologies

(continued...)

appears to have been made before firms began the testing of prototypes.[183] As shown in table I-2, no firm reported contacting or considering vendors offering more than one type of technology (the type it eventually purchased) during the so-called "prototype evaluation/development agreement stage." Firms generally reported purchasing and evaluating prototypes from no more than two or three firms before selecting one firm (with occasionally a backup supplier) to receive the commercial order. The reasons for not further considering disqualified vendors or for selecting the winning manufacturer cited by purchasers can be generally classified as technical performance or reliability of supply, but, taken individually, depict the myriad concerns of purchasers.

Perceived differences between the technologies can determine whether a firm is even considered as a vendor--especially if the purchaser believes a passive matrix LCD is required. As shown in table I-2, many firms indicated that they did not consider purchasing from or even contacting U.S. producers because of their inability to supply passive matrix LCDs.

The Negotiation Process

In the HIC FPD market, purchasers usually follow certain steps in choosing a supplier of displays. In general, purchasers determine the design and specifications of the end product that they wish to manufacture, including the type of display, and then evaluate the various suppliers to determine which firms have the ability to manufacture the specific HIC FPDs needed. The process of evaluating each supplier varies somewhat from purchaser to purchaser. U.S. purchasers of HIC FPDs were asked to provide information concerning the history and process of their purchasing negotiations with domestic and foreign suppliers. A summary of the information received from purchasers follows.[184] This information reflects the purchasing habits of the OEM computer manufacturers, medical equipment manufacturers, and control equipment makers.

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[182] (...continued)
can clearly be used should the purchaser desire different performance characteristics. As shown in table I-1, ***. Also, more than one technology was viewed as possessing the needed functions by *** for its ***. ***.

[183] The "decision stage" classifications in table I-2 were those reported by questionnaire respondents. Although the Commission's questionnaire suggested categories (namely, (1) initial inquiry and evaluation, (2) evaluation of prototypes leading to development agreement, and (3) negotiations leading to production agreement), respondents were requested to report their own stages if these were not meaningful for their firm's operations. Firms did not necessarily complete one "stage" for all suppliers before proceeding to the next stage (specifically, ***'s selection of a supplier for its ***).

[184] See app. I for a tabulation containing additional information on the decisions of these purchasers that provided information on the negotiation process.

COMPUTER MANUFACTURERS

*** reported that its typical decision process for the purchase of HIC FPDs opens as follows: first it prepares a custom design that meets specific operating parameters of the particular end-use application (e.g., ***). The next step is to verify whether the potential supplier has the technology to meet the parameters defined by ***'s custom design and the resources to develop a custom product. *** then examines whether or not the management has the infrastructure needed to mass produce the particular HIC FPD. *** then inspects the financial stability of the potential supplier and its ability to sustain high production rates. It is also important to *** that the firm can supply a quality product in a reliable fashion. Finally, *** assesses whether or not the supplier has the ability to continue to service ***'s technical needs in the long term. According to ***, the most important criteria in the evaluation process are technology, manufacturing capability and flexibility, and the overall philosophy of the vendor regarding the customer-supplier relationship.[185] It is only after these criteria have been examined that price is considered in the purchasing decision.

*** provided details of the negotiation and decision making process for ***.[186] *** reported that it chose LCD displays for these end products because only the LCD technology met ***'s criteria; factors considered by *** included response time, ***, low power requirement, light weight, and the ability to move from monochrome to multigray level by ***. *** stated that it did examine other technologies (e.g., EL and plasma technologies) but that they did not meet ***'s product specifications. In those cases where the supplier's product did not meet the technological specifications, the cost of the display was not considered by ***.

***. During the initial evaluation phase, price was not discussed. *** was not considered after this phase because *** did not believe that *** had the ability to produce the needed *** in mass commercial quantities. In addition, *** reported that *** did not submit a business plan or a strategy for production. *** also were not considered after this phase.[187] In the prototype evaluation stage, *** examined ***. Target prices were discussed at this time.[188] *** decided to purchase the *** displays from ***, a Japanese supplier, because only *** passed all of ***'s quality, reliability, and performance goals.

***. *** initially examined ***. ***. *** reported that it has ***. ***.[189]

*** reported that it generally creates a product design before it begins any negotiations for the purchase of HIC FPDs. *** first determines the technology required to manufacture the new product. *** engineers then interview all potential qualified suppliers of the chosen technology.[190,191]

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[185] ***.
[186] ***.
[187] ***. ***.
[188] ***.
[189] ***. ***.
[190] ***.
[191] ***.

Once qualified vendors are identified, *** provides specifications to which they respond with project proposals. *** may then order prototypes from the suppliers and ***'s engineers then request cost estimates. Per-unit price does not become a major issue until the appropriate technology is chosen and *** has determined that the vendor has met all its requirements.[192]

*** reported specific information on its purchases of HIC FPDs for ***. ***.[193] As stated above, *** made the technology decision on the basis of the specifications of the end-use product. For its purchases of *** displays, *** reported that it originally examined all technologies of FPDs but decided that the *** FPD was the best technology for its products.[194] *** reported that in one instance where it purchased LCD displays, domestic firms were considered during the research phase, but, in the others, they were not because they lacked the capability to manufacture ***.[195]

*** reported that there are several stages from the initial conception to the final marketing of the product. In the first stage, which is an ongoing process, *** evaluates the available technologies.[196] In the second stage, *** develops a product for commercial marketing using information obtained from customer surveys. The technology for the FPD is determined at this stage based on the specific requirements for the end product. *** then develops the preliminary specifications for the product and the FPD and surveys the vendors that are known to have the manufacturing potential to produce it. *** requests potential suppliers to submit information pertaining to ***'s requirements and often purchases prototypes from these firms. After narrowing down the number of potential suppliers to about ***, *** sends the firms a request for quotation (RFQ).[197] *** then analyzes the responses, paying particular attention to ***. In the next stage, the RFQ requests estimated prices. Cost then becomes one of the factors in determining the final vendor.[198] A final decision is made after these factors have been evaluated.

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[192] *** requires that the supplier demonstrates that it can custom design to ***'s specifications; is able to manufacture to high quality standards and is committed to such standards; has high-volume manufacturing capability; and can be flexible to frequent changes in volume and technology requirements. ***.

[193] ***.

[194] *** chose *** Japanese firms to supply it with the ***. *** reported that it did not consider any U.S. producers of *** panels, because at the time, the only U.S. firm that could have supplied their *** needs was ***; *** did not want to purchase from ***. *** reported that it did not purchase from *** because *** was not sure of *** product availability and production capability. According to ***, in ***, *** estimated that it would take *** before a prototype would be available and *** before full production would be possible.

[195] *** reported that it visited ***, a domestic producer, in *** in connection with its purchases of *** FPDs for ***. ***. ***.

[196] ***.

[197] The RFQ contains the full engineering specifications and seeks information to enable *** to determine the reliability of the product and the supplier, as well as the basic costs for the product.

[198] *** reported that cost is only one of numerous factors in making a determination between vendors of the same technology. Other factors such as ***.

*** presented specific information for two of its end products. *** chose a *** display for one product (***) and a *** display for the other product (***); in both cases, the technologies matched the needs of the end product the best. *** chose ***, a Japanese producer, as the primary source for the *** displays and *** as the alternate source. *** reported that *** was chosen for many reasons, including the fact that it had ***. *** considered *** U.S. *** as a source for *** displays for the personal computer.[199] *** was rejected for several reasons, including ***.

For its *** display purchases, *** examined *** different Japanese suppliers and chose *** because ***'s product was the closest fit to ***'s requirements. ***.

*** reported that it typically does not participate in negotiations for the purchase of HIC FPDs; rather, *** handles negotiations. However, *** reported that it did participate in the negotiations for the purchase of HIC FPDs for one end product, ***. *** negotiation process begins with a survey of the technologies available to meet the requirements. It then surveys potential vendors offering the specific technology and selects the vendor that is best qualified for the particular project. The final phase is the negotiation and development of the product. For its ***, *** chose a *** FPD. *** reported that the leading factor in the selection of this display was ***. *** stated that other possible technologies, such as *** were considered but were rejected because of power consumption, display life, and weight. *** reported that both plasma and EL technologies consume four times the amount of power that the LCD technology consumes.[200] Cost was not a critical factor in the evaluation of ***; in the case of *** technology, ***.

*** provided information on its purchasing negotiations in general and details with respect to *** of its end products, ***. *** reported that its typical decision process for HIC FPDs begins with an assessment of competitive technologies. *** first evaluates samples and then enters production volume negotiations.

For its *** display, *** chose to use a passive matrix, *** display from ***, a Japanese supplier. *** reported that other technologies, such as plasma and EL, were precluded from use in this product by power requirements. *** also reported that older LCD technologies were not feasible because they did not meet the optical requirements (e.g., response time and high contrast). *** also stated that the cost of the FPD for this product was not considered until the final phase of negotiations.

For its ***, *** chose to use a passive-matrix LCD display; therefore, no domestic producers were involved in the negotiations. *** reported that plasma and EL were once again precluded by power requirements. *** stated that the cost of the FPD was considered in both the sample evaluation and final negotiation stages.

*** also provided details on its negotiations for HIC FPDs for its *** computer. For this end product, *** chose to use *** displays. Of the *** firms considered, one was a U.S. firm (***) and *** were Japanese (***). ***

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[199] ***. ***.

[200] ***.

rejected *** during the first phase of the decision process.[201] *** chose to purchase HIC FPDs from *** because it was the only vendor that demonstrated that it was capable of supplying the required HIC FPD. *** was rejected due to its repeated inability to provide samples that met the power consumption and gray scale that were required.

*** provided information on its purchases of HIC FPDs for three different portable computers. For all three of these products, *** chose to use *** purchased from ***. *** considered ***, which are Japanese suppliers; however, *** was rejected in one of the three instances because of ***. In another case, *** supplied displays for the end product. *** ultimately selected ***. In the third instance, *** was chosen over *** because of proven technology, the possibility of future color technology with the same mechanical layout, and superior screen quality.

MEDICAL EQUIPMENT MANUFACTURERS

*** provided information regarding its negotiation process for HIC FPDs. *** generally begins by establishing the desired specifications of the display. It then identifies FPD vendors who meet these particular specifications and obtains prototypes for evaluation. *** then issues a request for quotation and compares the prices of the FPDs of different suppliers. Price and performance comparisons are made and sources are selected.

*** described the process by which it decided to purchase *** HIC FPD for use in its ***.[202] Prior to the design of the project, *** evaluated LCD, EL, and CRT technologies on the basis of cost, performance, size, weight, and power consumption. *** found that the *** technology was the only one suited to the needs of the product. *** displays were chosen over CRTs because the *** panels allowed power consumption and size to be minimized. Although *** displays offered the same power/size consumption advantages as *** displays, *** provided neither adequate brightness nor appropriate viewing angle. *** reported that the cost of the *** display was ***. The decision to use *** displays was made very early in the development cycle, even before the final product had been designed. *** reported that it considered *** producers of *** panels--***. *** stated that it rejected *** because ***. *** was rejected because ***. *** rejected *** because ***. *** was selected to provide *** with the *** displays because its *** display ***.[203]

*** outlined the four steps that it follows in a typical negotiation for HIC FPDs. *** compiles a list of different types of displays, gathers data sheets, and orders a few of each of the most promising displays for evaluation. *** then orders about *** of the initially selected displays for prototyping. After these steps, *** places its first production order for final displays in which it provides specific purchasing information for one of its end products. *** chose to use a *** display for use in its ***. *** decided to use this particular technology prior to the negotiation phase; *** technology was selected because it had the lowest cost and power consumption.

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[201] ***.

[202] This product ***.

[203] ***.

*** reported that *** technology was examined, but, for this particular end product, only *** was feasible. *** reported that other technologies were rejected because of their cost, their power requirements, and their large size. *** did not consider any domestic suppliers for this product because no U.S. producers manufacture ***.

*** reported information concerning its decision to purchase passive matrix LCD displays for use in its ***. *** decided to use LCDs in the design phase based on performance and price; *** reported that its three main criteria were ***. *** reported that the resolution and visual intensity of the LCD display were acceptable and the cost of the LCD was ***. *** reported that the visual intensity of the LCD was not as good as that of the EL displays, but, by ***, the LCD technology had improved. *** received price quotations from *** and decided to purchase the LCD displays from *** because of ***.[204] No U.S. firm was considered because none had the capability of supplying passive matrix LCD displays.

*** also provided information regarding its decision to use EL panels in its ***. *** reported that although it could have used either LCD or plasma displays in this application; it chose EL displays because ***. At the time of the initial evaluation (***), *** found the EL technology to be far superior to the LCD technology; *** stated that the performance of LCD displays has improved and ***. *** reported that the LCD technology ***. *** received price quotations from *** but purchased the EL displays from *** because ***.[205]

*** provided information on its purchasing negotiations with HIC FPD suppliers. *** reported that the marketing and engineering departments first determine the requirements based on the end use. Detailed product specifications are then submitted to potential vendors who use them to determine price quotations. *** evaluates prototypes and samples from the potential suppliers and then negotiates with the qualified suppliers.

For use in ***, *** chose a passive matrix LCD display. *** reported that no other technology could be used for this particular end use. *** chose to purchase LCD technology from ***, a Japanese supplier, because of ***.

AVIONICS EQUIPMENT MANUFACTURERS

*** provided information concerning its purchases of active matrix LCD displays for use in ***. *** reported that it generally performs an engineering analysis of technical capabilities to focus on the product's compliance to specification requirements. The next step is the negotiation of terms, conditions, and unit price. For ***, *** conducted technology studies from ***. *** chose the active matrix LCD display because it most closely produced the same characteristics as a CRT. *** stated that it examined several other technologies, including plasma and EL, for this end use, but it rejected these other technologies because of their failure to meet color, resolution, brightness, power, space, weight, gray scale, and viewing angle

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[204] ***.

[205] ***. ***.

requirements.[206] For this product, *** purchased the active matrix LCD display from the Japanese firm ***.

*** also provided information on its purchasing decision for ***. *** reported that active matrix LCD displays were chosen for use in this product because they had the capability to provide high resolution, full color graphics, and environmental ruggedness. *** reported that the active matrix LCDs were also chosen because of their reduced weight (relative to CRTs), space requirement, and power demand. *** reported that early development efforts were made with *** and ***. According to ***, the U.S. manufacturers were either unable to deliver the product or were bought by another company where the technology was moved off shore. *** reported that it ruled out *** because *** was not considered as advanced as its competition. *** ability to meet major performance specifications was judged to be questionable. *** sourced its displays from *** because *** was believed to be capable of meeting ***'s performance requirements and was also committed to ***'s custom design.

OVERHEAD PROJECTOR MANUFACTURERS

*** reported that it designs its end product around potential new display technologies. *** stated that it works closely with *** manufacturers to identify new displays with the potential applicability for its products. *** reported that ***. According to ***.

*** provided information on its decision to use a ***. *** reported that it chose the *** because there were no other color, transmissive display technologies that had the required speed, contrast, availability, and pricing. ***.[207] *** also reported that it did not attempt to purchase these displays from any U.S. suppliers because they are incapable of producing these displays in sufficient quantities.

*** provided information on selection of HIC FPDs for its ***. *** reported that it introduced ***. At that time, *** was the only supplier that offered the necessary technology. *** stated that it likes to maintain contact with all potential suppliers and is interested in negotiating the purchase of suitable LCD technology. *** reported that no U.S. manufacturer has been able to supply the appropriate LCD samples nor have they been willing to propose a program that would eventually support its requirements. *** stated that it has notified many HIC FPD suppliers, including domestic firms, of its requirements. According to ***, *** did not respond to *** request for quotation on ***.

OTHER EQUIPMENT MANUFACTURERS

*** provided information concerning its choice of an EL display purchased from *** for use in its ***.[208] *** reported that it compared EL, LCD, and plasma HIC FPDS for use in this product but it chose EL displays. According

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[206] ***.

[207] ***.

[208] ***.

to ***, plasma displays could also have been used for this particular end product; however, EL was chosen because of its ***.[209] *** reported that it looked at *** as a possible supplier of EL displays but did not select *** because its product was less durable than ***'s product.

Prices

HIC FPDs are an important component in a wide range of electronic equipment including aircraft instrumentation, electronic publishing and composing equipment, laptop computers, machine-tool controllers, medical-monitoring instruments, and word-processing equipment.[210] Thus, the demand for HIC FPDs depends upon the demand for these widely varied products. Two important technological trends appear to have tended to increase the demand for certain HIC FPDs in recent years. First, the trend toward smaller sized portable computers has led to a search for the smallest and lightest possible components and, second, there is a trend toward color technology in products such as laptop computers. These factors are likely to influence the demand for LCD displays because LCDs tend to be lighter (in weight) than other HIC FPD technologies, consume less power, and also have a more certain capability of color technology.[211,212]

During the period of investigation, U.S. flat panel display producers reported sales of EL and plasma displays, but no sales of active or passive matrix LCDs.[213,214] Most U.S.-produced HIC FPDs were sold directly to original equipment manufacturers (OEMs) for use in process-control and measurement equipment, office equipment, aerospace and military applications, and medical instruments. Only a small share of U.S.-produced HIC FPDs were sold for use in laptop computers.

Importers of Japanese HIC FPDs reported sales of all types of displays, but sales of passive matrix LCDs dominate. Importers sold displays for use in laptop and other computers, test equipment, overhead projectors, medical instruments, and consumer entertainment. The great majority of Japanese HIC FPDs were passive matrix LCDs sold to OEMs as components for laptop computers.[215]

Although some firms reported using price lists, most producers and importers reported that they do not use price lists as a starting point to determine prices for HIC FPDs.[216] FPD prices are generally determined though negotiations between the supplier and the purchaser; these negotiations can be

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[209] ***. ***.

[210] For a complete discussion of flat panel display uses see the section of this report entitled "The product."

[211] Currently, work is also being done to achieve color in the EL and plasma technologies.

[212] The majority of FPDs have been used in portable and laptop computers.

[213] ***.

[214] ***. ***.

[215] The Department of Commerce has rescinded its investigation on passive matrix LCD displays due to the lack of standing by the petitioners.

[216] Prices for a particular type of flat panel display can also vary depending on the special features required.

formal, but often are informal discussions between the two parties.[217] The first price that is discussed is usually referred to as the "target price." This target price is usually discussed in the first stages of negotiations between firms. Only after a supplier is chosen is a firm price determined.[218] FPD prices are typically quoted on an f.o.b. warehouse basis, and standard sales terms are net 30 days.

Many producers and importers reported that HIC FPD prices are the result of a series of informal negotiations between a single supplier and the purchaser rather than formal bids by more than one supplier. However, a few suppliers reported that a formal bid process is followed; this procedure is generally followed in sales to large OEMs and is required by the military. Suppliers reported that these OEMs usually begin their selection process by summarizing the technical specifications they require in a formal inquiry to a manufacturer, sometimes referred to as a Request for Information (RFI). An RFI usually specifies the OEM's expected production date, a projected schedule for production of sample prototypes, a request for a "budgetary price" for a range of production levels, a total cost breakdown for some of these runs, and a cost breakdown for any development costs that the producer would seek to have the OEM pay.

Those OEMs that solicit bids typically distribute their RFI only to manufacturers who are thought to have the technical and production capabilities to satisfy the RFI's requirements. In most cases these OEMs do not inform a particular manufacturer of how many other manufacturers received an RFI.

Based upon the information it receives in response to its RFI, these OEMs ask a few manufacturers to respond in writing to a Request for Quote (RFQ). An RFQ is typically issued by the OEM approximately a month after it has received responses to its RFI. The RFQ stage is the actual formal quotation process, including pricing based on a scale of quantities. At this stage, the OEM provides the manufacturers with more complete specifications asking for unit pricing, nonrecurring engineering costs and tooling charges, lead times, and development schedules.

The OEM evaluates the responses to its RFQ on the basis of technical merit, its past experience with the suppliers, and the suppliers' ability to provide the required volumes on schedule and at the agreed-upon price. Any one of these criteria might be more important than the others for a particular OEM; the precise mix varies from OEM to OEM and from project to project.

For a month or so after receiving the RFQs, the OEM and one or two potential manufacturers typically negotiate details such as timing and cost for provision of samples and prototypes, last-minute technological

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[217] Many purchasers reported that the decision from whom to purchase FPDs is first based on the availability of the particular technology; it is only after it is determined who is capable of supplying the specific FPD that price is discussed.

[218] The petitioners stated that they believe that the target price is actually the final price (see transcript of the hearing, pp. 30 and 61). On the other hand, purchasers reported that the target price is only an estimated value.

modifications, and prices for production runs. After agreeing to these details, the OEM typically awards the business to one or occasionally two suppliers, and a "design win" has taken place.

The majority of U.S. producers and importers reported that they are often subject to certain qualification procedures before they will be considered a potential supplier. Purchasers will evaluate potential suppliers on the basis of several factors; only those suppliers that satisfy these criteria are given serious consideration. In general, the factors considered include the financial strength of the supplier, current availability of product, past production experience of the supplier, product quality, capacity and production capability, quality control and assurance systems, and reliability of the firm. One importer, ***, reported that its purchasers believed that the level of technology and future capability in technological advances are important factors in choosing a particular supplier.

QUESTIONNAIRE PRICE DATA

The Commission requested U.S. producers and importers to provide quarterly price data between January 1988 and March 1991 for 24 representative FPD products and bid information for their sales of HIC FPDs. Price data were requested for the largest sales and the total quantity sold of four types of FPD products; passive matrix LCD, active matrix LCD, EL, and plasma. The selected products have varied applications. Passive matrix LCDs are mainly used in laptop computers, as well as in overhead projectors and test equipment. Active matrix LCDs are used in laptop and other computers, and aerospace and test equipment. EL displays are used to a limited extent in computers, but the majority are used in medical instruments, aerospace equipment, test equipment, and in specialized military applications.[219] Plasma displays are mainly used in computers, medical instruments, and specialized military equipment. Each product category was further broken down by pixel matrix configuration (e.g., 640 x 200, 640 x 400, or 640 x 480) and by gray scale or nongray scale capabilities. The Commission received usable price data for only 10 of the 24 products; data for 8 of these are presented in tables, while the other 2 are not because there were only very limited observations. Domestic producers reported prices for sales of EL and plasma displays, but not for sales of any of the specified passive matrix or active matrix LCD products. Importers of Japanese HIC FPDs reported prices for sales of EL, plasma, and passive matrix LCD products, but not for the specified active matrix LCD products. The eight products for which pricing data were reported are listed below:[220,221]

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[219] For a more complete discussion of FPD applications see the section of the staff report entitled "Like product considerations and comparison of technologies."

[220] Usable pricing data were not received for the other 16 products.

[221] The products for which price data were received accounted for *** percent of shipments of U.S.-produced HIC FPDs in 1990 and 15 percent of shipments of Japanese imports of FPDs in 1990.

Product 1: 640 x 200 plasma display (gray scale)
Product 2: 640 x 200 EL display (nongray scale)
Product 3: 640 x 400 EL display (nongray scale)
Product 4: 640 x 400 plasma display (nongray scale)
Product 5: 640 x 400 passive LCD (gray scale)
Product 6: 640 x 200 passive LCD (nongray scale)
Product 7: 640 x 480 passive LCD (gray scale)
Product 8: 640 x 480 passive LCD (nongray scale)

Three U.S. producers and eight importers reported usable price data, although most of their price series were not complete for all quarters.[222]

Several problems make it difficult to discuss price trends and comparisons in the FPD market. First, it is not appropriate to combine the selling prices of different suppliers to compute weighted-average prices because many of the HIC FPDs are manufactured specifically for use in a particular end users' product. Therefore, for a given producer, each flat panel display that it makes is likely to vary from one purchaser to another. Another problem in discussing price trends in the FPD market arises because within each product definition, each supplier sells various models of HIC FPDs. Therefore, what may appear to be trends in the prices for a given supplier may instead be the result of changes in the product mix sold by the supplier during different quarters.[223] Therefore, one must use caution when discussing actual price trends in the display market.

PRICE TRENDS

Prices for U.S.- and Japanese-produced HIC FPDs are presented in tables 39-43. Prices are reported by U.S. producers and importers of Japanese HIC FPDs with 640 x 200, 640 x 400, and 640 x 480 pixel matrix configurations, respectively. For all products, the prices shown in the tables are series reported by a single firm rather than weighted averages for the industry. In general, the limited pricing data available indicate that sales prices for U.S.-produced display products fell during the period January 1988-March 1991. Prices for HIC FPDs imported from Japan were generally mixed; however, in

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[222] Three domestic producers (***) reported usable pricing data. Several other U.S. producers reported shipments of HIC FPDs but did not report any usable pricing data. *** reported shipments of *** displays in 1990 for aerospace applications. *** reported that these displays were prototypes manufactured to meet the requirements of customer requests. *** reported shipments of plasma displays for aerospace and specialized military applications. *** reported shipments of *** plasma displays in 1990 for various applications; however, *** reported that none of these displays fit the requested product descriptions (***).

[223] For example, there may appear to be changes in the prices of a product for a given supplier; however, these changes may be the result of the supplier reporting sales of one model in one quarter and sales of another model in another. If the two models have different prices, due to different features, then the prices charged will vary. Thus, it may appear that a supplier's prices for a given product category may change during the period but these "trends" may actually be the result of variations in the product mix.

Table 39
HIC FPDs: Sales prices and total quantities for products 1, 2, and 3, as reported by U.S. producers and U.S. importers of Japanese HIC FPDs, by companies and by quarters, January 1988-March 1991

* * * * * * *

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

Table 40
HIC FPDs: Sales prices and total quantities for product 4 (640 x 400, plasma display, with nongray scale), as reported by U.S. producers and U.S. importers of Japanese HIC FPDs, by companies and by quarters, January 1988-March 1991

* * * * * * *

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

Table 41
HIC FPDs: Sales prices and total quantities for product 5 (640 x 400, passive LCD, with gray scale), as reported by U.S. importers of Japanese HIC FPDs, by companies and by quarters, January 1988-March 1991

* * * * * * *

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

Table 42
HIC FPDs: Sales prices and total quantities for product 6 (640 x 200, passive LCD, with nongray scale), as reported by U.S. importers of Japanese HIC FPDs, by companies and by quarters, January 1988-March 1991

* * * * * * *

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

Table 43
HIC FPDs: Sales prices and total quantities for products 7 and 8 (640 x 480, passive LCDs), as reported by U.S. importers of Japanese HIC FPDs, by companies and by quarters, January 1988-March 1991

* * * * * * *

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

several cases there was little change in the prices of different models within the period of investigation.

Domestic producers reported sufficient quarterly f.o.b. sales prices to show price series for products 2 and 3 (table 39). Prices reported by *** for product 2 are for different models fitting the general definition in different quarters; therefore, trends cannot be discussed. Prices reported by *** for product 2 *** during the period, ***. ***'s prices for product 3 *** between $*** and $*** per unit during 1988, but ***. *** prices were *** in 1990, before *** in the first quarter of 1991.[224]

* * * * * *

Importers of Japanese-produced HIC FPDs who market these products reported enough sales price data to show price series for products 1, 4, 5, 6, 7, and 8.[225] In many cases, importers reported prices for different models of HIC FPDs within each product definition. Therefore, trends in prices may be the result of changes in the product mix for which the firm is reporting prices. In those cases where the price series reported represent sales of one model, price trends can be analyzed.

*** reported prices for product 1 during the period. The reported prices are for one model and they ***.[226]

*** U.S. importers reported prices for sales of product 4 during the period of investigation. ***. *** reported prices for a single model of product 4; these prices *** percent during 1988 and ***. ***. ***. Overall, ***. Prices for product 4 reported by *** during the period, *** in 1988, and were *** during 1989 and through the second quarter of 1990, but were *** than they were at the beginning of the period.

Prices were reported by *** U.S importers of product 5, a passive matrix LCD, from Japan--***. All *** firms reported prices for different models within the specified definition, thus making price trend discussion difficult. ***'s prices for product 5 ranged from $*** to $*** during the period while ***'s ranged from $*** to $***. Prices reported by *** were constant at $*** for one model and at $*** for the other model. Although ***'s prices for product 5 ranged from $*** to $***, the prices ***.

For product 6, another passive matrix LCD, five importers reported prices--***. Both *** and *** reported a price series for one specific model for the entire period of investigation. Prices reported ***; in the first quarter of 1991, prices reported by *** and *** were *** and *** percent ***, respectively, than they were in the first quarter of 1988. Prices reported by *** were for different models within the general description of product 6; *** prices for each model within the reported series *** during the period. ***'s prices for product 6 ranged from $*** and $*** while ***'s ranged from $*** to $***. Prices reported by *** varied for each model and ranged from $*** to $*** during the period of investigation.

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[224] ***. ***.

[225] ***. ***. ***.

[226] The price reported by ***.

*** importers reported prices for product 7 sold during the period of investigation. *** reported sales of this product in only *** quarters; these prices represent sales of different models that fit the general description of product 7. ***'s prices for product 7 ranged from $*** to $*** during the period January 1989 to March 1991. *** reported prices for product 7; although these prices show *** during the period, they represent sales of different models. Within the series for product 7, the prices for each of the models *** during the period. *** reported prices for only *** quarters during the period of investigation; these prices *** from *** to *** before *** in the first quarter of 1991.

*** importers reported prices for sales of product 8 during the period of investigation. Prices reported by *** were for different models within the general definition for product 8. ***'s prices for each model ***, with the overall range for all models being $*** and $***. ***'s prices for product 8 ranged from $*** to $***; prices for a given model within the definition also *** during the period of investigation.

PRICE COMPARISONS

There were only a few instances where prices were reported by both U.S. producers and importers for the same product in the same quarters. However, there are serious difficulties in making comparisons between prices for even those few instances. The main difficulty arises because there are differences between products within the same general product category (due to customization for the purchaser). In many instances, the HIC FPDs are specifically manufactured for a certain purchaser; therefore, the various flat panels for which prices were reported may differ in the number and type of features offered. In addition, the bulk of the sales of the imported product are passive matrix LCDs and U.S. producers do not produce these types of displays for commercial sale. Finally, the quantity of displays sold can also affect the price of the product.

For only *** quarter for product 3 and *** quarters for product *** were prices reported by both U.S. producers and importers of Japanese HIC FPDs.[227] In the case of product 3 (640 x 400 El display), the Japanese product was priced significantly lower than the domestic product.[228] For product 4 (640 x 400 plasma display), the Japanese HIC FPDs were priced below the corresponding U.S. product in all three instances. However, it should be noted that the quantities of the U.S.-produced products were vastly different than those of the Japanese product during those quarters.[229]

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[227] Prices reported by *** for product 3 are not presented in the table but are discussed in footnote 2 of table 39.

[228] ***'s price was $*** while ***'s was $*** during ***. The quantity for which *** reported prices (i.e., *** units) was much lower than that of *** (i.e., *** units).

[229] ***.

BID INFORMATION

U.S. producers and importers were also requested to provide information on bids they made to sell HIC FPDs since January 1988. Because many of the sales in the HIC FPD market are the result of informal negotiations, many producers and importers were unable to provide actual bid information. *** and *** were able to provide limited information on their sales quotations for HIC FPDs. ***. ***. ***. ***. ***.

PURCHASER RESPONSES

Questionnaires were sent to approximately 60 firms that are believed to be purchasers of HIC FPDs. Because of the many different uses for HIC FPDs, there are a wide variety of types of consumers. The major groups of purchasers of FPDs are manufacturers of personal computers, medical equipment, avionics equipment, control equipment, and military control equipment. In general, most purchasers reported that they had specific technological needs that required a specific type of HIC FPD. A summary of the information obtained from various purchasers follows.

Purchasers of Active Matrix LCDs

There are currently only a relatively small number of purchasers of active matrix LCDs; however, some industry experts believe that the size of this market will grow strongly over the next few years.[230] Questionnaire responses were received from three purchasers of active matrix LCDs. *** purchases monochrome active matrix LCDs for use in its ***. *** purchases color active matrix LCDs for use in ***, while *** uses these displays in a ***.

Although the end products of these firms differ, all three purchasers reported buying active matrix LCDs because they best fit the technological specifications of the products. ***.[231] ***.

All three of these purchasers have some similarities in their purchasing habits. They all stated that they generally contact only one or two suppliers when making a purchasing decision but none reported changing suppliers in the last few years. The reluctance to change suppliers can be attributed in part to the fact that suppliers must be qualified before purchases are made.

All three firms reported that they have procedures for qualifying their suppliers. *** reported that its qualification process can be very lengthy and involved. Suppliers are evaluated based on adequate capacity availability, yield rates for the specified FPD, and the ability to provide expanded capacity. *** reported that prototype panels must meet its performance specifications and the supplier must demonstrate that it has the capability to manufacture at least *** units per year. *** rates its

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[230] Active matrix LCD is reportedly the technology of the future because it has color capability and low weight and power requirements. ***.

[231] ***. ***.

potential suppliers based on technology, quality, responsiveness, delivery, and cost.

Each of these purchasers reported that it considers several major factors before purchasing FPDs. *** reported that it examines the supplier's willingness to develop *** panels, the technical talent of the supplier, the manufacturing capability, the quality program of the supplier, and the financial stability of the manufacturer. The major factors considered by *** include technology, quality, responsiveness of the supplier, delivery, and cost. *** reported that since its purchases are of ***, it focuses on the supplier's basic design technology, management and manufacturing infrastructure, business performance, and ***.[232]

***, ***, and *** all reported purchase prices for active matrix LCDs.[233] ***.[234] ***.[235] ***.

Purchasers of EL Displays

Ten firms that purchased EL panels during the period of the investigation provided information on purchases of these products.[236] These firms reported using EL displays in products such as medical monitors, portable computers, militarized portable computers, and control panels in shipboard and airborne applications.[237,238]

These purchasers also reported that there are qualifications that a supplier must meet before they will be considered to be a source of HIC FPDs. The qualification of suppliers is often done at the design phase of the product. Suppliers are evaluated based on product availability, product quality, past experience of the supplier, existing production and technology, and commitment to customer support. While most of these purchasers reported they have not failed to qualify a supplier, two firms stated that they have. ***. ***.[239]

Several major factors are considered by these purchasers when choosing the source of display panels. Purchasers of EL panels reported that they consider the current and forecasted product availability; product quality; policies regarding warranty, service, and technical support; customer service; price; manufacturing capability; leadtime; and range of supplier's product line. In general, most EL purchasers did not mention price as one of the major factors considered.

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[232] *** reported that technology is the core of the relationship.

[233] ***. ***. ***.

[234] *** was the importer of record on these purchases.

[235] *** was the importer of record for these purchases.

[236] Firms that purchased EL displays include ***.

[237] The use of HIC FPDs in the *** market is relatively new. These manufacturers are beginning to use FPDs to reduce the weight, power consumption, and size of the products.

[238] ***. ***. ***. ***.

[239] ***.

Purchase prices for EL displays were reported by four firms during the period of investigation (table 44). Three firms reported purchasing 640 x 200 EL displays from domestic sources; prices for all of these firms *** during the quarters for which they were reported. *** was the only firm that reported purchasing this product from a Japanese source. ***'s prices *** irregularly during the period. As stated earlier, it is difficult to compare prices due to the fact the FPDs are often custom made. However, ***'s prices for the *** EL panel were the lowest while ***'s prices for the *** EL were generally higher than the others.

Purchase price data for 640 x 400 EL displays were sparse (table 45). Prices reported by *** for domestic FPDs *** from January-March 1989 to October-December 1990. Prices reported by *** for the same product imported from Japan *** during 1990 but then *** in the first quarter of 1991. The prices reported by *** and *** for the Japanese products were *** than those reported for the domestic FPDs.

Table 44
HIC FPDs: Purchase prices and total quantities for U.S.-produced and Japanese **640 x 200 EL displays**, as reported by U.S. purchasers, by companies and by quarters, January 1988-March 1991

* * * * * *

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

Table 45
HIC FPDs: Purchase prices and total quantities for U.S.-produced and Japanese **640 x 400 EL displays**, as reported by U.S. purchasers, by companies and by quarters, January 1988-March 1991

* * * * * *

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

Purchasers of Passive Matrix LCDs

Eleven purchasers reported buying passive matrix LCDs for use in laptop and notebook computers, portable medical monitors, and control equipment. These purchasers reported that passive matrix LCDs are best suited to certain applications because of the low weight, size, and power requirements. Most of these purchasers stated that they chose the passive matrix LCD panels at the beginning of the design phase of the end product; the technical specifications of the end product determined the type of display to be used.

These purchasers stated that they consider several factors when choosing a supplier from whom to purchase HIC FPDs. These factors include technological capability, production capability, quality, competitive pricing, traditional relationship with supplier, customer service, and flexibility to respond to changes in quantity demanded.

Purchasers of Plasma Displays

Five firms reported buying plasma displays for use in avionics products, military control equipment, computers, and control equipment. These purchasers reported buying plasma displays for such reasons as technical design, ruggedness, wide viewing angle, and high contrast.

In the avionics market, *** reported using plasma panels. ***. ***.

In the military market, ***.[240] *** reported that supplier changes are not usually made because the number of suppliers for each technology is limited. In this market, suppliers are qualified on the basis of existing technology and production capabilities and supplier history.[241]

*** was the only firm that purchased plasma displays for use in a computer. *** chose plasma displays for use in this laptop product because of the need for quick response and wide viewing angle. *** reported that it infrequently changes suppliers because of technology and partnership considerations. *** reported that it examines several factors when choosing a supplier, including available technology, historical vendor experience, and commitment to customer service. ***.

Lost Sales and Lost Revenues from the Final Investigation

*** submitted 15 allegations of lost sales totaling $*** and involving *** units and 13 allegations of lost revenues totaling $*** and involving *** units during the final investigation.[242,243] Seventeen of these allegations were submitted and investigated in the preliminary investigation; the information obtained on these allegations is contained in the following section of the report. A summary of the information obtained during the final investigation follows.[244]

*** was named by *** in a lost sales allegation totaling $*** and involving *** displays allegedly due to competition from Japanese imports during ***. *** reported that it did purchase between *** and *** displays from *** instead of buying a comparable product from a domestic producer. *** reported that it paid $*** per unit for the displays purchased from *** for

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[240] ***.

[241] *** also purchased plasma displays for the military market.

[242] Of the 15 lost sales allegations, *** involved Japanese EL displays; these allegations totaled $***. Of the 13 lost revenues allegations, *** involved EL displays; these allegations totaled $*** of lost revenues.

[243] ***. ***. ***.

[244] Of the 28 firms named in these allegations, staff contacted all and received information from 22 firms.

use in its ***; the price of the domestic product was around $*** per unit (for a quantity of ***). *** reported that the FPD is *** and the cost of the FPD becomes important because ***. *** added that the *** panel was chosen over other technologies because of its wider viewing angle and display color; both of these characteristics are ***.

*** alleged that it lost revenues of $*** on a sale of *** displays to *** in *** due to competition from Japanese *** displays. *** reported that the price of the domestic *** displays was reduced from $*** (per unit) to $*** (per unit); however, *** stated the price decrease was due to a ***, not competition from Japanese FPDs. *** reported that it was ***. ***. *** reported that the quality of the *** product was better but ***.

*** alleged that it lost revenues of $*** on a sale of *** displays to *** due to competition from Japanese *** displays. *** did not specifically comment on the lost revenue allegation; however, *** did provide information on the company's purchasing habits. *** reported that the majority of FPDs that *** purchased in *** were from ***; ***. The remainder of ***'s purchases in *** were from ***.[245] *** reported that during the period ***. *** stated that *** began buying FPDs from ***. *** stated that *** was having trouble ***. *** added that it is difficult switching from FPDs of one supplier to those of another; the cost of switching can be as much as it would cost to develop the product initially.

*** alleged that it lost revenues of $*** on a sale of *** displays to *** in *** due to competition from Japanese *** displays. *** stated that the company did purchase the reported units from *** at the reduced price. *** stated the price was reduced primarily because ***. ***.[246]

*** reported losing revenues of $*** on a sale of *** displays to *** in *** allegedly due to competition from Japanese *** displays. *** did not confirm this specific allegation but reported that U.S. FPD companies have lowered their price to ***. *** stated that *** has not used the price of Japanese FPDs in the negotiations for lower domestic prices; however, she did state that FPD salespeople are usually aware that the Japanese product is available at a lower price. According to ***, the quality of the U.S. *** display is superior to that of the Japanese and *** has only used domestic *** displays in the *** that it produces. *** stated that the company purchases domestic FPDs because it wants to support the American market and the performance is better.

*** named *** in *** lost sales allegations involving a total of *** displays worth $*** in *** and ***. ***. There is some disagreement over this allegation. ***.[247] Petitioners assert that this indicates that price is in fact important in the purchasing decision and that is why *** dropped the project.[248] According to ***, the decision was not based on the per-unit price of the display, rather on the total cost of the project. *** stated that ***.[249] *** rejected ***'s proposal because ***. *** reported that it never

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[245] *** import HIC FPDs from Japan.
[246] ***. ***. ***. ***.
[247] ***. ***. ***.
[248] Transcript of the hearing, p. 49.
[249] ***.

bought the alleged *** units from Japan; it only purchased about *** prototypes. The end product for which these displays were used was never sold in the commercial marketplace, therefore the *** displays were not needed.

*** alleged that it lost $*** of revenues on a sale of *** displays to *** allegedly due to competition from Japanese FPDs. *** denied the allegation, stating ***. *** reported that the company does purchase *** displays and the majority (i.e., 80 percent) of those purchased in *** were from U.S. suppliers. *** also reported that some U.S. suppliers were considered possible suppliers of HIC FPDs but were not chosen because of price.[250] However, ***.

Lost Sales and Lost Revenues from the Preliminary Investigation

During the preliminary investigation, *** firms reported *** allegations of lost sales of *** units valued at $*** and *** allegations of lost revenues totaling $*** on sales of *** units. Staff contacted 12 customers concerning 14 allegations representing $*** in alleged lost sales and *** allegations representing $*** in alleged lost revenues.

*** was named by *** in *** lost sales allegations of *** displays with *** configurations worth $*** in *** and ***. ***, a representative of ***, reported that *** imported ***. *** stated that *** frequently contacted U.S. producers of HIC FPDs (***) but their ability to deliver displays in the timeframe and volume required did not meet ***'s product-development schedule. *** did not issue formal RFIs or RFQs. All requests were made verbally, with firms responding by letters. A price may have been quoted, but not as an absolute number, only as a ballpark figure.

*** reported that in ***, at the design stage of *** was considered as a supplier of *** displays, but was not able to deliver according to ***'s product-development schedule. Even if *** agreed to move its time frame back, ***'s maximum capacity to supply *** displays did not meet half of ***'s requirements.

In ***, *** decided to buy *** displays from two Japanese firms. After the product-development stage, *** did not consider substituting *** displays for *** displays because the two types of displays are distinctly different in appearance. A domestic producer of *** displays, ***, did not have production facilities at the time.

*** considered buying *** from ***, but ruled them out because of ***. In ***, *** began to use passive matrix LCDs, which consume lower levels of power, in battery-powered products. *** did not consider using *** displays in these product lines because they consumed too much power.

*** stated that ***, cost was never a deciding factor in the purchasing decisions. The product requirements, amounts, and time involved were always the deciding factors.

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[250] ***.

, was named by *** in a *** lost sales allegation for *** displays having *** configurations valued at $ million. ***, reported that they are under contract with *** to provide ***. Therefore, ***.

*** uses only *** displays, and has bought only from ***. They have not imported any HIC FPDs. In 1989, ***, but the *** firms did not do enough development in HIC FPDs to warrant buying the imported product.

Initially, *** sends out RFIs. If the technical qualifications are met, the producer is sent an RFQ. In purchasing HIC FPDs, *** first looks to see if the product meets its "realm" of technical specifications. Then, if delivery schedules and quantity requirements are satisfied, *** chooses the supplier that offers the lowest prices.

*** has exceeded ***'s realm of technical specifications and they have been very happy with ***'s performance thus far. Therefore, *** has no reason to source elsewhere.

*** named *** in a *** lost sales allegation of *** displays having *** configurations worth roughly $***. *** reported that they have purchased Japanese-produced *** displays. *** stated that there are no domestic manufacturers that produce the *** products that *** needed. *** told *** that they could supply them with *** displays, but not until ***, which was too late for ***.

*** was named by *** in a lost sales allegation of *** displays having *** configurations valued at $*** in ***. *** reported that *** produces the only specialty *** suitable for use in its ***. *** mentioned that the *** display manufactured by *** is technologically unsuited for application in ***'s product. *** requires an FPD that offers ***; the displays employing ***. *** stressed that performance, not price, determined his selection of supplier.

*** identified *** in a lost sales allegation for *** displays with *** configurations valued at $***. *** reported that the HIC FPDs that they use are ***. *** explained that the systems include ***. ***.

*** was named by *** in a lost sales allegation of *** displays with *** configurations worth $***. ***. *** stated that, while he considered buying ***'s product on several occasions, he opted for ***' product because ***'s product did not meet his needs. He found the ***; price was not an issue.

*** alleged a *** lost sale to *** of *** displays with *** configurations valued at $***.[251] *** could not substantiate this claim. He reported that his firm ***. However, he mentioned that he ***. *** noted that he is considering ***.

*** claimed a lost sale to *** of *** displays with *** configurations worth $*** in ***. *** reported that *** currently buys *** displays from *** for use in ***. In ***, *** considered products from ***. Since prices were comparable, the firm chose *** based on the perceived superior quality of its product. *** also noted the better availability of ***'s FPD.

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[251] ***. ***. ***. ***.

*** named *** in *** lost sales allegations totaling approximately $*** and involving *** HIC FPDs. *** stated that *** does in fact purchase HIC FPDs from Japanese sources. *** reported that, to his knowledge, domestic suppliers have not made any bids to sell HIC FPDs to ***. *** stated that the purchasing decision is mainly driven by technology. *** purchases *** from Japan; however, according to ***, no U.S. company produces the *** displays. *** stated that the HIC FPDs available in the United States (***) are not as clear as those from Japan. ***.

*** named *** in an *** lost sale allegation of *** displays with *** configurations worth $***. *** confirmed that *** considered purchasing *** displays to build into its ***. However, *** selected *** over *** for the following reasons: ***. *** stated that ***. Currently, ***. *** added that, when reviewing *** and ***'s products, he considered them of equal value. While ***'s *** was less expensive, ***'s display offered higher resolution and, therefore, commanded a higher price.

*** named *** in a lost sale allegation of *** valued at $***. ***. *** added that they asked the domestic producers *** for quotes, but these companies did not quote firm prices or offer samples. *** paid roughly $*** a display for the *** and $*** to $*** a display for the ***. ***. ***. ***. ***.

*** considered other types of HIC FPDs, but did not feel that the other types were suitable for a *** (i.e., not bright enough, insufficient viewing angle, slow response time).

***. ***. ***.

*** was named by ***. *** reported that they bought ***. ***. ***. ***. ***.

*** named *** in a lost revenue allegation of $***. *** could not confirm the lost revenues. *** indicated that, several years ago, his firm chose *** over *** to deliver ***. *** negotiated independently with each potential supplier and based its purchase decision on its perception of *** as ***. Also, the company generally finds it easier to work with domestic producers. *** noted that the two products were evenly priced, so price was not a decisive factor in the sale. *** did not reduce its price to match a bid from ***. Finally, *** said that *** has not experienced any major difficulties with ***'s product.

*** reported a $*** revenue loss on a *** sale to ***. ***. *** incorporates these displays into a ***; it has purchased fewer than *** displays. While *** could not verify this specific lost revenue allegation, he stated that *** lowered its price to compete with Japanese firms such as ***. Although ***'s product had the technical features that *** wanted, it was not price competitive. To make the sale, *** reduced its quoted price. According to ***, *** has experienced only minor problems with the *** display.

*** was named by *** in a lost revenue allegation of $*** for a *** sale of *** with *** configurations. *** stated that his company has purchased *** displays over the past ***. Price was not a determining factor in ***'s

decision to buy from ***, and *** could not confirm this lost revenue allegation. *** noted that *** began buying from *** because of ***'s quality and ***'s willingness to build displays to ***. He added that large Japanese manufacturers are seldom interested in supplying specialized HIC FPDs in the low volumes required by ***. *** also found American producers "easier to deal with" in general.

*** claims to have lost $*** in revenue on a sale of *** displays with *** configurations to ***. *** said that *** currently supplies his firm with HIC FPDs and that *** has never purchased displays from ***. He added, however, that ***. ***.

*** named *** in a lost revenue allegation of $*** on a *** sale of *** displays with *** configurations. ***. *** also considered ***, but chose *** because *** thought that their displays were the best. *** paid roughly $*** a unit with the understanding that the price would drop to $***-$*** if *** bought in quantity. The prices that *** offered were comparable with the prices offered by the other companies. *** was not involved in the actual price negotiations, so he does not know how the other companies' bids affected the price that *** received. *** expects to be buying roughly *** displays per year from *** in the future. *** visited ***'s facilities and is confident that they can produce these volumes of displays. *** chose *** displays over *** because the display looked better. *** had originally used ***, but the displays "looked horrible".

Exchange Rates

Quarterly data reported by the International Monetary Fund indicate that during January 1988-March 1991 the nominal value of the Japanese yen fluctuated, depreciating 4.4 percent overall relative to the U.S. dollar (table 46).[252] Adjusted for movements in producer price indexes in the United States and Japan, the real value of the Japanese currency showed an overall depreciation of 9.9 percent for the period January 1988 through March 1991.

[252] International Financial Statistics, July 1991.

Table 46
Exchange rates: 1/ Indexes of nominal and real exchange rates of the Japanese yen and indexes of producer prices in the United States and Japan, 2/ by quarters, January 1988-March 1991

Period	U.S. producer price index	Japanese producer price index	Nominal exchange rate index	Real exchange rate index 3/
1988:				
January-March.....	100.0	100.0	100.0	100.0
April-June.....	101.6	99.7	101.9	100.0
July-September.....	103.1	100.6	95.7	93.4
October-December....	103.5	99.8	102.2	98.4
1989:				
January-March.....	105.8	100.2	99.6	94.4
April-June.....	107.7	102.9	92.7	88.6
July-September.....	107.3	103.7	90.0	86.9
October-December....	107.7	103.5	89.5	86.0
1990:				
January-March.....	109.3	103.9	86.5	82.3
April-June.....	109.1	104.7	82.4	79.2
July-September.....	111.0	104.7	88.1	83.1
October-December....	114.4	105.4	97.9	90.2
1991:				
January-March.....	112.0	105.5	95.6	90.1

1/ Exchange rates expressed in U.S. dollars per Japanese yen.
2/ Producer price indexes--intended to measure final product prices--are based on period-average quarterly indexes presented in line 63 of the International Financial Statistics.
3/ The real exchange rate is derived from the nominal rate adjusted for relative movements in producer prices in the United States and Japan.

Note.--January-March 1988 = 100.

Source: International Monetary Fund, International Financial Statistics, May 1991.

APPENDIX A

FEDERAL REGISTER NOTICES

[A-588-817]

Postponement of Final Antidumping Duty Determination: High Information Content Flat Panel Displays and Subassemblies Thereof From Japan

AGENCY: Import Administration, International Trade Administration, Commerce.

ACTION: Notice.

SUMMARY: This notice informs the public that we have received request from Toshiba Corporation, a respondent in the antidumping duty investigation, to postpone the final determination, as permitted in section 735(a)(2) of the Tariff Act of 1930, as amended (the Act) (19 U.S.C. 1673d(a)(2)). Based on this request, we are postponing our final determination as to whether sales of high information content flat panel displays and subassemblies thereof (FPDs) from Japan have been made at less than fair value until not later than July 8, 1991.

EFFECTIVE DATE: March 11, 1991.

FOR FURTHER INFORMATION CONTACT: Bradford Ward, Office of Antidumping Investigations, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, Washington, DC 20230, at (202) 377-5288.

SUPPLEMENTARY INFORMATION: On February 28, 1991, Toshiba Corporation, a respondent that accounts for a significant proportion of exports of the subject merchandise, requested that the Department postpone the final determination until not later than 135 days after the date of publication of the preliminary determination, in accordance with section 735(a)(2) of the Act.

Accordingly, we are postponing the date of the final determination until not later than July 8, 1991. In accordance with 19 CFR 353.38, case briefs or other written comments in at least ten copies must be submitted to the Assistant Secretary no later than May 30, 1991, and rebuttal briefs no later than June 6, 1991. In accordance with 19 CFR 353.38(b) of the Department's regulations, we will hold a public hearing, to afford interested parties an opportunity to comment on arguments raised in case or rebuttal briefs. The hearing will be held on June 10, 1991, at 10 a.m. at the U.S. Department of Commerce, room 3708, 14th Street and Constitution Avenue, NW., Washington, DC 20230. Interested parties who wish to participate in the hearing must submit a written request to the Assistant Secretary for Import Administration,

U.S. Department of Commerce, room B-099, within ten days of the publication of this notice in the Federal Register. Requests should contain: (1) The party's name, address, and telephone number; (2) the number of participants; (3) the reasons for attending; and (4) a list of the issues to be discussed. In accordance with 19 CFR 353.38(b) of the Department's regulations, oral presentations will be limited to issues raised in the briefs.

This notice is published pursuant to section 735(d) of the Act and 19 CFR 353.20(b)(2).

Dated: March 4, 1991.

Eric I. Garfinkel,

Assistant Secretary for Import Administration.

[FR Doc. 91-5682 Filed 3-8-91; 8:45 am]

BILLING CODE 3510-DS-M

INTERNATIONAL TRADE COMMISSION

[Investigation No. 731-TA-469 (Final)]

High-Information Content Flat Panel Displays and Subassemblies Thereof From Japan

AGENCY: United States International Trade Commission.

ACTION: Institution and scheduling of a final antidumping investigation.

SUMMARY: The Commission hereby gives notice of the institution of final antidumping investigation No. 731-TA-469 (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 is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of high-information content flat panel displays and subassemblies thereof, that have been found by the Department of Commerce, in a preliminary determination, to be sold in the United States at less than fair value (LTV). Such imports are provided for under the following headings and subheadings of the Harmonized Tariff Schedule of the United States: 8543, 8803, 9013, 9014, 9017.90.00, 9018, 9022, 9026, 9027, 9030, 9031, 8471.92.30, 8471.92.40.00, 8473.10.00, 8473.21.00, 8473.30.40, 8442.40.00, 8466, 8517.90.00, 8528.10.80, 8529.90.00, 8531.20.00, 8531.90.00, and 8541. Commerce will make its final LTFV determination on or before July 8, 1991 and the Commission will make its final injury determination by August 21, 1991 (see sections 735(a) and 735(b) of the act (19 U.S.C. 1673d(a) and 1673d(b)).

EFFECTIVE DATE: February 21, 1991.

FOR FURTHER INFORMATION CONTACT: Debra Baker (202-252-1180), Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-252-1000.

SUPPLEMENTARY INFORMATION:

Background.—This investigation is being instituted as a result of an affirmative preliminary determination by the Department of Commerce that imports of high-information content flat panel displays and subassemblies thereof from Japan 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 July 18, 1990 by the Advanced Display Manufacturers Association, Washington, DC. In response to that petition the Commission conducted a preliminary antidumping investigation and, on the basis of information developed during the course of that investigation, determined that there was reasonable indication that an industry in the United States was materially injured by reason of imports of the subject merchandise (55 FR 37577, September 12, 1990).

Participation in the investigation.—Persons wishing to participate in 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 (19 FR 201.11), not later than twenty-one (21) days after the publication of this notice in the **Federal Register**. Any entry of appearance filed after this date will be referred to the Chairman, who will determine whether to accept the late entry for good cause shown by the person desiring to file the entry.

Public service list.—Pursuant to § 201.11(d) of the Commission's rules (19 CFR 201.11(d)), the Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to this investigation upon the expiration of the period for filing entries of appearance. In accordance with sections 201.16(c) and 207.3 of the rules (19 CFR 201.16(c) and 207.3), each public document filed by a party to the investigation must be served on all other parties to the investigation (as identified by the public service list), and a certificate of service must accompany the document. The Secretary will not accept a document for filing without a certificate of service.

Limited disclosure of business proprietary information under a protective order and business proprietary information service list.—Pursuant to § 207.7(a) of the Commission's rules (19 CFR 207.7(a)), the Secretary will make available business proprietary information gathered in this final investigation to authorized applicants under a protective order, provided that the application be made no later than twenty-one (21) days after the publication of this notice in the **Federal Register**. A separate service list will be maintained by the Secretary for those parties authorized to receive business proprietary information under a protective order. The Secretary will not accept any submission by parties containing business proprietary information without a certificate of service indicating that it has been served on all the parties that are authorized to receive such information under a protective order.

Staff report.—The prehearing staff report in this investigation will be placed in the nonpublic record on June 21, 1991, and a public version will be issued thereafter, pursuant to § 207.21 of the Commission's rules (19 CFR 207.21).

Hearing.—The Commission will hold a hearing in connection with this investigation beginning at 9:30 a.m. on July 11, 1991 at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC. Requests to appear at the hearing should be filed in writing with the Secretary to the Commission not later than the close of business (5:15 p.m.) on July 2, 1991. 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 July 3, 1991 at the U.S. International Trade Commission Building. Pursuant to § 207.22 of the Commission's rules (19 CFR 207.22) each party is encouraged to submit a prehearing brief to the Commission. The deadline for filing prehearing briefs is July 2, 1991. If prehearing briefs contain business proprietary information, a nonbusiness proprietary version is due July 3, 1991.

Testimony at the public hearing is governed by § 207.23 of the Commission's rules (19 CFR 207.23). This rule requires that testimony be limited to a nonbusiness proprietary summary and analysis of material contained in prehearing briefs and to information not available at the time the prehearing brief was submitted. Any written material submitted at the hearing must be filed in accordance with the procedures described below and any business proprietary materials must be submitted at least three (3) working days prior to the hearing (see § 201.6(b)(2) of the Commission's rules (19 CFR 201.6(b)(2))).

Written submissions.—Prehearing briefs submitted by parties must conform with the provisions of § 207.22 of the Commission's rules (19 CFR 207.22) and should include all legal arguments, economic analyses, and factual materials relevant to the public hearing. Posthearing briefs submitted by parties must conform with the provisions of § 207.24 (19 CFR 207.24) and must be submitted not later than the close of business on July 17, 1991. If posthearing briefs contain business proprietary information, a nonbusiness proprietary version is due July 18, 1991. 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 July 17, 1991.

A signed original and fourteen (14) copies of each submission must be filed with the Secretary to the Commission in accordance with § 201.8 of the Commission's rules (19 CFR 201.8). All written submissions except for business proprietary data will be available for public inspection during regular business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary to the Commission.

Any information for which business proprietary treatment is desired must be submitted separately. The envelope and all pages of such submissions must be clearly labeled "Business Proprietary Information." Business proprietary submissions and requests for business proprietary treatment must conform with the requirements of §§ 201.6 and 207.7 of the Commission's rules (19 CFR 201.6 and 207.7).

Parties which obtain disclosure of business proprietary information pursuant to § 207.7(a) of the Commission's rules (19 CFR §207.7(a)) may comment on such information in their prehearing and posthearing briefs, and may also file additional written comments on such information no later than July 22, 1991. Such additional comments must be limited to comments on business proprietary information received in or after the posthearing briefs.

A nonbusiness proprietary version of such additional comments is due July 23, 1991.

Authority: This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.20 of the Commission's rules (19 CFR 207.20).

Issued: March 20, 1991.

By order of the Commission.

Kenneth R. Mason,

Secretary.

[FR Doc. 91-7193 Filed 3-26-91; 8:45 am]

BILLING CODE 7020-02-M

INTERNATIONAL TRADE COMMISSION

Change in Briefing Schedule for Ongoing Title VII Investigations

AGENCY: United States International Trade Commission.

ACTION: Revised briefing schedule for ongoing Title VII investigations.

EFFECTIVE DATE: April 22, 1991.

FOR FURTHER INFORMATION CONTACT: Lynn Featherstone (202) 252-1161), Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at (202) 252-1000.

SUPPLEMENTARY INFORMATION: On March 21, 1991, the Commission published final rules concerning the conduct of investigations under Title VII of the Tariff Act of 1930 (56 FR 11918). The new rules become effective April 22, 1991, and apply to all investigations active on that date. The new rules delete the provisions of former rule 207.7(g), which authorized parties to file supplemental written comments on business proprietary information received under an administrative protective order (APO) by no later than five calendar days after the deadline for posthearing briefs in a final investigation, or three calendar days after the deadline for postconference briefs in a preliminary investigation. In lieu of the separate APO submission, the Commission intends to extend the deadlines for posthearing/postconference briefs to better enable the incorporation of data received under APO in those documents. Accordingly, revised due dates for posthearing/postconference briefs in ongoing investigations are presented below; the supplemental APO submissions originally scheduled for these investigations will not be accepted.

Investigation	Original posthearing/postconference brief deadline	Revised posthearing/postconference brief deadline
731-TA-514 (Preliminary), Shop Towels from Bangladesh	April 23, 1991	April 24, 1991.
731-TA-52 (Final), Sheet Pilng from Canada	April 23, 1991	April 25, 1991.
731-TA-459 and 460 (Final), Polyethylene Terephthalate Film, Sheet and Strip from Japan and the Republic of Korea	April 24, 1991	April 25, 1991.
731-TA-464 (Final), Barium from the People's Republic of China	May 6, 1991	May 8, 1991.
731-TA-469 (Final), High-Information Content Flat Panel Displays and Subassemblies Thereof from Japan	July 17, 1991	July 19, 1991.
731-TA-472 (Final), Silicon Metal from the People's Republic of China	May 1, 1991	May 3, 1991.
731-TA-470 and 471 (Final), Silicon Metal from Argentina and Brazil	June 12, 1991	June 14, 1991.

As specified in rule 207.3(c), if posthearing/postconference briefs contain business proprietary information, a nonbusiness proprietary version must be filed no later than one business day later.

Issued: April 12, 1991.

By order of the Commission.

Kenneth R. Mason,

Secretary.

[FR Doc. 91-9333 Filed 4-18-91; 8:45 am]

BILLING CODE 7020-02-M

[A-588-817]

High Information Content Flat Panel Displays and Display Glass Therefor From Japan: Final Determination; Rescission of Investigation and Partial Dismissal of Petition

AGENCY: Import Administration, International Trade Administration, Commerce.

EFFECTIVE DATE: July 16, 1991.

FOR FURTHER INFORMATION CONTACT: Karmi Leiman or Joel Fischl, Office of Antidumping Investigations, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue NW., Washington, DC 20230; telephone (202) 377-4198 or 377-1778, respectively.

Final Determinations

Final Affirmative Determination of Sales at Less Than Fair Value: Active-Matrix Liquid Crystal High Information Content Flat Panel Displays and Display Glass Therefor from Japan

Final Affirmative Determination of Sales at Less Than Fair Value: Electroluminescent High Information Content Flat Panel Displays and Display Glass Therefor from Japan

Final Negative Determination of Sales at Less Than Fair Value: Gas Plasma High Information Content Flat Panel Displays and Display Glass Therefor from Japan

Rescission of Initiation of Investigation and Dismissal of Petition: Passive-Matrix Liquid Crystal High Information Content Flat Panel Displays and Display Glass Therefor from Japan

We determine that imports of active-matrix liquid crystal high information content flat panel displays and display glass therefor and electroluminescent high information content flat panel displays and display glass therefor from Japan are being, or are likely to be, sold in the United States at less than fair value, as provided in section 735(a) of the Tariff Act of 1930, as amended (19 U.S.C. 1673d(a)) (the Act). The estimated weighted-average margins are shown in the "Continuation of Suspension of Liquidation" section of this notice. We also determine that gas plasma high information content flat panel displays and display glass therefor from Japan, are not, nor are likely to be, sold in the United States at less than fair value. In addition, we are rescinding our initiation of investigation of passive-matrix liquid crystal high information content flat panel displays and display glass therefor, and are dismissing that part of the petition upon which the rescinded initiation was based.

Case History

On February 21, 1991, the Department published an affirmative preliminary determination (56 FR 7008). Since that date, the following events have occurred. On March 11, 1991, the Department published a notice postponing the final determinations in these investigations until not later than July 8, 1991 (56 FR 10236). Interested parties submitted comments for the record in case briefs dated May 30, 1991 and in rebuttal briefs dated June 6, 1991. A public hearing was held on June 10, 1991. The Department requested post-hearing briefs which were submitted by interested parties on June 13, 1991. We received additional submissions after that date.

Scope of Investigations

The products covered by these investigations, constituting three classes or kinds of merchandise, are (1) active-matrix liquid crystal high information content flat panel displays and display glass therefor; (2) gas plasma high information content flat panel displays and display glass therefor; and (3) electroluminescent high information content flat panel dispalys and display glass therefor.

Based on information submitted to the Department by interested parties to the investigations, we have clarified the definition of "display glass of high information content flat panel displays." This clarification provides a more detailed definition of display glass. For further discussion of this issue, see Comment 2 of the "General Comments" section of this notice.

1. Active-Matrix Liquid Crystal High Information Content Flat Panel Displays and Display Glass Therefor

Active-matrix liuqid crystal high information content flat panel displays (active-matrix LCD FPDs) are large area, matrix addressed displays, no greater than four inches in depth, with a picture element (pixel) count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Active-matrix LCF FPDs utilize a thin-film transistor array to activate liquid crystal at individual pixel locations. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video.

Active-matrix LCD FPD display glass, whether or not integrated with additional components, exclusively dedicated to and designed for use in active-matrix LCD FPDs, is defined as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage (*i.e.*, liquid crystal) and contact pads for interconnecting drive electronics.

2. Gas Plasma High Information Content Flat Panel Displays and Display Glass Therefor

Gas plasma high information content flat panel displays (gas plasma FPDs) are large area, matrix addressed displays, no greater than four inches in depth, with a pixel count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Gas plasma FPDs incorporate a matrix of electrodes that, when activated, excite a gaseous compound, typically neon and argon, causing it to emit light. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video.

Gas plasma FPD display glass, whether or not integrated with additional components, exclusively dedicated to and designed for gas plasma FPDs, is defined as processed glass substrates that incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage (*i.e.*, gas plasma) and contact pads for interconnecting drive electronics.

3. Electroluminescent High Information Content Flat Panel Displays and Display Glass Therefor

Electroluminescent high information content flat panel displays (EL FPDs) are large area, matrix addressed displays, no greater than four inches in depth, with a pixel count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. EL FPDs incorporate a matrix of electrodes that, when activated, apply an electrical current to a solid compound of electroluminescent material (*e.g.*, zinc sulfide) causing it to emit light. Included are monochromatic, limited color, and full color displays used to display text, graphics, and video.

EL FPD displays glass, whether or not integrated with additional components, exclusively dedicated to and designed for use in EL FPDs, is defined as processed glass substrates that

incorporate patterned row, column, or both types of electrodes, and also typically incorporate a material that reacts to a change in voltage (*e.g.*, phosphor) and contact pads for interconnecting drive electronics.

The following merchandise is excluded from the scope of these investigations: Passive-matrix liquid crystal high information content flat panel displays and display glass therefor (passive-matrix LCD FPD) (see, "Class or Kind of Merchandise" and "Rescission of Investigation With Respect to Passive-Matrix LCD FPDs" sections of this notice for further details); segmented flat panel displays; matrix addressed flat panel displays with less than 120,000 pixels; and cathode ray tubes (CRTs).

All types of FPDs described above are currently classifiable under subheadings 8543, 8803, 9013, 9014, 9017.90.00, 9018, 9022, 9026, 9027, 9030, 9031, 8471.92.30, 8471.92.40, 8473.10.00, 8473.21.00, 8473.30.40, 8442.40.00, 8466, 8517.90.00, 8528.10.80, 8529.90.00, 8531.20.00, 8531.90.00, and 8541 of the Harmonized Tariff Schedule (HTS). Although the HTS subheadings are provided for convenience and customs purposes, our written description of the scope of these proceedings is dispositive.

Class or Kind of Merchandise

In the petition, the petitioners characterized all high information content flat panel displays as a single class or kind of merchandise. In the Department's notice of initiation (55 FR 33146, August 14, 1990) and preliminary determination (56 FR 7008, February 21, 1991) we also treated the merchandise as a single class or kind.

On September 4, 1990, the Department solicited comments from all interested parties on several issues relating to the investigations, including class or kind. We received responses to our request from the petitioners (consisting of the Advanced Display Manufacturers of America and its member companies; Planar Systems, Inc.; Plasmaco, Inc.; OIS Optical Imaging Systems, Inc.; The Cherry Corporation; Magnascreen Corporation; Photonics Technology, Inc.; and Electro-Plasma, Inc.), Toshiba Corporation (Toshiba), Hosiden Corporation (Hosiden), GRiD Systems, Inc. (GRiD), Kyocera Corporation (Kyocera), and the Computer System Manufacturers Group (CSMG) (consisting of Apple Computer Corporation, International Business Machines Corporation, Compaq Computer Corporation, and Tandy Corporation/GRiD Systems, Inc.). We continued to receive comments on class or kind from interested parties throughout the course of these investigations, including comments in case and rebuttal briefs, at the public hearing, and in post-hearing submissions. Based upon our analysis of these submissions, we determine that the products covered by the petition constitute four separate classes or kinds of merchandise: active-matrix LCD FPDs; passive-matrix LCD FPDs; gas plasma FPDs; and EL FPDs. The following is a discussion of the class or kind arguments presented and the Department's analysis.

A. Petitioners

The petitioners state that the subject merchandise constitutes one class or kind of merchandise. The petitioners analyze the subject merchandise based on the criteria set forth in *Diversified Products Corporation* v. *United States*, 6 CIT 155, 162, 572 F. Supp. 883, 889 (1983) and *Kyowa Gas Chemical Industrial Co.* v. *United States*, 7 CIT 138, 582 F. Supp. 887 (1984) (*Diversified* criteria). These criteria are:

(1) The general physical characteristics;
(2) The ultimate use;
(3) The expectations of the ultimate purchaser;
(4) The channels of trade; and
(5) The manner of advertising and display.

According to the petitioners, all FPDs have the same general physical characteristics. They are virtually identical in size, have depths of four inches or less, and have a pixel count of 120,000 or greater. Each is comprised of display glass, drive electronics, control electronics, a mechanical package, and a power supply. The petitioners also state that FPDs are regularly analyzed and compared among technologies based on characteristics such as brightness, viewing angle, response time, power consumption, and ruggedness. In their case briefs, the petitioners contend that all FPDs can achieve the same power consumption, size, weight, etc., and that the industry is moving to achieve these goals. For example, the petitioners note that Planar Systems, Inc. has produced an EL FPD with the same power consumption, size, and weight of many backlit LCD displays currently on the market. They assert there are numerous examples of this technology overlap.

Asserting that systems designers have complete flexibility when deciding which type of FPD to use in a system, the petitioners note that different original equipment manufacturers (OEMs) use different FPDs in the same applications. For example, in avionics, Allied-Signal chose to use an active-matrix LCD FPD while Boeing and Canadian Marconi chose EL FPDs. Also, Data General purchased EL FPDs from Planar as replacements for passive-matrix LCD FPDs in one of its systems. Thus, all FPD technologies are competing for market opportunities in virtually all end-user markets.

According to the petitioners, the expectations of the ultimate purchaser of an FPD are to present textual, graphic, or video information on a display with reduced size and weight. The petitioners note that while the relative importance of various performance criteria differ from application to application, purchasers regularly evaluate cost-performance trade-offs for their applications.

The petitioners contend that all FPDs are sold through the same channels of trade. They are sold to OEMs through a factory direct sales force, independent sales representatives, or through stocking distributors. The petitioners note that individual sales representatives often market more than one technology and cite the case of Sharp Corporation, whose sales force sells passive-matrix LCD FPDs and EL FPDs concurrently.

Finally, the petitioners argue FPD manufacturers advertise their products in a similar manner, whether it be in specific product literature, at trade shows, or in the trade press. A review of advertising shows that information is presented in a similar fashion regardless of technology.

The petitioners conclude, based on these criteria, that it is clear there is one class or kind of merchandise which encompasses the four products subject to this investigation.

B. Toshiba

Toshiba holds that FPDs include several distinct sophisticated devices with technologically material differences. Applying the Diversified criteria, Toshiba states there are four classes or kinds of merchandise based on the four FPD technologies.

According to Toshiba, there are numerous differences in physical characteristics that result in distinct product capabilities with respect to optical, electrical, and mechanical factors. First, some FPDs are emissive, that is, they emit light (EL FPDs and gas plasma FPDs), while others (LCD FPDs) are non-emissive, modulating and reflecting ambient light. Second, LCD, EL, and gas plasma FPDs use different mediums to activate each pixel, *i.e.*, liquid crystal, phosphor, or gas, respectively. The different materials result in different color displays: LCD is

black-on-white or blue-green; gas plasma is red; and EL is yellow. Contrast, transparency, and brightness also differ among technologies. In addition, each FPD technology has unique electrical requirements that determine power consumption and battery life. Gas plasma and EL FPDs consume relatively high power while LCD FPDs are a lower power technology. Mechanical requirements of the technologies determine size and weight, with gas plasma and EL FPDs typically being an inch thick and two pounds in weight and LCDs being one-quarter inch thick and weighing one pound or less.

The varying physical characteristics of the FPD technologies offer ultimate users distinctly different products depending on application. LCD is most appropriate in applications where ambient light conditions are not constant, while gas plasma is used when picture quality is important. EL FPDs are used when security needs dictate suppression of radio frequency emissions. Battery life is another important consideration, should the ultimate user desire to use the FPD in a battery-powered application. Toshiba argues only portables with LCD FPDs can operate under battery power.

Similarly, the ultimate use of the FPD is determined by the technology. LCD technology is used in laptop computers, while gas plasma and EL FPDs are used in portable computers, specialized military and medical instruments and for other uses. There is no interchangeability of the various FPDs after the design stage for their use in an end-product.

Toshiba states that this analysis, based on the Diversified criteria, shows there are four separate classes or kinds of merchandise.

C. Hosiden

Hosiden also maintains there are four classes or kinds of merchandise distinguished by technology. Hosiden's position is identical to Toshiba's except as noted below.

Hosiden elaborates on the distinctions between the four types of FPDs with respect to mechanical structure and electronic interface. The "mechanical structure" refers to the manner in which the glass and electronic circuitry are held together. Gas plasma FPDs require that the glass substrate be directly bonded to a reinforced plastic support frame that also supports the drive electronics. EL FPD technology requires that the glass substrate be directly bonded to the drive electronics printed circuit board with discrete pin connections and without the use of a frame. LCD FPDs, both passive-matrix and active-matrix, can be assembled using either a backboard, tape automated bonding, or chip-on-glass. Hosiden notes that active-matrix LCD FPDs differ from passive-matrix LCD FPDs because of the thin-film transistor array.

The electronic interface allows the display controller device in the host system to communicate with the display driver in the FPD. The circuit connections, AC data timing signals, DC voltage levels, display control functions, and color and gray-scale emulation control functions are unique to each of the four types of FPDs. They cannot be interchanged without significant hardware and software modifications.

D. GRiD

GRiD, a wholly-owned subsidiary of Tandy Corporation, offers the following analysis of the subject merchandise as it pertains to the laptop computer industry. GRiD argues there are four classes or kinds of merchandise.

A passive-matrix LCD FPD is the most desirable display for battery-powered laptop computers, because of its low power consumption. In addition, its light weight and reasonable picture quality are attributes that make passive-matrix LCD FPDs good general purpose displays for many applications. Passive-matrix LCD FPDs are the only display type that can be used in portable computers used in field work under varying light conditions and where battery life is essential due to the absence of AC power outlets. Transflective LCDs (those reflecting ambient light as well as transmitting light from a backlight or sidelight) allow varying light conditions to be overcome while maintaining low power and weight. Gas plasma and EL FPDs cannot be used under these conditions. Lastly, passive-matrix LCD FPDs are substantially less costly than the other types of FPDs.

Gas plasma FPDs provide a crisp red-on-black display with excellent off-angle viewing. This viewing angle is necessary in certain portable computer applications where the user requires that several people be able to view the display at the same time. On the other hand, the high power consumption and weight of gas plasma FPDs preclude their use in notebook computers, where the incorporation of a gas plasma FPD instead of a passive-matrix LCD FPD would increase weight by up to 40 percent and require a battery with two times as much power to achieve the necessary three hours of battery life that GRiD requires. The higher cost of gas plasma FPDs relegates them to the portable market in applications where their fast response time and excellent viewing angle are paramount.

EL FPDs have a bright yellow display with excellent off-angle viewing. EL FPDs are the most costly of the technologies utilized by GRiD. As the incorporation of an EL FPD into a notebook computer would increase weight by approximately 54 percent due to the additional power requirements, GRiD has not widely incorporated EL FPDs into its notebook applications. GRiD has utilized EL FPDs primarily in Tempest systems. Tempest systems suppress radio frequency emissions of the display and are used in situations where information security is needed. EL is the only FPD technology used in Tempest systems because of the brightness of the display. A Tempest system uses a fine metal screen to reduce emissions, which also significantly reduces the brightness of the display. An EL FPD can accommodate the metal screen and remain readable due to its inherent brightness.

GRiD concludes that no one type of FPD can serve all applications and that users select their laptop computer with a particular FPD based on the intended application. Each type of FPD is a separate class or kind of merchandise.

E. Kyocera

Kyocera states that the Department has the authority to find that more than one class or kind of merchandise exists. Kyocera adds that the petitioners' categorization of FPDs is simplistic and over-broad. Based on the Diversified criteria, Kyocera argues there are four classes or kinds of merchandise.

F. CSMG

In its submission of September 7, 1990, the CSMG states that it is within the discretion of the Department to determine there is more than one class or kind of merchandise subject to investigation. The CSMG cites the Department's decision in Final Determination of Sales at Less Than Fair Value: Antifriction Bearings (Other Than Tapered Roller Bearings) and Parts Thereof from the Federal Republic of Germany (54 FR 18992, May 3, 1989) (AFBs). In those investigations, the petitioner maintained that all AFBs constituted one class or kind of merchandise because all have the same general physical characteristics, since all have essentially the same four components (inner race, outer race, cage system, and rolling elements). The petitioner also asserted that all AFBs have the same general use (*i.e.*,

reducing friction between moving parts) and, as a result, all bearings give rise to the same general consumer expectation. Finally, the petitioner noted that all AFBs are distributed within the same general channels of trade. The Department disagreed, finding petitioner's description of AFBs over-simplistic, and found there were five classes or kinds of merchandise. The CSMG compares the AFBs decision to high information content flat panel displays and offers its analysis of the subject merchandise based on the Diversified criteria, concluding there are four classes or kinds of FPDs, based on technology. This analysis is similar to that offered by Toshiba, Hosiden, GRiD, and Kyocera.

In its case brief submitted to the Department on May 30, 1991, the CSMG proposed an alternative to its request for a finding of four classes or kinds. The CSMG maintained that, although they continue to believe there are four classes or kinds of merchandise, if it would not agree, the Department should recognize there are at least two classes or kinds of merchandise, emissive and non-emissive FPDs. The division between the classes or kinds should be based on the ability of the FPD technology to produce and emit light. Thus, EL and gas plasma FPDs are one class or kind of merchandise because both technologies produce and emit light when activated by an electrical current. LCD FPDs, passive-matrix and active-matrix, are a second class or kind of merchandise because an LCD FPD matrix, absent the addition of a light source (*e.g.*, backlight), is non-emissive. LCD FPDs reflect ambient light or allow transmission of light from a source behind or to the side of the pixel matrix.

In a discussion of the Diversified criteria, the CSMG states that the emissive technologies consume more power, and are larger and heavier than non-emissive displays. Hence, their ultimate uses are drawn along similar lines. Non-emissive displays are used in applications where light weight and low power consumption are a necessity, *e.g.*, laptop computers. Emissive technologies are utilized in applications where their wide viewing angle is important and no severe power limitations exist. Medical instrumentation, systems controls, and extremely large video displays (such as stadium systems) are examples of applicatiosn that lend themselves to the emissive technologies. The CSMG notes that its members are the only end-users to have submitted information on the record regarding end-use and the expectations of ultimate users. The CSMG states there is no interchangeability among technologies. The technological differences among the four types of FPDs allow or prevent their use in computer systems. Emissive displays cannot be used in laptop computers where power consumption is a chief concern. However, in systems such as Compaq's original portable computer, the Portable III, a 20 pound system designed for office applications where a power source is of no concern, a gas plasma FPD was used because it most emulated the qualities of a CRT display. The CSMG concludes that the essential physical differences between the FPD technologies, the actual expectations of customers as to each display type's applications, and the lack of substitutability between emissive and non-emissive displays all compel the Department to find at least two classes or kinds of merchandise: emissive and non-emissive FPDs.

G. DOC Determination

The Court of International Trade (CIT) has recognized the authority of the Department to define and clarify the scope of its investigation. *Mitsubishi Electric Corp.* v. *United States*, 700 F. Supp. 538, 552 (CIT 1988), *aff'd*, 898 F. 2d 1577 (Fed. Cir. 1990). The CIT has also recognized the Department's authority to subdivide the class or kind of merchandise submitted by the petitioner in the petition when the Department determines that more than one class or kind of merchandise has improperly been merged into a single class or kind of merchandise. *Torrington Co.* v. *United States*, 745 F. Supp., 718 (CIT 1990).

Given the substantial information placed on the record regarding the appropriate number of classes or kinds of merchandise, we have decided to reexamine the class or kind of merchandise as described in the petition. In this regard, we have applied the Diversified criteria to the facts in these investigations to determine whether the merchandise subject to the investigation should be divided into separate classes or kinds of merchandise. See, AFBs, at 19000. Based on these criteria, we determine that FPDs constitute four distinct classes or kinds of merchandise. Our analysis shows that the technology of the FPD determines or limits the FPD's functional capabilities (*e.g.*, power consumption, viewing angle, brightness, and weight). In turn, these capabilities establish the boundaries of the FPD's ultimate use and customer expectations.

General Physical Characteristics. The four FPD technologies are fundamentally different. Passive-matrix LCD FPDs incorporate rows and columns of electrodes, a matrix activated by an electrical current. This current causes the liquid crystals to twist at the junction of the activated row and column electrodes, acting as an aperture, and allowing light to pass through. This light comes from the reflection of ambient light or from light produced from a backlight or sidelight incorporated into the FPD. Passive-matrix LCD technology requires the display to constantly "refresh," that is, sequentially activate the row electrodes while selectively activating column electrodes, hundreds of times per second, so that at the junction of the activated row and column electrodes a pixel is turned on. Active-matrix LCD FPDs use a thin-film transistor array to address the individual pixels. This array, sometimes compared to a very large semiconductor, places a transistor at each pixel location that allows each pixel to be activated individually. This eliminates the need for "refresh." Gas plasma FPDs incorporate a matrix of electrodes that, when activated, excite a gaseous compound of neon and argon causing it to emit light. This process is similar to the activation of neon and fluorescent lights. Electroluminescence is the non-thermal conversion of electrical energy to luminous energy. EL FPDs incorporate a matrix of electrodes that apply a current to a solid compound of electroluminescent material (*e.g.*, zinc sulfide) causing it to emit light.

The petitioners assert that all FPDs are similar because they display text, graphics, and video, are less than four inches thick, and have more than 120,000 pixels. While the petitioners note that current EL and gas plasma FPDs may someday be able to achieve some of the low power and size requirements currently achieved by passive-matrix LCD FPDs, their class or kind analysis is deficient in its approach to dissimilar products that are clearly complex devices engineered utilizing the most advanced production techniques and clean room environments. Analysis of FPDs in current production shows that all types of FPDs cannot meet the same technical specifications. For example, the vast majority of EL and gas plasma FPDs cannot meet the same low power levels of the passive-matrix LCD FPDs.

Expectations of the Ultimate Purchasers & Ultimate Use. The demand for a range of FPDs with different technologies arises from applications where power, viewing angle, brightness, and weight can vary greatly. Active-matrix LCD FPDs have been used in the avionics industry, where their wide viewing angle, ability to be viewed in direct sunlight, and a lessened concern

over power source, make them suitable FPDs for aircraft cockpits. Also, active-matrix LCD FPDs are beginning to be incorporated into computer systems where a thin display is required and where graphics and video display requirements preclude the use of passive-matrix LCD FPDs, as these FPDs do not offer the fast response time needed in these applications. Passive-matrix LCD FPDs, with their very low power consumption, have become the standard in the laptop and notebook computer industry, where consumer demand calls for units that can operate for several hours on a battery. The record shows that passive-matrix LCD FPDs dominate the fast growing laptop and notebook computer market, with no significant exceptions. However, the incorporation of passive-matrix LCD FPDs into laptop and notebook computers does not achieve the brightness or viewing angle that gas plasma and EL FPDs offer. The inherent brightness of EL FPDs has allowed them to capture the Tempest market, while their ruggedness has made them ideal for a variety of military applications. The wide viewing angle and brightness of gas plasma and EL FPDs allows them to be used in systems controls and medical instrumentation, where the FPD must be seen by several operators at the same time. Additionally, current manufacturing technology allows gas plasma and EL FPDs to be produced in larger sizes than either passive-matrix or active-matrix LCD FPDs, thus allowing them to be used in systems where a large display is necessary (*e.g.*, stadium systems and office workstations). In fact, information submitted on the record shows that the majority of gas plasma and EL FPDs are incorporated into medical instrumentation and systems control applications while the majority of passive-matrix LCD FPDs are incorporated into laptop computer applications.

These physical distinctions and consequent performance differences dictate what the customer can expect of the display. For instance, a laptop computer manufacturer will not consider an EL FPD because an EL FPD consumes more power than allowable to maintain an optimum battery life, whereas a passive-matrix LCD FPD, while not offering the same viewing angle as an EL FPD, will allow the laptop computer to operate on battery power for the requisite number of hours. A manufacturer of Tempest systems will not consider active-matrix or passive-matrix LCD FPDs because of their inability to be seen through the metal screen used to suppress radio frequency emissions. Military field applications do not utilize either passive-matrix or active-matrix LCD FPDs because of their inability to meet the rigorous physical demands (*e.g.*, extremes in temperature, physical shock) of military environments.

Channels of Distribution & Advertising. Channels of distribution and advertising are generally the same among the technologies. Significantly more important dissimilarities exist with respect to physical characteristics, ultimate uses, and the expectations of ultimate users. AFBs, at 18999 (Although all AFBs have the same general physical characteristics and serve the same general function (*i.e.*, to reduce friction), the Department found five classes or kinds of merchandise where the Department's analysis revealed that the shape of the rolling element or contact surface determined or limited the AFB's key functional capabilities (*e.g.*, load and speed), and these capabilities in turn established the boundaries of the AFB's ultimate use and customer expectations).

This analysis clearly indicates there are four classes or kinds of merchandise. Each of the four classes or kinds of merchandise has a distinct technology which produces the image as well as a distict set of physical characteristics such as power consumption, brightness, viewing angle, contrast, and weight. The combination of physical characteristics, in turn, directly determines the expectations of purchasers and the ultimate uses of each type of FPD. The functional capabilities of each type of FPD, when in combination with the expectations of the purchaser and ultimate use, almost always preclude the use of more than one technology in the same application. Except in rare instances, as noted above, each FPD technology accommodates a different set of criteria.

Rescission of Investigation With Respect to Passive-Matrix FPDs

The petition in this case was brought by Advanced Display Manufacturers of America, Planar Systems, Inc., Plasmaco, Inc., OIS Optical Imaging Systems, Inc., The Cherry Corporation, Electro-Plasma, Photonics Technology, Inc, and Magnascreen Corporation. The petition specifically coverd at least four types of high information content flat panel displays: passive-matrix LCD FPDs, active-matrix LCD FPDs, EL FPDs, and gas plasma FPDs. As discussed in the class or kind section of this notice, the Department has found four distinct classes or kinds of merchandise corresponding to these four types of FPDs. During the course of our investigation, we determined that no petitioner produces passive-matrix LCD FPDs. Since the petitioners do not produce one of the classes or kinds of merchandise, we further evaluated whether the petitioners had standing to file a petition with respect to passive-matrix LCD FPDs. This evaluation was necessary given the Department's continued obligation to evaluate the standing of petitioners. See, *Oregon Steel Mills, Inc.* v. *United States*, 862 F.2d 1541 (Fed. Cir. 1988) Accordingly, we must determine whether the petitioners have standing to file a case with respect to passive-matrix LCD FPDs.

Under section 732(b)(1) of the Act, in order to have standing to file an antidumping petition, a petitioner must be an "interested party." The term "interested party" is defined, in relevant part, as "a manufacturer, producer, or wholesaler in the United States of the "like product." Section 771(9)(C) of the Act. Therefore, in determining whether the petitioners have standing as an interested party to file a petition on passive-matrix LCD displays, the Department must determine what the like product(s) is in this proceeding.

In this regard, the Department has traditionally adopted the International Trade Commission's (ITC) definition of the like product because the ITC must define the like product for purposes of its injury determination. See, e.g., Final Determination of Sales at Less Than Fair Value: 3.5" Microdisks and Coated Media from Japan (54 FR 6433, February 10, 1989) (If ITC found more than one like product in its final determination, the Department would reconsider whether petitioner was an interested party with standing to file the petition); and Final Determination of Sales at Less Than Fair Value: Granular Polytetrafluoroethylene Resin from Italy (53 FR 26096, 26098, July 11, 1988) (The Department relied on the ITC's finding that there was one like product in establishing that petitioner had standing to bring the case). However, nothing in the statute or the regulations requires the Department to adopt the ITC's like product definition for purposes of determining whether petitioners have standing. See, *NTN Bearing Corp.* v. *United States*, 757 F.Supp. 1425, 1430 (CIT 1991), *aff'd* —— ("It is the function of the ITA to determine standing and no statute or regulation requires the ITA to defer to data used by the ITC"). Indeed, issues involving the application of the term "like product" are not new ones for the Department. The Department has defined the like product for purposes of

assessing a petitioner's standing at the time of initiation of an investigation. See, Notice of Initiation: Antidumping Duty Investigation of Tungsten Ore Concentrates From the People's Republic of China (56 FR 6835, 6836, February 20, 1991). Moreover, the Department has had to resolve questions concerning a party's status by defining the like product in cases filed pursuant to section 303 of the Act (19 U.S.C. 1303) in which an injury determination was not required. See *e.g.*, Final Affirmative Countervailing Duty Determinations and Countervailing Duty Orders; Certain Textile Mill Products and Apparel from Peru; and Rescission of Initiation of Investigations With Respect to Hand-Made Alpaca Apparel and Hand-Made Carpet and Tapestries (50 FR 9871, March 12, 1985).

Accordingly, although the Department ordinarily adopts the ITC's definition of the like product where such a definition exists, the Department has the authority to make like product determinations for purposes of determining whether a petitioner has standing to file a case. If the Department was required to adopt the ITC's like product definition for purposes of assessing a petitioner's standing in all cases, it would effectively place the issue of standing before the ITC contrary to the holdings of both the Court of Appeals for the Federal Circuit and the Court of International Trade. See, *Algoma Steel Corp.*, v. *United States*, 865 F.2d 240, 241 (Fec. Cir. 1989), *cert. denied*, 109 S.Ct. 3244 (1989); and *Gilmore Steel Corp.* v. *United States*, 585 F.Supp. 670, 676 (CIT 1984) (The Department of Commerce has the authority to terminate an investigation where a petitioner does not have standing to file a petition).

More importantly, it may be inappropriate in certain situations for the D .partment to rely solely on the ITC's definitions of the like product for purposes of determining a petitioner's standing, because rigid adherence to the ITC's definition may lead to results which are contrary to those intended by Congress. For example, the ITC is required to examine a U.S. industry in order to determine whether that industry is being injured by sales of the subject merchandise. Accordingly, for purposes of its injury analysis, the ITC defines the like product in a manner which ensures that there is a domestic industry producing the like product. See, High Information Content Flat Panel Displays and Subassemblies Thereof From Japan, Inv. No. 731-TA-469 (Preliminary), USITC Pub. 2311 at 6 (September 1990) and cases cited therein (ITC rejected the notion that a like product could be defined as a product not produced by a U.S. industry); S. Rep. No. 96-249, 96th Cong., 1st Sess. 90 (1979) ("The ITC will examine an industry producing the product like the imported article being investigated, but if such industry does not exist * * * then the ITC will examine an industry producing a product most similar in characteristics and uses with the imported article").

The approach used by the ITC for purposes of its injury analysis may, therefore, result in a definition of the like product which is so broad that the petitioner would qualify as a producer of the "like product," and thus have standing, but nevertheless have no legitimate stake in the outcome of the Department's investigation. This is directly contrary to the result intended by Congress. See, S. Rep. No. 96-249 at 63 ("The committee intends that the standing requirements be administered to * * * prohibit petitions filed by persons with no stake in the result of the investigation"). See, also *NTN Bearing Corp.*, 757 F. Supp. at 1428 (endorsing the language of S. Rep. No. 96-249). It also underscores why the Department must, in certain cases, define the like product in order to appropriately determine whether a petitioner has standing. Although this may result in two district definitions of the like product, one for standing purposes and one for delineating the industry to be examined by the ITC, such inconsistencies are inherent in the bifurcated system created by Congress and do not render an agency's determination contrary to law. See, *Algoma Steel Corp.* v. *United States*, 688 F. Supp. at 642-644.

In this case, the ITC preliminary determined that there was one like product consisting of all high information content flat panel displays. If the Department were to rely exclusively on the ITC's preliminary definition of the like product, the petitioners would have standing because they qualify as producers of high information content flat panel displays. However, we have reason to believe that the petitioners may not have a legitimate interest in the result of an investigation with respect to passive-matrix LCD FPDs because the petitioners do not produce this class or kind or merchandise.* In addition, we are confronted with the situation where, for purposes of its injury analysis, the ITC would be required to define the like product more broadly than "passive-matrix LCD FPDs" because there is no domestic industry producing this class or kind of merchandise. See, High Information Content Flat Panel Displays and Subassemblies Thereof From Japan, USITC Pub. 2311 at 5-6. As detailed above, it is inappropriate for the Department to adopt the ITC's like product definition in this situation because strict adherence to the ITC's definition of the like product may very well lead to a result which is contrary to that intended by Congress: a finding that petitioners have standing to bring an antidumping case but nevertheless have no legitimate interest in the outcome of the investigation. Accordingly, it is necessary for the Department to conduct a like product analysis in order to properly assess the petitioners' standing in this case.

We have examined the factors generally considered by the ITC when analyzing like product issues. These factors include: (1) Physical characteristics, (2) end uses, (3) interchangeability of products, (4) channels of distribution, (5) production processes, (6) customer or producer perceptions of the product, (7) use of common manufacturing facilities and production employees, and (8) price. No single factor is dispositive. See, *e.g.*, High Information Content Flat Panel Displays and Subassemblies Thereof from Japan, USITC Pub. 2311 at 4, n. 6.

On the basis of our analysis of these factors, for the purposes of determining whether the petitioners have standing, we have determined that FPDs constitute four like products: active-matrix LCD FPDs; passive-matrix LCD FPDs; gas plasma FPDs; and EL FPDs.

Factors (1), (2), (4), and (6) noted above are similar or identical to the Diversified criteria. We discussed these elements in detail in the "Class or Kind of Merchandise" section of this notice, where we conclude that there are substantial differences in physical characteristics, end-uses, and expectations of the ultimate purchasers, and similarities in the channels of distribution. The remaining factors are discussed below.

There is little interchangeability among the four FPD technologies. Interchangeability suggests that one product may be easily substituted for another, that is, its specifications are such that both products will serve the same purpose in their final application. The ITC noted in its preliminary determination that "[t]he record

* We note that the petitioners alleged material retardation in this case as an alternative argument in the event that the ITC failed to find material injury. However, nothing in the record of this case suggests that the petitioners could have, or would have, produced passive-matrix LCD FPDs absent Japanese sales of this merchandise.

suggests that there is also a lack of interchangeability in use even among displays of the same format and technology." (See, High Information Content Flat Panel Displays and Subassemblies Thereof from Japan, USITC Pub. 2311 at 7, n. 19. For example, to date, virtually all notebook computers incorporate passive-matrix LCD FPDs because of their relatively low power requirements, weight, and cost. In the avionics industry, gas plasma and EL FPDs are not used because of their inability to be seen in direct sunlight. Tempest computers utilize EL FPDs because of their ability to be clearly seen through a metal screen.

The petitioners cite a few examples of one technology being substituted for another in a specific application. The breadth of the information on the record indicates that these examples are the exception, not the rule. FPDs are also generally not interchangeable at the design stage. Briefs submitted by the CSMG, end-users of FPDs, show that OEMs approach FPD manufacturers with a specific set of technical specifications, including the technology, to be achieved in the design of the FPD. For instance, Apple Computer requires a crisp black-on-white display and no "submarine effect" of the cursor and text for its Macintosh Portable computer, specifications that require the use of an active-matrix LCD FPD. No other type of FPD can be substituted at the design stage when these specifications are presented to the FPD manufacturer.

The different FPD technologies use different production processes. Department staff toured seven manufacturing facilities in the United States and Japan, examining the production of each of the four types of FPDs. The methods of electrode formation, material filling, and sealing are processes unique for each of the FPD technologies. In addition, different types of FPDs cannot be manufactured on the same production line, as the production machinery is technology specific. Clean room environments must be maintained during production; however, different technologies require different clean room levels. For example, gas plasma FPD production requires a lower level of clean room (*i.e.*, Class 100) than does acive-matrix LCD FPD production (*i.e.*, Class 10). In fact, the physics associated with producing text, graphics, or video in each type of FPD is so different that they are not designed by the same engineer, produced on the same production line, or incorporated into the same application without considerable re-engineering. In our plant tours, we saw no common manufacturing facilities or sharing of production employees among the different technologies. Companies that produced more than one technology did so on different production lines with different personnel.

The record suggests that prices among the technologies differ somewhat. Passive-matrix LCD FPDs tend to be less expensive than the other technologies, although no clear trend in pricing by technology can be determined at this time.

Based on the foregoing analysis, we determine that there are clear dividing lines between these products and find four distinct like products: active-matrix LCD FPDs; passive-matrix LCD FPDs; gas plasma FPDs; and EL FPDs.

The petitioners produce three of the four like products; they do not produce passive-matrix LCD FPDs. Therefore, we determine that the petitioners are not interested parties and do not have standing with respect to an investigation of passive-matrix LCD FPDs. Accordingly, we are rescinding our initiation of investigation of passive-matrix LCD FPDs and subassemblies thereof, and we are dismissing that part of the petition upon which the rescinded initiation was based.

We note that In Focus Systems, Inc. (In Focus) has challenged the petitioners' standing in this investigation alleging that the petition was not filed "on behalf of" a U.S. industry. In Focus claims to be a U.S. manufacturer of passive-matrix LCD FPDs. Since we have determined that the petitioners do not have standing with respect to passive-matrix LCD FPDs, we need not go further and examine whether In Focus is a producer of the subject merchandise.

Such or Similar Categories

We have determined that there is one such or similar category for each class or kind of merchandise. Where there were no sales of identical merchandise in the home market with which to compare merchandise sold in the United States, sales of the most similar merchandise were compared on the basis of a three-tiered set of criteria developed after consulting the parties to the investigations. The set of criteria is fully explained in appendix V of the Department's questionnaire. For further discussion of the selection of such or similar categories, see the "Interested Party Comments" section of this notice.

We made adjustments for differences in the physical characteristics of the merchandise, where appropriate, in accordance with section 773(a)(4)(C) of the Act. In some instances, we adjusted cost data used for calculating differences in the physical characteristics of the merchandise, pursuant to verification findings.

Period of Investigation

The period of investigation (POI) is February 1, 1990, through July 31, 1990.

Fair Value Comparisons

To determine whether sales of FPDs from Japan to the United States were made at less than fair value, we compared the United States price to the foreign market value (FMV), as specified in the "United States Price" and "Foreign Market Value" sections of this notice.

United States Price

A. Hosiden

In calculating United States price, we used the best information available (BIA) as described in Comment 3 of the "Interested Party Comments" section of this notice. For Hosiden, we based United States price on purchase price, in accordance with section 772(b) of the Act, because all sales were made directly to unrelated parties prior to importation into the United States and because exporter's sales price (ESP) methodology was not indicated by other circumstances. We calculated purchase price based on packed, FOB customer's freight forwarder in Japan or Japan seaport prices to unrelated customers in the United States. We made deductions, where appropriate, for foreign brokerage and handling, foreign inland freight, foreign inland insurance, palletizing, and containerization and stevedoring expense.

B. Matsushita

For Matsushita Electric Industrial Co. Ltd., and related companies (Matsushita), we based United States price on purchase price, in accordance with section 772(b) of the Act, where sales were made directly to unrelated parties prior to importation into the United States and because ESP methodology was not indicated by other circumstances. For Matsushita's sales of FPDs which it further manufactured in the United States into portable computers, we based United States price on ESP, in accordance with section 772(c) of the Act.

We calculated purchase price based on packed, FOB U.S. port or delivered prices to unrelated customers in the United States. We made deductions, where appropriate, for foreign brokerage and handling, foreign inland freight, ocean freight, air freight, U.S. inland freight, U.S. brokerage and handling,

U.S. Customs processing fees, harbor maintenance fees, and insurance. For comparisons in which FMV was based on home market prices, in accordance with section 772(d)(1)(C) of the Act, we added to net unit price the amount of value-added tax (VAT) that is not collected by reason of exportation of the merchandise.

For ESP sales, the FPDs were incorporated into portable computers before being sold to the first unrelated party. To calculate ESP we used the packed, CIF prices of computers to unrelated purchasers in the United States, adjusted for the value added in the United States as noted below.

We made deductions, where appropriate, for foreign inland freight, foreign brokerage and handling, ocean freight, air frieght, U.S. inland freight, U.S. brokerage and handling, U.S. customs processing fees, harbor maintenance fees, and insurance. In accordance with section 772(e)(2) of the Act, we made additional deductions, where appropriate, for credit expenses, warranty expenses, royalties, and indirect selling expenses. For comparisions in which FMV was based on home market prices, in accordance with section 772(d)(1)(C) of the Act, we added to net unit price the amount of VAT that is not collected by reason of exportation of the merchandise.

In addition to the aforementioned deductions, we deducted all value added to the FPD in the United States, pursuant to section 772(e)(3) of the Act. The value added consists of the costs associated with the production and sale of the computer, other than costs associated with the FPD, and a proportional amount of profit or loss related to the value added. Profit or loss was calculated by deducting from the sales price of the computer all production and selling costs incurred by the company for the computer. The total profit or loss was then allocated proportionately to all components of costs. Only the profit or loss attributable to the value added was deducted. In determining the costs incurred to produce the computer, the Department included (1) the costs of manufacture for each component; and (3) general expenses, including selling, general, and administrative expenses, research and development (R&D) expenses, and interest expenses.

We used Matsushita's data except in the following instances where the costs were not appropriately quantified or valued:

1. For the FPD, further manufactured in the United States, the cost of manufacture was adjusted to reflect the weighted-average cost incurred at two factories.

2. R&D incurred during the POI specifically for the gas plasma FPD class or kind of merchandise was calculated as a percentage of the cost of manufacture of gas plasma FPDs during the POI.

3. R&D for the class or kind of merchandise not sold during the POI was allocated over the cost of sales of the general class or kind of merchandise. R&D incurred during the 1989 fiscal year for the class or kind of merchandise not sold during the POI was used, as BIA, instead of R&D incurred during the POI, since Matsushita could only provide such data for fiscal year 1989. See the "General Comments" and "Interested Party Comments" sections of this notice for further details.

4. General and administrative (G&A) expenses were reduced for the amount of R&D re-classified to the general class or kind of merchandise.

5. R&D incurred by Matsushita Electronics Corporation (MEC) was increased due to a mathematical error made in Matsushita's response.

C. Sharp

For Sharp Corporation and related companies (Sharp), we based United States price on purchase price, in accordance with section 772(b) of the Act, where sales were made directly to unrelated parties prior to importation into the United States and because ESP methodology was not indicated by other circumstances. Where sales to the first unrelated purchaser took place after importation into the United States, we based United States price on ESP, in accordance with section 772(c) of the Act.

We calculated purchase price based on packed, ex-godown (free on dock) port of export prices to unrelated customers in the United States. We made deductions, where appropriate, for foreign brokerage and handling, foreign inland freight, and foreign inland insurance. For comparisons in which FMV was based on home market prices, in accordance with section 772(d)(1)(C) of the Act, we added to net unit price the amount of VAT that is not collected by reason of exportation of the merchandise.

We calculated ESP based on packed, CIF prices to unrelated customers in the United States. We made deductions, where appropriate, for foreign inland freight, foreign brokerage and handling, ocean freight, air freight, U.S. customs processing fees, U.S. inland freight, U.S. brokerage and handling, U.S. duty, and insurance. In accordance with section 772(e)(2) of the Act, we made additional deductions, where appropriate, for credit expenses, warranty expenses, advertising expenses, product liability premiums, price protection rebates, rebates for meeting competition, inventory carrying expenses, and indirect selling expenses. In accordance with section 772(e)(1) of the Act, we also deducted commissions. For comparisons in which FMV was based on home market prices, in accordance with section 772(d)(1)(C) of the Act, we added to net unit price the amount of VAT that is not collected by reason of exportation of the merchandise.

D. Toshiba

For Toshiba's sales of FPDs which it further manufactured in the United States into portable computers, we based United States price on ESP, in accordance with section 772(c) of the act. To calculate ESP we used packed, FOB prices of computers to unrelated purchasers in the United States, adjusted for the value added in the United States, as noted below.

We made deductions, where appropriate, for foreign inland freight, foreign brokerage and handling, ocean freight, air freight, U.S. inland freight, U.S. brokerage and handling, U.S. customs processing fees, and insurance. In accordance with section 772(e)(2) of the Act, we made additional deductions, where appropriate, for cash discounts, rebates, credit expenses, flooring expenses, advertising expenses, warranty expenses, royalties, price protection, inventory carrying expenses, and indirect selling expenses.

In addition to the aforementioned deductions, we deducted all value added to the FPD, pursuant to section 772(e)(3) of the Act. The value added consists of the costs associated with the production and sale of the computer, other than the costs associated with the FPD, and a proportional amount of profit or loss related to the value added. Profit or loss was calculated by deducting from the sales price of the computer all production and selling costs incurred by the company for the computer. The total profit or loss was then allocated proportionately to all components of cost. Only the profit or loss attributable to the value added was deducted.

In determining the costs incurred to produce the computer, the Department included (1) the costs of manufacture for each component, (2) movement and packing expenses for each component, and (3) general expenses, including selling, general, and administrative expenses, R&D expenses, and interest expenses.

We used Toshiba's data, except in the following instances where the costs were not appropriately quantified or valued:

1. Unconsolidated G&A expenses were calculated as a percentage of unconsolidated cost of sales. "Other expenses" were included in G&A.

2. R&D related specifically to a class or kind of merchandise was allocated over sales of the class or kind of merchandise. R&D expenses for classes or kinds of merchandise not sold during the POI were allocated over the cost of sales of the general class or kind. See the "General Comments" section of this notice for further details.

3. R&D expenses of a group laboratory were included in general R&D. General R&D expenses were reduced for expenses which were determined to be related to the general class or kind of merchandise.

4. U.S. value added costs were increased for miscellaneous material usage variances.

5. The exclusion of commissions paid for services to a related party was disallowed.

Foreign Market Value

In order to determine whether there were sufficient sales of FPDs in the home market to serve as a viable basis for calculating FMV, we compared the volume of home market sales in each such or similar category to the volume of third country sales in the same such or similar category, in accordance with section 773(a)(1)(B) of the Act. Sharp, Matsushita, and Hosiden had viable home markets with respect to sales of the newly defined such or similar categories of FPDs made during the POI (*i.e.*, EL FPDs, gas plasma FPDs, and active-matrix LCD FPDs, respectively). Toshiba's home market was not viable with respect to sales of gas plasma FPDs, the only relevant such or similar category sold by Toshiba in the United States during the POI.

A. Hosiden

We calculated FMV based on constructed value (CV), in accordance with section 773(e) of the Act, because Hosiden had no sales in the home market of merchandise which could reasonably be compared to its U.S. sales according to the Department's matching criteria. The CV includes the cost of materials and fabrication of the merchandise exported to the United States, plus general expenses, profit, and packing. We used Hosiden's CV data except in the following instances where the costs were not appropriately quantified or valued:

1. The material cost variance was not used to determine the material costs; instead, the standard material cost was used as BIA.

2. Material cost was increased, using BIA, for the difference between glass used, as reflected on inventory records, and the glass used, as reflected on production records.

3. Fabrication cost was increased, using BIA, to account for an adjustment in the machine time standard for February and March, 1990.

4. The cost of manufacture was increased due to an adjustment in yields. Using BIA, the quantity input into the succeeding production stage, rather than output from each production stage, was used to calculate the yield of each stage.

5. R&D related specifically to the active-matrix LCD FPD class or kind of merchandise was allocated over sales of that class or kind of merchandise. See the "General Comments" section of this notice for further details.

6. Certain R&D that was incurred for the benefit of the active-matrix LCD FPD class or kind of merchandise but classified by Hosiden as general R&D was re-classified as R&D for that class or kind of merchandise and allocated over the cost of sales of that class or kind of merchandise.

7. Indirect selling, warranty, and credit expenses were adjusted for various discrepancies.

After the adjustments, we used actual general expenes, in accordance with section 773(e)(1)(B)(i) of the Act, because these expenses exceeded the statutory minimum of ten percent. For profit, we applied eight percent of the combined cost of materials, fabrication, and general expenses, pursuant to section 773(e)(1)(B)(ii) of the Act, because the actual amount was less than the statutory minimum of eight percent.

We made circumstance of sale adjustments for differences in credit, warranty, and technical services expenses, pursuant to 19 CFR 353.36(a) We added U.S. commissions and deducted home market indirect selling expenses up to the amount of the U.S. commissions, in accordance with 19 CFR 353.36(b).

We have recalculated Hosiden's U.S. warranty and technical services expense adjustments to reflect information discovered at verification and changes to the cost of manufacture of Hosiden's merchandise sold in the United States.

B. Matsushita

As stated in our preliminary determination, we investigated whether sales by Matsushita were made in the home market at less than the cost of production. We compared home market ex-factory sales prices to the cost of production (COP) in all cases. We found that less than 90 percent but more than 10 percent of sales were made at prices above the COP and considered only the above-cost sales as a basis for determining FMV. We disregarded below-cost sales in our analysis.

For specific products, all of which were sold below cost, we based FMV on CV, in accordance with section 773(e) of the Act.

We relied on the submitted COP and CV information, except in the following instances where the costs were not appropriately quantified or valued:

1. R&D incurred during the POI specifically for the gas plasma FPD class or kind of merchandise was calculated as a percentage of the cost of manufacture of gas plasma FPDs during the POI.

2. R&D for the class or kind of merchandise not sold during the POI was allocated over the cost of sales of the general class or kind of merchandise. R&D incurred during the 1989 fiscal year for the class or kind of merchandise not sold during the POI was used, as BIA, instead of R&D incurred during the POI, since Matsushita could only provide such data for fiscal year 1989. See the "General Comments" and "Interested Party Comments" sections of this notice for further details.

3. G&A expenses were reduced for the amount of R&D reclassified to the general class or kind of merchandise.

4. R&D incurred by MEC was increased to correct a mathematical error made in Matsushita's response.

After the adjustments, we used actual general expenses, in accordance with section 773(e)(1)(B)(i) of the Act, because they exceeded the statutory minimum of ten percent. For profit, we applied eight percent of the combined cost of materials, fabrication, and general expenses, pursuant to section 773(e)(1)(B)(ii) of the Act, because the actual figure was less than the statutory minimum of eight percent. We added U.S. packing.

Where FMV was based on home market prices, for comparisons to purchase price sales, we made deductions, where appropriate, for discounts and foreign inland freight. We made circumstance of sale adjustments, where appropriate, for differences in credit, warranty, and royalty expenses, pursuant to 19 CFR 353.56(a). We deducted home market packing costs and added U.S. packing costs. We made

a circumstance of sale adjustment for VAT incurred on home market sales and not on export sales.

Where FMV was based on CV, for comparisons to purchase price sales, we made circumstance of sale adjustments, where appropriate, for differences in credit, warranty, and royalty expenses, pursuant to 19 CFR 353.56(a).

Where FMV was based on home market prices, for comparisons to ESP sales, we made deductions, where appropriate, for discounts and foreign inland freight. We made deductions, where appropriate, for credit, warranty, and royalty expenses. We also deducted indirect selling expenses, including inventory carrying expenses, warehousing expenses, advertising expenses, and other indirect selling expenses. This deduction for home market indirect selling expenses was capped by the amount of indirect selling expenses incurred in the U.S. market, in accordance with 19 CFR 353.56(b). We deducted home market packing costs and added U.S. packing costs. We made a circumstance of sale adjustment for VAT incurred on home market sales and not on export sales.

Where FMV was based on CV, for comparisons to ESP sales, we made deductions, where appropriate, for credit, warranty, and royalty expenses. We also deducted indirect selling expenses, including inventory carrying expenses, warehousing expenses, advertising expenses, and other indirect selling expenses. This deduction for home market indirect selling expenses was capped by the amount of indirect selling expenses incurred in the U.S. market, in accordance with 19 CFR 353.56(b).

C. Sharp

As stated in our preliminary determination, we investigated whether sales by Sharp were made in the home market at less than the cost of production. We compared home market ex-factory sales prices to the COP in all cases. We found that less than 90 percent but more than 10 percent of sales were made at prices above the COP and considered only the above-cost sales as a basis for determining FMV. We disregarded below-cost sales in our analysis. For certain models, all of which were sold below cost, we based FMV on CV in accordance with section 773(b) of the Act. The submitted COP and CV costs were relied upon, except in the following instances, where the costs were not appropriately quantified or valued:

1. Glass material costs were increased for the difference between glass used from inventory records and glass used according to production records. Because Sharp was unable to provide the necessary data, we used, as BIA, data obtained from other respondents in these investigations.

2. Factory overhead expenses of the LCD Division which Sharp had included in its G&A calculation were reclassified and included in the cost of manufacture. These expenses were allocated over the cost of sale of the LCD Division.

3. R&D expenses related specifically to the EL FPD class or kind of merchandise were allocated over sales of the EL FPD class or kind of merchandise. R&D expenses the for classes or kinds of merchandise not sold during the POI were allocated over the cost of sales of the general class or kind. See the "General Comments" section of this notice for further details.

4. G&A expenses were allocated according to the level of the corporate organization at which they were incurred—the LCD Division, the Electronics Components Group, and Sharp Corporation.

After the adjustments, we applied the statutory minimum of ten percent for general expenses, in accordance with section 773(e)(1)(B)(i) of the Act, because the actual expenses did not exceed ten percent. For profit, we applied eight percent of the combined cost of materials, fabrication, and general expenses, pursuant to section 773(e)(1)(B)(ii) of the Act, because the actual figure was less than the statutory minimum of eight percent. We added U.S. packing.

Where FMV was based on home market prices, for comparison to purchase price sales, we made deductions, where appropriate, for cash discounts, rebates, and inland freight. We made circumstance of sale adjustments, where appropriate, for differences in credit and warranties, pursuant to 19 CFR 353.56(a). We deducted home market packing costs and added U.S. packing costs and U.S. credit expenses. We made a circumstance of sale adjustment for VAT incurred on home market sales and not on export sales. We made the VAT adjustment based on U.S. gross price net of discounts.

Where FMV was based on home market prices, for comparison to ESP sales, we made deductions, where appropriate, for cash discounts, rebates, and inland freight. We made deductions, where appropriate, for credit and warranties. We deducted home market indirect selling expenses, which included inventory carrying expenses, product liability premiums, other indirect selling expenses, and advertising expenses. This deduction for home market indirect selling expenses was capped by the amount of indirect selling expenses and commissions incurred in the U.S. market, in accordance with 19 CFR 353.56(b). We deducted home market packing costs and added U.S. packing costs. We made a circumstance of sale adjustment for VAT incurred on home market sales and not on export sales. We made the VAT adjustment based on U.S. gross price net of discounts.

Where FMV was based on CV, for comparisons to ESP sales, we made deductions, where appropriate, for credit and warranties. We deducted home market indirect selling expenses, which included inventory carrying expenses, product liability premiums, other indirect selling expenses, and advertising expenses. This deduction for home market indirect selling expenses was capped by the amount of indirect selling expenses and commissions incurred in the U.S. market, in accordance with 19 CFR 353.56(b). We added U.S. packing costs.

D. Toshiba

We calculated FMV based on CV, in accordance with section 773(a)(2) of the Act, because Toshiba did not have a viable home market or third country market. The CV includes the cost of materials and fabrication of the merchandise exported to the United States, as reflected in the price Toshiba paid for the FPD from an unrelated supplier, plus general expenses, profit, and packing. We used Toshiba's CV data except in the following instances where the costs were not appropriately quantified or valued:

1. Unconsolidated G&A expenses were calculated as a percentage of unconsolidated cost of sales. "Other expenses" were included in G&A.

2. R&D expenses related specifically to a class or kind of merchandise were allocated over sales of the class or kind of merchandise. R&D expenses for classes or kinds of merchandise not sold during the POI were allocated over the cost of sales of the general class or kind. See the "General Comments" section of this notice for further details.

3. R&D expenses of a group laboratory were included in general R&D. General R&D expenses were reduced for expenses which were determined to be related to the general class or kind of merchandise.

4. The exclusion of commissions paid for services to a related party was disallowed.

5. Interest expenses were reduced to avoid double counting imputed credit.

After the adjustments, we used actual general expenses, in accordance with section 773(e)(1)(B)(i) of the Act, because they exceeded the statutory minimum of ten percent. For profit, we applied eight percent of the combined cost of materials, fabrication, and general expenses, pursuant to section 773(e)(1)(B)(ii) of the Act, because the actual figure was less than the statutory minimum of eight percent. We added U.S. packing.

From CV we deducted rebates, warranties, royalties, credit, and indirect selling expenses. The deduction for home market indirect selling expenses was capped by the amount of indirect selling expenses incurred in the U.S. market, in accordance with 19 CFR 353.56(b).

Currency Conversion

In accordance with 19 CFR 353.60, we converted foreign currency into the equivalent amount of United States currency using the official exchange rates in effect on the appropriate dates. All currency conversions were made at rates certified by the Federal Reserve Bank.

Verification

We verified the information used in making our final determination in accordance with section 776(b) of the Act. We used standard verification procedures including examination of relevant accounting records and original source documents of the respondents. Our verification results are outlined in the public versions of the verification reports which are on file in the Central Records Unit (room B-099) of the Main Commerce Building.

General Comments

Comment 1: Interested parties have suggested a number of methods for the allocation of R&D as it relates to constructed value and the cost of production. Individual respondent positions on R&D can be found in the "Interested Party Comments" section of this notice.

DOC Position: The Department's methodology for the allocation of R&D in these investigations is as follows.

In order to calculate COP and CV, the Department has allocated R&D using a two-step process. First, all class or kind-specific R&D was allocated only to all class or kind specific sales. For example, all gas plasma FPD R&D was allocated to all gas plasma FPD sales. Second, in instances where a company had R&D for a class or kind of merchandise during the POI, but no sales of the same class or kind of merchandise, that R&D expense was allocated over sales of the general class or kind of merchandise, all high information content flat panel displays, regardless of technology.

Section 773(e)(1)(B) of the Act requires the Department to include in CV an "amount for general expenses . . . equal to that usually reflected in sales of the merchandise of the same general class or kind as the merchandise under consideration." In Cellular Mobile Telephones and Subassemblies from Japan: Final Results of Antidumping Duty Administrative Review (54 FR 48011, November 20, 1989), the Department "determined to use profit and selling, general, and administrative expense (SG&A) figures for a specific product when such data was more accurate or otherwise more appropriate." In this case, it is both more accurate and more appropriate to allocate class or kind specific R&D over class or kind specific sales, wherever possible because the benefits of this R&D relate directly to sales of this class or kind of merchandise. Where this is not possible, the Department has used the next most appropriate method, that of allocating R&D over the general class or kind of merchandise.

Comment 2: The petitioners contend that the Department should define the scope of these investigations to include all subassemblies that are exclusively dedicated to or designed for use in FPDs. The petitioners state that the evidence in the record fully supports the inclusion of all such subassemblies, as expressed in the petition, rather than only "processed glass substrates, whether or not integrated with additional components," as the Department preliminarily determined. The petitioners maintain that the petition satisfied the requirements for initiation of a case involving all subassemblies, that precedent holds that there is a presumption that the products described in the petition are within the class or kind of merchandise subject to these investigations, and that the Department "has neither stated that the petition is insufficient or unsatisfactory in any respect, nor cited evidence in the record that would support such a finding." The petitioners state that they manufacture all of the subassemblies identified in the petition, that such subassemblies are the same class or kind of merchandise as complete FPDs, and that the inclusion of all such subassemblies is necessary to prevent circumvention of any ensuing antidumping duty order.

The petitioners state that in altering the scope of these investigations, the Department only cited concerns regarding potential disruption of trade in many electronic components and regarding the administrability of any ensuing antidumping duty order. The petitioners contend that the "exclusively dedicated to or designed for use" standard responds to both of those concerns, and is consistent with administrative practice in cases involving imports of subassemblies (e.g., Final Determination of Sales at Less Than Fair Value: Certain Small Business Telephone Systems and Subassemblies Thereof from Japan (54 FR 42541, October 17, 1989)). The petitioners state that their clear intent throughout the investigations has been to include all of the aforementioned subassemblies. The petitioners conclude, citing *NTN Bearing Corp. of America* v. *United States*, 14 CIT _____, 747 F. Supp. 726, 730 (1990), that "absent record evidence requiring a contrary conclusion, the Department is statutorily obliged to insure that the proceedings are maintained in a form which corresponds to the petitioner's clearly evinced intent and purpose."

The CSMG contends that the Department should use its inherent authority to redefine and clarify the parameters of its investigations to exclude all subassemblies from the scope of the investigations, including glass substrates. CSMG states that there is no claim of dumping of these subassemblies, that subassemblies are not being imported, and that the petitioners state that is no market for subassemblies. CSMG maintains that fears of circumvention of any ensuing antidumping duty order are insufficient justification for including subassemblies, and that the anti-circumvention provision of the Omnibus Trade and Competitiveness Act of 1988 provides ample protection for the domestic industry. CSMG further states that the petitioners have failed to adequately describe the subassemblies they want included in the scope of the investigations, that it is doubtful that the petitioners are representative of the U.S. industry that manufactures parts or subassemblies of FPDs, and, therefore, that the petitioners have failed to meet their legal burden and provide information that would enable the Department to conduct thorough investigations. CSMG stated that if glass substrates remain within the scope of the investigations, glass substrates should be properly defined to include only patterned glass with electro-optical material incorporated, since that definition is technologically appropriate and administratively feasible.

In Focus contends that the Department should exclude from the scope of the investigations the processed glass substrates purchased by

In Focus for use in manufacturing color FPDs. In Focus states that such a step would reflect the differences in manufacturing processes among companies and that the petitioners' proposed scope of investigation is carefully crafted to exclude glass which the petitioners import, while including glass which the petitioners' domestic competitors import.

Texas Instruments Incorporated (TI) contends that the Department should continue to exclude drive and control electronics from the scope of the investigations, and that if the Department includes such electronics in the scope of the investigations, the petitioners do not have standing to initiate antidumping investigations with respect to such electronics, as TI represents the majority of the domestic industry producing driver integrated circuits and control electronics. TI believes that drive and control electronics are, in general, not "exclusively dedicated to or designed for use in" FPDs. Drive electronics, by their very nature, were usable in both high and low information content flat panel displays. TI adds that the petitioner's revised definitions of drive electronics, as reflected in the petitioners' case brief, are neither clear nor adequately specific. TI also states that many products perform the function of control electronics for FPDs, but that these products can also be used with cathode ray tube displays and other non-FPD applications.

Toshiba contends that the Department should not redefine the scope of the investigations to include subassemblies that are exclusively dedicated to, or designed for, use in FPDs. Toshiba expresses concern that such a redefinition would lead to significant administrative and commercial problems regarding the importation of other electronic components.

DOC Position: We find that the continued inclusion in the scope of the investigations of display glass, as defined in the "Scope of Investigations" section of this notice, is warranted, given the apparent exclusion dedication of that subassembly and the fact that it represents that essential character of an FPD. The technology used by an FPD is defined by the technology of the display glass and, therefore, the basic technical characteristics of the completed FPD are also defined by the display glass. In addition, the selection of the other components is a function of the display technology, which is determined by the type of display glass.

In addition to the display glass, the petitioners request that other subassemblies of an FPD be included in the scope of investigations. The petitioners name as subassemblies: Drive electronics; control electronics, mechanical package, and power supply. We find that the evidence on the record does not support the inclusion of these other subassemblied in the scope of investigations for the reasons set forth below.

The aforementioned subassemblies are not adequately defined. For example, the petitioners state that they do not wish to include "driver integrated circuits" (ICs) but wish to include "driver electronics." The petitioners distinguish between these items as follows: "when driver ICs and other parts are joined together in a certain fashion * * * they become a subassembly within the requested scope." See, Letter from Paul Rosenthal to Secretary, May 30, 1991, at 12. The petitioners definition is so ambiguous that it would be administratively impossible for the U.S. Customs Service to identify a covered subassembly. In the case of driver electronics, Customs would need to know the number of ICs that constitute driver electronics, as well a clear identification of the "other parts" necessary for the item to qualify as a subassembly. Furthermore, Customs would be required to determine the "certain fashion" of assembly required for the product to be included in the scope of investigations.

The petitioners' principal concern appears to be that failure to include subassemblies in the scope of investigations would result in circumvention of any import relief granted in the investigations. The petitioners argue that subassemblies can be assembled into a completed FPD easily, quickly, and at no great expense. The Omnibus Trade and Competitiveness Act of 1988 amended the Tariff Act of 1930 to include new section 781, which specifically addresses the issue of circumvention. If the petitioners discover evidence that circumvention of any ensuing antidumping duty order is occurring, they may file for relief under section 781 of the Act.

Comment 3: Mitsui contends that it imports computer systems from Japan which incorporate an FPD in their system hardware. Mitsui states that its transactions involve the sale and subsequent importation of a computer system, and not the purchase of components, such as an FPD. All of the components of the systems which it imports are designed and dedicated for use together. Mitsui maintains that transactions involving computer systems, by their nature, do not involve the sale of subject merchandise to the United States. Such transactions, therefore, are beyond the scope of these investigations. Mitsui also states that although U.S. Customs classifies the subassembly containing the FPD as a display, Customs looks only at the condition of merchandise at the time of importation, while the Department must make determinations based on the class or kind of merchandise sold. Mitsui maintains that it sells computer systems. Finally, Mitsui states that, since its shipments of computer systems began long before the beginning of this case, its shipments were not designed to circumvent antidumping duties on FPDs.

Toshiba urges that the Department accept the position advocated by Mitsui.

The petitioners contend that the Department in its preliminary determination properly included in the scope of these investigations FPDs imported in shipments with other computer subassemblies. The petitioners state that the failure to include such subassemblies in the scope of these investigations would create a loophole enabling importers to circumvent an antidumping duty order.

DOC Position: We disagree with Mitsui. Mitsui's contention that the finished product (*i.e.*, the computer) is treated by the OEM as an integrated entirety and all components are designed for a specific and singular end-use is not dispositive of whether merchandise is within the scope of an investigation. Mitsui clearly sells a collection of components to the OEM, one of which is indisputably an FPD. Nor is the fact that Mitsui's FPDs are imported in shipments with other computer subassemblies controlling. As the Department determined in Final Determination of Sales at Less Than Fair Value: Color Picture Tubes From Japan (52 FR 44171, November 18, 1987), the mere fact that additional components may be entered at the same time as the subject merchandise does not change the fact that the subject merchandise is being imported and potentially dumped. Furthermore, the Department continues to find the rulings of the U.S. Customs Service on this matter instructive. Three rulings, issued in 1988, 1989, and 1990, determined that shipments of FPDs by Mitsui "do not represent an unassembled computer," but rather were properly classified as "display units without cathode ray tube, having a visual display diagonal not exceeding 30.5 centimeters," under HTS 8471.92.3000.

Therefore, we determine that the importation of FPDs, as described by Mitsui, are subject to these investigations so long as those FPDs are

active-matrix LCD FPDs or EL FPDs. We have rescinded the investigation with respect to passive-matrix LCD FPDs and have found no sales at less than fair value of gas plasma FPDs.

Interested Party Comments

A. Hosiden

Comment 1: Hosiden contends that the Department improperly used constructed value as the basis for FMV, rather than appropriate, available, and verified third country sales data. The Department found that Hosiden's home market is viable but that Hosiden had no sales of "such or similar merchandise" in its home market because the home market sales failed to meet the Department's Tier 1 matching criteria. Hosiden submits that these findings are logically inconsistent and legally insupportable. Hosiden concludes that the Department's Tier 1 criteria preclude its home market sales from being such or similar to its U.S. sales, and therefore that its home market cannot be viable.

Hosiden argues that in the absence of a viable home market there is a clear statutory and regulatory preference for the use of third country sales, rather than constructed value, for FMV. Hosiden cites Final Results of Antidumping Duty Administrative Review: Color Television Receivers, Except for Video Monitors from Taiwan (53 FR 49714, December 9, 1988), where the Department stated that "[i]t is our policy, based on the legislative history of the 1979 [Trade Agreements] Act, to use third country sales, where possible, rather than constructed value as a basis for comparison in determining foreign market value."

Hosiden also cites Final Determination of Sales at Less Than Fair Value: Motorcycle Batteries from Taiwan (47 FR 9267, March 4, 1982), where the home market was technically viable but, based on the substantial dissimilarity between the merchandise sold in the home market and in the United States, the Department used third country sales for comparison to all but one U.S. model. Hosiden states that it has no home market models comparable to those sold in the United States.

Hosiden further cites Final Determination of Sales at Less Than Fair Value: Small Business Telephone Systems and Subassemblies Thereof from Korea (54 FR 53141, 53150, December 27, 1989) where the Department stated that it is a reasonable exercise of its discretion under the law to use third country sales rather than constructed value, even when the home market has been determined to be viable.

Hosiden states that it has reported to the Department substantial sales to one third country of merchandise identical to that sold to the United States, with these third country sales forming the most appropriate basis for comparison to U.S. sales.

The petitioners contend that selection of constructed value for FMV is the only choice that results in a fair comparison of prices in different markets. The petitioners state that Hosiden's third-country sales were made pursuant to the same contract as the U.S. sales and the petitioners conclude that the U.S. and third-country sales were not unique transactions capable of comparison with each other, but simply one sale with shipments going to two different destinations.

DOC Position: We calculated FMV for Hosiden based on constructed value because: (1) Hosiden's home market is viable; and (2) Hosiden made no sales in the home market that were comparable to its U.S. sales.

Section 773(a)(1) of the Act states that FMV "shall be the price * * * at which such or similar merchandise is sold * * * in the principal markets of the country from which exported" unless "the quantity sold for home consumption is so small in relation to the quantities sold * * * to countries other than the United States as to form an inadequate basis for comparison." The determination of whether home market sales are "so small" as to be "inadequate" is commonly referred to as the "viability test."

The viability test calls for a comparison of the quantity of sales in the home market with the quantity sold to third countries. If that ratio is too small (normally, below five percent), then the Department considers home market sales to constitute an "inadequate basis for comparison" and calculates FMV based on sales to a third country or based on constructed value. See, 19 CFR 353.48.

In our preliminary determination, we found that all FPDs constituted a single class or kind of merchandise with three such or similar categories (*i.e.*, LCD, EL, and gas plasma FPDs). As an initial step in analyzing Hosiden's data, we found that Hosiden was viable with respect to the such or similar category that it produced for sale to the United States, LCDs.

Despite the redefinition of the classes or kinds of merchandise and the such or similar categories, Hosiden remains viable when the viability test is performed on the basis of the redefined class or kind of merchandise (and such or similar category) that Hosiden sells to the United States—active-matrix LCD FPDs. The viability test shows that there was a significant volume of active-matrix LCD FPD sales in the home market compared to sales of such or similar merchandise in third countries.

Prior to issuing the questionnaire in these investigations, we solicited comments from interested parties regarding the criteria that should be used for the selection of the most similar home market products for comparison to U.S. sales. Based on these comments, we established "matching criteria" in appendix V of our questionnaire. No parties objected to the appendix V matching criteria.

Based on the criteria established in Tier I of appendix V, Hosiden had no sales in the home market that were sufficiently similar to its U.S. sales to allow comparison. Hosiden contends that under these circumstances, it cannot, by definition, be viable and that therefore the Department must use third country sales to calculate FMV. See, H.R. Rept. No. 1261, 85th Congress, 2d Sess. (1958), at 8.

Hosiden confuses the purpose of the viability test and the purpose of the matching criteria. The policy underlying the viability test is to ensure that the market in which price comparisons are being performed is adequate and appropriate. The viability test is not intended to measure precise quantities of sales of each individual product model; rather, it is intended to provide a guideline, early in the investigation, as to the existence of a reasonable level of market activity. Matching criteria, on the other hand, are intended to ensure that each U.S. sale is matched to the most similar home market sale, as well as to define when sales are sufficiently dissimilar that they may not be compared once home market viability has been established.

The viability test is often performed using the same groupings of merchandise used for price comparisons. However, these two groups need not be identical, as long as the first group (those transactions used for the viability test) provides a reasonable indication of the level of activity in the home market and the second group (those transactions used for specific price comparisons) contain sales that can properly be compared with those in the United States.

In those instances where sales in the home market are viable but nevertheless cannot be properly compared with sales to the United States, however, the Department has traditionaly based FMV on CV. See, *e.g.*, Final Results of

Antidumping Duty Administrative Review: Forged Steel Crankshafts from the United Kingdom (55 FR 48880, November 23, 1990) (ITA used CV as the basis for FMV where the ITA could not adjust for the differences between the twisted and untwisted crankshafts. ITA also used CV as the basis for FMV where ITA identified comparable home market products but was unable to find contemporaneous sales); and Final Determination of Sales at Less Than Fair Value: Small Business Telephone Systems from Korea (54 FR 53141, December 27, 1989) (Although home market was viable, where merchandise was regarded as dissimilar due to substantial difference in merchandise adjustments, ITA used CV).

The conclusions reached by the Department in the cases cited by Hosiden were based upon an entirely different set of circumstances than are present in this case and these cases do not support the proposition for which they are cited. In both Small Business Telephone Systems from Korea and Motorcycle Batteries from Taiwan, the department determined that although the home market met the five percent test, the volume of sales in the home market was so small compared to U.S. sales that it was not appropriate to consider it "viable."

Comment 2: The petitioners contend that the Department should include fixed warranty costs in Hosiden's indirect selling expenses.

Hosiden responds that the petitioners have blindly adopted an error in the constructed value verification report, and that U.S. indirect selling expenses are irrelevant for Hosiden's sales, which were all on a purchase price basis.

DOC Position: We agree with the petitioners. Hosiden stated at verification that the fixed portion of warranty costs was not included in indirect selling expenses. Indirect selling expenses are relevant, given the inclusion of such expenses for the home market in the CV. Therefore, we have adjusted Hosiden's indirect selling expense figures to include home market fixed warranty costs.

Comment 3: Hosiden contends that its date of sale methodology for U.S. sales is correct, with its selection of change order (CO) dates accurately reflecting the dates on which the essential terms of the transactions were fixed. The CO is issued by a customer to alter the terms of a preceding purchase order (PO) (*e.g.*, price, quantity, delivery date).

The petitioners contend that the appropriate dates of sale for Hosiden are the dates on which the price and quantity terms of the transactions were no longer subject to modification, and that those terms were still subject to modification after at least one change order date claimed by Hosiden as date of sale.

DOC Position: After a thorough review of information submitted on the record and information obtained at verification, we determine that the proper date of sale is the invoice date (*i.e.*, shipment date). It is the Department's practice to determine the date of sale as the date on which the essential terms of the sale, specifically, price and quantity, are finalized. See, Final Determination of Sales at Less Than Fair Value: Grey Portland Cement and Clinker from Japan (56 FR 12156, 12163, March 22, 1991). Although the material terms of sale are included in the POs and COs, the terms of sale are not final until shipment. For at least half of the COs claimed by Hosiden as dates of sale, changes to essential terms of sale occurred after some shipments had been made pursuant to the COs. That these changes can and do occur up to the shipment date indicates that the POs and COs do not finally set the terms of sale. Therefore, we have used the invoice date (*i.e.*, shipment date) as the date of sale. (See, Final Determination of Sales at Less Than Fair Value: Industrial Nitrocellulose from the Federal Republic of Germany (55 FR 21058, 21059 May 22, 1990) (The Department determined that the terms of sale were not set at the purchase order date where changes were made to price and quantity up until the date of shipment.

Accordingly, the Department used the date of shipment as the date of sale.))

At verification we examined sales reported by Hosiden (*i.e.*, sales made pursuant to POs or COs issued during the POI). We did not examine in detail information regarding shipments made during the POI pursuant to POs or COs issued prior to the POI. Therefore, as BIA, we have based our margin calculation only on sales reported by Hosiden and examined in detail at verification.

Comment 4: The petitioners contend that the Department should reject Hosiden's home market warranty expense claim because Hosiden overstated its home market warranty expenses by assuming that all home market units returned were scrapped and because the cost of manufacture data used to calculate per-unit warranty expenses for certain home market models do not agree with the per-unit manufacturing cost that Hosiden reported at the cost verification.

Hosiden replies that its methodology used conservative assumptions since actual data were not available at the time of its response, and that any overstatement of home market warranty expenses would be to Hosiden's detriment in a constructed value situation.

DOC Position: We agree with the petitioners that certain manufacturing costs used to calculate the home market warranty expense do not agree with manufacturing cost information presented during the cost verification. Therefore, we have recalculated Hosiden's home market warranty expense claim by including the manufacturing costs that were inappropriately excluded.

Comment 5: The petitioners contend that the Department should recalculate Hosiden's U.S. warranty and technical service expense factors based on FPDs sold during the POI, rather than FPDs invoiced during the POI.

Hosiden contends that the Department has traditionally accepted the value of shipments during the POI as the denominator for circumstance of sale adjustments, notwithstanding that the date of sale is not based on date of shipment.

DOC Position: Given that we are now using invoice date as date of sale, it is appropriate to use shipments invoiced during the POI as a basis for allocating these expense.

Comment 6: Hosiden contends that its technical service expenses properly exclude travel expenses incurred by sales personnel.

The petitioners contend that the sales personnel attended a meeting relating to technical service, in one instance, and that the sales personnel's visit coincided with the visit of technical service personnel in another instance. Therefore, the travel expenses for sales personnel for these visits should be classified as technical service expenses.

DOC Position: We agree with Hosiden. There is no evidence on the record to suggest that Hosiden's sales personnel performed any technical service functions.

Comment 7: The petitioners contend that Hosiden incorrectly excluded from technical service expenses a large percentage of travel costs related to visits to U.S. customers.

Hosiden contends that it correctly calculated its U.S. technical service expenses.

DOC Position: We agree with Hosiden. The schedules of visits to U.S. customers by Hosiden's technical service personnel were examined at verification, and we have no reason to believe that the allocation of expenses for these personnel is unreasonable or distortive.

Comment 8: Hosiden contends that the Department improperly required Hosiden to report home market direct selling expenses for constructed value. Hosiden states that "binding precedent" requires the Department to use U.S. direct selling expenses as a "proxy" for home market direct selling expenses, a policy established in Final Determination of Sales at Less Than Fair Value: Cell Site Transceivers from Japan (49 FR 43080, 43084, October 26, 1984). Hosiden emphasizes that it had no sales of comparable merchandise in the home market and that direct selling expenses for its home market products are not representative because they relate to products which are too different from those sold in the United States.

The petitioners contend that the Department's requirement is supported by the Department's precedent (*e.g.*, Final Determination of Sales at Less Than Fair Value: Mechanical Transfer Presses from Japan (55 FR 335, 345, January 4, 1990)).

DOC Position: We agree with the petitioners. The Act addresses this point specifically: "the constructed value of imported merchandise shall be the sum of * * * an amount for general expenses [*i.e.*, selling, general, and administrative expenses] and profit equal to that usually reflected in sales of merchandise of the same general class or kind as the merchandise under consideration which are made by producers *in the country of exportation* * * *." (section 773(e)(B) of the Act [emphasis added]). Cases cited by Hosiden in which the Department did not use home market direct selling expenses involved exceptional circumstances in which the Department was unable to use such expenses. No exceptional circumstances existed in this case, and the Act clearly required the Department to use Hosiden's home market direct selling expenses. Therefore, we have used home market direct selling expenses in our calculations for the class or kind of merchandise sold in the United States (*i.e.*, active-matrix LCD FPDs).

Comment 9: The petitioners contend that the Department should use BIA to determine the constructed value of Hosiden's U.S. sales because Hosiden failed to submit a timely response to the Department's questionnaire and failed to provide a response in the form required by the Department. The petitioners maintain that it is well-established Department policy not to allow new responses to be filed after the preliminary determination and during verification because there is insufficient time for proper analysis and verification by the Department. The petitioners state that Hosiden's proposed revisions to its constructed value response submitted during verification were properly rejected by the Department. Finally, the petitioners state that, during verification, the Department discovered numerous inconsistencies in Hosiden's March 1, 1991, submission which, along with problems with Hosiden's submissions at verification, warrant the use of BIA.

Hosiden contends that the revisions to the constructed value proffered at verification were not new information and did not materially alter prior responses. Additionally, Hosiden claims that the methodology used for the cost of manufacturing calculation in both of the worksheets not accepted at verification by the Department and the January 4, 1991, submission were tested and verified by the Department. Finally, Hosiden contends that the revised submissions should not have been rejected because the Department's regulations which requires respondents to submit factual information "seven days before the scheduled date at which the verification is to commence" (19 CFR 353.31(a)(1)(i)) apply only to new information.

DOC Position: We agree with the petitioners in part. During verification the Department held to its well-established policy of not accepting new information or information that would substantially alter the submission and properly did not accept Hosiden's proposed revisions to its submissions. As stated in 19 CFR 353.36(c), the purpose of verification is "to verify the accuracy and completeness of *submitted* factual information." (Emphasis added) New or revised data that is submitted during verification is not necessarily subject to verification because it may substantially alter the prior submission, and/or the Department may not have sufficient time to properly analyze the information. We used the information submitted by Hosiden prior to verification as the basis for calculating CV. The information submitted by the respondent, except for those areas that were adjusted in the final results, was verified to a degree which did not warrant total rejection of the information. See the "Foreign Market Value" section of this notice for further details of adjustments to Hosiden's data.

Comment 10: The petitioners contend that the Department should reject Hosiden's constructed value data and use BIA, because Hosiden calculated a material cost variance from calculations that included high information content and low information content active-matrix LCD FPDs. By including costs associated with the production of low information content FPDs, Hosiden understated the actual costs it incurred to manufacture the high information content FPDs sold in the United States.

Hosiden maintains that the calculation of the material cost variance is proper because both the low information content and high information content active-matrix LCD FPDs were made on the same production lines.

DOC Position: We have used Hosiden's CV data but have rejected Hosiden's calculation of the material cost variance. The material cost variance, calculated only for the purpose of this investigation, was incorrect and appears to understate actual material cost per unit. The standard material cost that was applied to all inputs did not recognize the difference between units intended to be completed for sale and units intended for analytical testing, thus overstating the total of the standard costs for all inputs and creating a favorable variance calculation. While this understatement of actual material cost was not a sufficient basis to reject Hosiden's entire response, it did require us to use partial BIA. As BIA, we used the standard material cost per input as adjusted for the actual production yields for the product sold in the United States and did not adjust these costs for Hosiden's calculated material variance.

Comment 11: The petitioners claim production yields for the subject merchandise were overstated because:

(1) Hosiden failed to include in its yield calculations mother glass panels used for routine testing purposes; and

(2) The number of mother glass panels issued to production based on inventory records does not agree with the number of panels issued according to the production records.

Hosiden contends that it has captured the costs of glass units used for routine testing in its cost of manufacture calculation by the adjustment of the material cost variance. Hosiden also maintains that the difference between inventory and production records which could not be reconciled is likely attributable to changes in inventory due to the fiscal year-end inventory count adjustments.

DOC Position: We agree with the petitioners. The Department discovered at verification that the total quantities of mother glass reported as input into production used for the calculation in the submission did not reconcile to the total quantities of mother glass used from Hosiden's inventory records.

Because the Department rejected the material cost variance calculation, the costs of routine glass testing and unreconciled glass were not included in CV; thus, as BIA, the Department adjusted the material costs to include the cost of mother glass used for routine testing and the unreconciled quantity of glass from inventory. See, also, DOC Response to Comment 1 above.

Comment 12: The petitioners argue that Hosiden overstated its production yields for the subject merchandise by improperly reporting good output at the end of each production stage although there was a substantial difference between the output of one production stage and the input into the next stage.

Hosiden contends that the yields calculated in the cost verification exhibits are based on the ratio of the number of output units of each product from each production stage to the number of inputs from the same stage adjusted for work in process.

DOC Position: We agree with the petitioners. Due to the discrepancies in the verification exhibits presented by Hosiden in reporting FPDs that were used for analytical testing and the contradictory information on the record regarding the nature of the processing of these units, as BIA, we have based the yield calculation for each production stage on the number of units input into the succeeding stage.

Comment 13: The petitioners contend that the Department should reject Hosiden's cost of manufacture data because the Department found at verification that the worksheets used to prepare Hosiden's questionnaire response did not reconcile to its daily production and inventory records.

Hosiden claims that the Department's conclusion in the cost verification report that the monthly production summary reports did not reconcile to the daily production and inventory records is the result of the Department's misunderstanding of the format of, and data in, the verification exhibit. Hosiden maintains that had the Department added the proper column on the verification exhibit, it would have found no discrepancy between the daily and monthly report data.

DOC Position: Hosiden did not present a clear explanation at verification of certain documents. However, after analyzing a complete translation and examining the explanation in Hosiden's case brief, we agree that the daily production data does reconcile.

Comment 14: The petitioners contend that Hosiden failed to include yields on common glass panels in overall yield data, thus understating the cost of manufacturing.

Hosiden maintains that the petitioners' claim should be rejected because common glass is not product specific to the panel stage and, moreover, the Department found no discrepancies concerning this issue in Hosiden's monthly and daily factory yield reports.

DOC Position: We agree with Hosiden. For the submission, Hosiden applied the model-specific yield incurred on array mother glass to the common mother glass used in each model. Thus, with regard to common glass, all relevant costs were properly included in Hosiden's submissions.

Comment 15: The petitioners claim that Hosiden's cost of manufacturing data are unreliable, and thus cannot be used by the Department in the final analysis, because the cost of manufacturing information is different in the home market warranty portion of the sales verification and the profit portion of the cost verification.

Hosiden holds that the sales price of the model in question on the home market warranty verification exhibit was used as a conservative proxy for its cost of manufacture. Hosiden explains that a proxy was used because the cost of manufacture calculations for this model had not been completed at the time of the submission of Hosiden's home market direct selling expenses.

DOC Position: We have recalculated Hosiden's home market warranty expense adjustment to include manufacturing costs improperly excluded by Hosiden. *See*, DOC Response to Comment 4 above. However, we find no reason to reject Hosiden's model-by-model manufacturing costs.

Comment 16: The petitioners contend that thin-film transistor R&D costs incurred for other active-matrix LCD FPDs produced, but not sold in the United States, during the POI, should be allocated to the model sold in the United States. The petitioners state that information gathered at verification shows that this R&D could benefit the particular FPD sold in the United States.

Hosiden maintains that although general knowledge and experience gained on one project may have an indirect beneficial effect on other contemporaneous or future projects, the extent of any overlap must be precisely defined. Under any circumstances, this overlap must be confined to product line R&D activities and expenses. Hosiden claims that the product sold in the United States is not of the same product line as the other active-matrix LCD FPDs because, according to the Department's matching criteria, none are such or similar to the product sold in the United States.

DOC Position: We have allocated all R&D incurred for a specific class or kind of merchandise (active-matrix LCD FPDs) over sales of the same class or kind of merchandise. The R&D incurred for active-matrix LCD FPDs included some expenses for low information content FPDs; however, Hosiden was unable to separate these from high information content FPDs. The Department has considered all R&D for active-matrix LCD FPDs to be related to high information content FPDs and has allocated such expenses to the cost of goods sold of high information content active-matrix LCD FPDs. See the "General Comments" section of this notice for further details.

Comment 17: The petitioners contend that the Department should increase Hosiden's model-specific R&D costs by including additional costs, incurred during prior years, which were uncovered during verification.

Hosiden maintains that revisions to its R&D data, to include additional historic costs and update a customer's forecasts for future purchases, were proper and timely because it provided the most accurate information regarding actual events occurring subsequent to the submission. This information affected the distribution of product specific R&D expenses to the merchandise sold in the United States.

DOC Position: As stated above, we have treated all R&D incurred in fiscal year 1989 for active-matrix LCD FPDs as related to high information content active-matrix LCD FPDs and have allocated such costs to the class or kind. Because of the "slice-of time" approach used in investigations, R&D incurred in prior years was not included in the CV for the final determination. Thus, it was unnecessary to adjust for additional prior-year R&D.

Comment 18: The petitioners contend that the Department should adjust Hosiden's R&D to include all expenses incurred by the R&D Center which were related to FPDs.

Hosiden claims that the record shows that Hosiden's R&D analysis and methodology was meticulously reviewed and verified by the Department.

DOC Position: We agree with the petitioners and have considered the R&S for Technical Administration to be R&D overhead related to active-matrix LCD FPD and not general R&D as it was classified in the submission. R&D overhead expenses for the R&D Division, R&D Administration and General Affairs that were classified as

general expenses were also considered by the Department to be R&D overhead and were allocated to all LCD products based on cost of sales. Hosiden allocated R&D to the cost of sales of LCD products. Such costs benefit two classes or kinds of merchandise, passive-matrix LCD FPDs and active-matrix LCD FPDs. Because Hosiden was unable to separately quantify the benefit to each class or kind of merchandise, as BIA, we have allocated such R&D to the combined cost of sales.

Comment 19: The petitioners contend that production coordination expenses should be classified as a manufacturing cost rather than general and administrative expenses. Such costs are incurred to schedule and coordinate production, are incurred as a direct result of manufacturing activity, and are necessary to coordinate factory operations.

Hosiden maintains that the costs of the Production Coordination Department functions are headquarters administrative expenses and not manufacturing costs. The manufacturing, forecasting, planning and administration of the production operations for liquid crystal displays occur at the production plants. Finally, production coordination costs are classified on Hosiden's financial statements as part of selling, general and administrative expenses.

DOC Position: We agree with Hosiden and have not re-classified these expenses. The costs of production coordination are properly included in the general expenses because they are incurred to support the entire company's operations.

Comment 20: The petitioners claim Hosiden's interest expenses should be recalculated based on instructions in the Department's questionnaire, *i.e.*, interest expense less short-term interest income should be reduced by the ratio of accounts receivable to total assets. Hosiden's interest expense rate is understated because it reduced interest expense by the accounts receivable ratio before deducting the full interest income amount.

Hosiden contends that its calculation is correct because the imputed credit calculation does not take into account interest income.

DOC Position: We agree with the petitioners. Therefore, we have recalculated net interest expense so that it reflects the actual short-term financing incurred by the company.

Comment 21: The petitioners contend that the enterprise tax is a general cost of Hosiden's operating activities and should be included in Hosiden's general expenses

Hosiden contends that the enterprise tax in Japan is levied on the basis of corporate income which is unrelated to cost of production and therefore should not be included in general expenses for purposes of calculating constructed value.

DOC Position: We agree with Hosiden. Although the taxes are considered an operating expense and classified as SG&A on the financial statements, the amount of this tax is determined based on the level of income of the corporation. The Department does not consider income taxes based on the aggregate profit/loss of the corporation to be a cost of producing the product. (See, e.g., Final Results of Antidumping Duty Administrative Review: Color Picture Tubes from Japan (55 FR 37915, September 14, 1990).) Therefore, we have excluded such taxes for purposes of this determination.

B. Matsushita

Comment 22: The petitioners claim that Matsushita improperly included in its home market advertising expenses a markup charged by a related party. The petitioners state that the expenses should be reduced by the amount of the markup.

Matsushita contends that although its advertising expense claim includes a markup charged by a related party, the claim is reasonable because the markup reflects the expenses incurred by the related party in procuring the advertising and because the final amounts paid to the related party are similar to prices charged by unrelated suppliers on the open market.

DOC Position: We agree with the petitioners. Matsushita's home market advertising expense should be based on the prices which Matsushita paid to unrelated parties rather than on prices paid by one Matsushita unit to another. At verification, we requested that Matsushita provide information on advertising expenses paid to unrelated parties. Matsushita provided this information for only one advertisement during the POI. We have accepted Matsushita's advertising claim with respect to this advertisement. We did not adjust Matsushita's FMV for the advertising expenses for which Matsushita was unable to provide any information regarding the price paid to unrelated parties because we have no evidence to suggest that the mark-up charged by the related company on the single verified advertising claim is similar to the mark-up charged on other advertisements.

Comment 23: The petitioners contend that Matsushita improperly divided advertising expenses for Matsushita Electric Industrial (MEI) Corporate International Industry Sales Division (CIISD) by a value based on transfer prices, rather than prices to the first unrelated customer. The petitioners maintain that prices to the first unrelated customer should be used.

Matsushita contends that its calculation of the denominator for this factor is now based entirely on sales to unrelated parties.

DOC Position: We agree with Matsushita that its calculation of the denominator for this expense, while formerly including some transfer price values, is now properly based on sales prices to unrelated parties.

Comment 24: The petitioners state that Matsushita improperly included in its home market advertising claim expenses for a trade show which benefitted U.S. and third country sales, as well as home market sales. Costs for such trade shows should be allocated to all FPD sales.

Matsushita states that expenses for the trade show in question, held in Tokyo, should be allocated only to home market sales because in the past the Department has attributed expenses to the market in which the show was held. The show was inarguably focused on the Japanese industry.

DOC Position: We agree with Matsushita that expenses for its Tokyo trade show should be allocated solely to home market sales, because the show was held in Japan and was intended to promote products in the Japanese market.

Comment 25: The petitioners contend that the Department should reject Matsushita's home market warranty expense claim because:

(1) Matsushita failed to exclude from this expense the costs of returned units which were charged to customers;

(2) Matsushita's home market warranty expense includes expenses for all markets;

(3) Matsushita submitted two revised warranty expense claims during verification; and

(4) The Department did not verify documents relating to Matsushita's actual warranty expenses.

Matsushita contends that the Department should allow its home market warranty expense claim because:

(1) It did not include the cost of returned units that were charged to customers;

(2) Although the numerator for the warranty expense factor includes expenses for other markets, the denominator includes sales to all markets (Matsushita's records do not

permit a separation of the markets, and it performed the only reasonable allocation permitted by its records);

(3) All information included in the revised warranty calculation was placed on the record in advance of verification in timely responses to the Department's requests for information; and

(4) The costs of manufacture used in the home market warranty calculation were fully verified during the cost verification.

DOC Position: We agree with Matsushita and have accepted its warranty calculation because we verified that its statement of the facts surrounding the warranty claim are correct.

Comment 26: The petitioners contend that the Department should disallow Matsushita's claimed home market freight costs on shipments from Industry Sales Office (ISO) warehouses to customers because Matsushita claimed such costs for all home market shipments, including those which did not go through ISO warehouses.

Matsushita contends that its method for calculating this expense is accurate and reasonable, and has been accepted by the Department in previous investigations. The calculation of this expense on a shipment-by-shipment basis would be excessively difficult and burdensome. Instead Matsushita has calculated an average freight cost, which will yield the same results as shipment-by-shipment costs when a weighted-average FMV is calculated.

DOC Position: We agree with Matsushita. We find that Matsushita's method is reasonable, given the difficulty of calculating the expense on a shipment-by-shipment basis.

Comment 27: The petitioners contend that the Department should exclude markup charged by related companies from home market freight costs.

Matsushita contends that related companies charged markup for movement expenses for both the home market and the United States, so the issue must be treated the same for both markets. If the markup is excluded from home-market movement expenses, it must also be excluded from U.S. movement expenses.

DOC Position: We agree with the petitioners. We find that Matsushita's home market freight costs should be based on the prices which Matsushita paid to unrelated parties rather than on prices paid by one Matsushita unit to another. The price paid by the related party is not a market price; rather, it is a price established for internal Matsushita bookkeeping purposes. The price paid to the unrelated freight company is the true cost incurred by Matsushita for its home market freight. As such, we have reduced Matsushita's claimed home market freight costs by the amount of markup found at verification.

Matsushita is incorrect in its claim that we verified the markup charged by related companies on movement expenses for U.S. sales. In fact, we simply examined the rate chart of a random, unrelated freight company and compared it to the prices charged by the related company. We verified that the prices charged by the related company were equivalent to prices based upon market transactions. Therefore, for foreign brokerage and handling for purchase price sales, we are using the figures reported by Matsushita and verified as correct.

Comment 28: The petitioners contend that Matsushita understated its warranty expenses on U.S. FPD sales by:

(1) Dividing warranty expenses by a total sales value that includes shipments of merchandise to replace returned units; and

(2) Basing the numerator for the expenses on ex-MEI values/transfer prices and the denominator on sales values.

Matsushita contends that it did not understate these expenses because:

(1) The denominator of the factor is based on POI purchase orders, not shipments, so it will not reflect shipments of replacement units;

(2) The numerator and denominator for the calculation were calculated on the same basis, which is correct and internally consistent.

DOC Position: We agreed with Matsushita because:

(1) Matsushita's sales value does not include shipments of units to replace returned units;

(2) The numerator of the warranty expense factor, based on ex-MEI transfer prices is an appropriate approximation of Matsushita's warranty costs; and

(3) If an adjustment is to be applied as a factor to sales values, then the denominator used in calculating the factor should also be based on sales values.

Comment 29: The petitioners contend that the Department should use the expense factor provided at verification, using an alternative methodology, for shipping and handling charges incurred by MEI Corporate Overseas Management Division of the Americas (COMDA) on shipments to the United States.

Matsushita contends that its original methodology was reasonable and appropriate because:

(1) The use of the shipping and handling expense factor for cased FPDs as a surrogate for that expense factor for computers is reasonable, since the FPD is by far the most valuable single component shipped;

(2) The Department has accepted that type of methodology in numerous prior determinations, recognizing when allocation of charges to specific products is impracticable; and

(3) The alternative methodology is based on a single month of shipments and, therefore, is less reliable than a factor calculated for the entire POI.

DOC Position: We agree with the petitioners. The alternative methodology provided at verification is more reflective of the expenses which Matsushita actually incurred.

Matsushita originally reported the cost of shipping a computer "kit" by calculating the cost of moving just the FPD. The alternative methodology provided at verification calculates the cost of moving the entire kit and, therefore, is more reflective of the expenses which Matsushita actually incurred. With regard to Matsushita's claim that the alternative methodology is inaccurate because it is based on only one month of the POI, we find no evidence to suggest that there would be significant variations in movement cost from month to month.

Comment 30: The petitioners contend that Matsushita did not report movement charges for shipments of plasma displays and computer components from MEI Special Projects Office (SPO) to a subcontractor. As BIA, the Department should use an amount equal to the revised expense factor for COMDA shipping and handling charges.

Matsushita contends that its subcontractor picks up all components at SPO and builds any movement expense into the subcontracting fee charged to Matsushita.

DOC Position: We agree with Matsushita. Evidence on the record indicates that Matsushita properly accounted for movement expenses between SPO and the subcontractor.

Comment 31: The petitioners contend that the Department should use, for foreign inland freight charges on shipments from MEC to SPO, the weighted-average cost calculated during verification for shipments handled by Matsushita's primary short haul carrier. The petitioners state that the Department should use this cost rather than the revised cost provided by Matsushita earlier during the verification.

Matsushita contends that the first revised cost is a weighted-average cost

for all short haul carriers, and is thus more accurate than information based only on Matsushita's primary short haul carrier. In addition, Matsushita states that the weighted average figure was virtually identical to the figure for the major single carrier, thus verifying the accuracy of the weighted-average number.

DOC Position: We agree with the petitioners. The revised figure calculated at verification is an allocation based on the costs charged by the carrier for shipments including FPDs. Matsushita officials explained at verification that the carrier is responsible for "virtually all" shipments of FPDs from MEC to SPO.

Comment 32: The petitioners contend that the Department should include a portion of expenses incurred by Panasonic Finance, Inc. (PFI) in Matsushita's U.S. expenses because PFI conducts financing activities for Matsushita Electric Corporation of America (MECA) and Matsushita Computer Company (MCPC).

Matsushita contends that PFI's expenses are included in expenses and costs for MECA and MCPC. Matsushita states that PFI's expenses are part of MECA's general and administrative expenses and, as such, are allocated to MECA's divisions, including those dealing with FPDs and computers.

DOC Position: We agree with Matsushita. Evidence on the record indicates that expenses for PFI have been properly allocated.

Comment 33: The petitioners state that the Department should ensure that computer parts are not included in the prices reported by Matsushita for its U.S. sales of transportable computers, since both parts and computers are recorded in Panasonic Industrial Company Special Projects Office's (PIC-SPO) Invoice Tax Register (ITR).

Matsushita contends that no computer parts were included in PIC-SPO's computer sales.

DOC Position: We agree with Matsushita. The records examined at verification showed that no computer parts were included in PIC-SPO's computer sales.

Comment 34: The petitioners contend that factors for U.S. selling expenses should be based on U.S. sales net of shipments of merchandise to replace returned units.

Matsushita contends that its factors for U.S. selling expenses are based on sales figures which did not include replacement units.

DOC Position: We agree with Matsushita. The records examined at verification showed that no replacement units were included in sales figures used to calculate U.S. selling expenses.

Comment 35: The petitioners contend that Matsushita understated its R&D in the submission by including in the general R&D expenses R&D which was specifically for high information content passive-matrix and active-matrix LCD FPDs and EL FPDs. As described in the preliminary determination in this investigation, the products covered in these investigations include all high information flat panel displays with pixel count of 120,000 or greater. Thus all R&D incurred on behalf of high information content flat panel displays technology should be considered product-line R&D, should be allocated only to sales of high information content flat panel displays, and should be included in Matsushita's cost of manufacture.

Matsushita contends that the methodology used for calculating R&D is consistent with the company's organizational structure and accounting practices, with necessary distinctions among FPD technologies, and with previous DOC determinations.

DOC Position: We agree with the petitioners, in part. R&D expenses incurred for the class or kind of merchandise under investigation for Matsushita, *i.e.*, gas plasma FPDs, were allocated based on the production of the gas plasma FPDs. Because there were no sales of other class or kinds of FPDs during the POI, all other R&D incurred for FPDs were allocated to the general class or kind of merchandise.

Comment 36: The petitioners contend that Matsushita understated its R&D by allocating gas plasma FPD R&D to both high information content and low information content gas plasma FPDs even though most of these R&D projects were specifically for high information content gas plasma FPDs.

Matsushita maintains that gas plasma FPD related R&D were not allocated over too broad a range of products, *i.e.*, both low information content and high information content gas plasma FPDs, because only a small amount of the costs of low information content FPD production, *e.g.*, labor and overhead, was included in the denominator of the R&D ratio. Therefore, exclusion of this minor amount of costs from the denominator would have a minor impact on the cost of production calculations.

DOC Position: We agree with the petitioners. Matsushita understated high information content gas plasma FPD product line R&D by including the labor and overhead of low information content gas plasma FPDs in the denominator of its R&D calculation. Therefore, we adjusted the denominator to include only the costs of manufacture of information content gas plasma FPDs.

Comment 37: The petitioners contend that the cost of manufacture of the FPDs sold in the United States should be adjusted because the yields for the glass panel that Matsushita reported in its response were based on the yields from only one of its two FPD plants.

Matsushita acknowledges the error and has no objection to adjusting the cost of manufacture so that it reflects the weighted average manufacturing cost of the FPD further manufactured in the United States.

DOC Position: We have made the appropriate adjustment to the cost of manufacture of the FPD which was sold in the United States.

Comment 38: The petitioners contends that the cost of electronic components produced by a subsidiary of MEC are understated and should be increased for the final determination because certain components appeared to be sold below cost. Additionally, petitioners contend that the Department should recalculate Matsushita's FPD cost of production based on the greater of the related party transfer prices or the related suppliers' actual cost of production.

Matsushita maintains that the understatement in the response for the cost of electronic components produced by a subsidiary of MEC is not significant and thus has a minimal effect on the final results. Matsushita also contends that the range of profits earned on transactions between MEC's subsidiary and MEC are normal. Finally, Matsushita contends that since no issue was raised for further consideration in the cost verification report, the Department recognizes that there was no reason to doubt the arm's-length nature of the transfer prices.

DOC Position: The Department used the actual costs of components produced by Matsushita Kotobuki Electronics (MKE), a related company, for the cost of materials in CV.

For CV, pursuant to section 773(e)(2) of the Act, the Department uses transfer prices between related companies unless such prices do not "fairly reflect the value in the market under consideration." Printed circuit boards assembled onto the fabricated glass panel were customer-designed and thus not comparable to other such boards on the market. However, we note that some of the transfer prices were made at prices less than the cost of producing the merchandise. Therefore, for CV purposes, the Department has disregarded the transfer prices and used the cost of the components as representative of the value reflected in

the market under consideration. (See, Final Determination of Sales at Less Than Fair Value: Antifriction Bearings (Other Than Spherical Plain and Tapered Roller Bearings) and Parts Thereof from Italy; Final Determination of Sales at Not Less Than Fair Value: Spherical Plain Bearings and Parts Thereof from Italy (54 FR 19096, May 3, 1989).)

Comment 39: The petitioners contend that factory overhead cost incurred by MCPC was not properly allocated to the computer models under investigation because of the large labor hour variance for the production line that was exclusively devoted to assembly of the computer models under investigation.

Matsushita maintains that the standard work times were used for the limited purpose of allocating overhead and G&A costs among models. The standards were not used to calculate these costs. Total overhead and G&A costs were based on total actual costs as recorded on MCPC's books. Matsushita holds that the large variance between standard time and the actual time is irrelevant. MCPC divided total actual costs by total standard time, and then applied the resulting ratio to per-model standard time. MCPC did not, as the petitioners seem to contend, divide total actual costs by total actual time and apply the ratio to standard times. Since the denominator of the calculation was based on standard time, MCPC applied the ratio to per model standard time.

DOC Position: We agree with Matsushita. Factory overhead and G&A costs incurred on the production line dedicated to the production of the computers containing the subject merchandise were properly allocated and thus no adjustment is necessary.

Comment 40: Matsushita contends that it is inappropriate to attribute all of MEI Headquarters G&A expenses to indirect selling expenses as the Department did during the preliminary determination. MEI Headquarters G&A oversees Matsushita's worldwide operations which involve both production and selling functions, thus this G&A for this headquarter operations must be allocated between production and sales.

The petitioners contend that the measure of relative G&A expenses should be based on cost of sales rather than on relative G&A expenses incurred by MEI's production and sales subsidiaries. The petitioners' claim that the Department properly included MEI Headquarters G&A expenses in indirect selling expenses.

DOC Position: We agree with Matsushita because part of the function of the headquarters was to manage corporate R&D laboratories in addition to the company as a whole, both of which involve production functions. Thus, we have allocated MEI Headquarters G&A as indirect selling expenses and G&A as reported by Matsushita.

C. Sharp

Comment 41: The petitioners contend that advertising expenses claimed by Sharp as direct selling expenses are actually indirect selling expenses. The petitioners state that Sharp's advertising was not direct at the customer's customer and thus, does not meet the Department's criteria for a direct advertising expense claim.

Sharp replies that, because the advertising was aimed at the ultimate consumer of the high information content FPDs, the expense incurred qualifies as a direct selling expense. Sharp asserts that the "customer's customer" standard, as set forth in AFBs, should not apply to advertising for components and other nonconsumer products. Sharp claims that because it sells only to OEMs and that once the FPD is sold to the OEM it undergoes a substantial transformation, there is no "customer's customer" for the FPD as an individual product. Sharp cites Sheet Piling from Canada: Final Results of Antidumping Administrative Review and Cancellation of Suspension Agreement (55 FR 49551, 49552, November 29, 1990) as a decision where the Department shifted the focus of the advertising expense analysis to the "level in the sales chain" when determining which advertising expenses qualify as direct selling expenses. As OEMs are the "ultimate user" in the sales chain of an FPD, Sharp contends that advertising directed at OEMs should be classified as a direct selling expense.

DOC Position: We agree with the petitioners. The Department's regulations state that "[t]he Secretary also will make reasonable allowances for differences in selling costs (such as advertising) incurred by the producer or reseller but normally only to the extent that such costs are assumed by the producer or reseller on behalf of the purchaser from that producer or reseller." 19 CFR 353.56(a)(2). Furthermore, the Department's Study of Antidumping Adjustments Methodology and Recommendations for Statutory Change, November 1985, at 51, clearly addresses advertising, stating "[w]e will allow a circumstance of sale adjustment for the seller's expense incurred on advertising and sales promotion directed at the *customer's customer*; we will allow no adjustment when the target is the party purchasing from the manufacturer or exporter." (Emphasis added). It is consistent with our regulations and longstanding practice to use the customer's customer standard in evaluating whether to treat advertising as a direct or indirect selling expense. See *e.g.*, Tapered Roller Bearings Four Inches or Less in Outside Diameter and Certain Components Thereof from Japan: Final Results of Antidumping Duty Administrative Review (55 FR 38720, 38724, September 20, 1990); and AFBs, at appendix B. To the extent Sheet Piling from Canada is inconsistent with this approach, it was wrongly decided. Sharp's advertising is directed at the OEM, the first unrelated customer, and is not borne by Sharp "on behalf of the purchaser from that" OEM. Accordingly, we have classified Sharp's advertising expense in the home market as an indirect selling expense.

Comment 42: The petitioners state that Sharp incorrectly calculated its home market cash discount percentage by reporting cash discounts incurred on sales outside the POI. The petitioners urge the Department to remove these cash discounts from Sharp's total and recalculate the cash discount percentage.

Sharp replies that the petitioners misinterpreted the verification exhibit upon which the petitioners base their argument. Sharp states that while its documentation consolidates sales to home market customers to one line item of its report, it itemizes cash discounts granted to its customers' head offices, sales branches, etc. Therefore, the petitioners incorrectly extrapolate from the report that cash discounts appearing next to sales branches with a zero sales figure were incurred outside the POI. Sharp notes that sales to the disputed sales branch are consolidated under the head office.

DOC Position: We agree with Sharp. Information reviewed at verification shows that Sharp does indeed consolidate sales to home market customers while itemizing cash discounts. Both total sales and total cash discounts were verified to be correct.

Comment 43: The petitioners state that Sharp incorrectly based its ESP credit expense adjustment on the cost of short-term funds incurred by Sharp Corporation, the parent company. Furthermore, the petitioners assert, the most accurate basis for the ESP credit expense adjustment is Sharp Electronic Corporation's (USA) (SEC) short-term interest rate. As the Department does not have adequate information on SEC's

weighted-average cost of short-term funds during the POI, the petitioners urge the Department to use the highest reported short-term interest rate shown on SEC's audited financial statements.

Sharp contends that, in *LMI—La Metalli Industriale S.p.A.* verses *United States* 912 F. 2d 455, 460 (Fed. Cir. 1990), the court concluded that it is reasonable to assume that a corporation will finance its operations with the cheapest money available. Sharp states that, in line with the reality of doing business, it should be allowed to use the lowest interest rate available during the POI, regardless of the market in which it occurred.

DOC Position: We agree with the petitioners. It is Department practice to apply the U.S. subsidiary's short-term interest rate to ESP sales to calculate the ESP credit adjustment. The LMI decision was based on purchase price transactions where no U.S. subsidiary existed. In the LMI decision, the court found that since the company, LMI, could secure funds at a lower rate in the United States and, in fact, did so, the U.S. interest rate should be applied to these purchase price sales. While the respondent in this case contends that because short-term credit costs are imputed, whether SEC actually borrowed funds to finance sales is irrelevant. Yet the court's decision in LMI is based on the fact that LMI actually did secure funds at low interest rates on a regular basis in order to purchase raw materials. Nowhere on the record does Sharp state it secures short-term funds from its parent company. Theoretically, this may be possible, but factually it has not occurred. In the present situation, Sharp's U.S. subsidiary is responsible for ESP transactions and, as indicated on its financial statement, is securing short-term funds in the United States in order to conduct business. For this reason, it is proper to apply the U.S. short-term interest rate to these sales. Sharp's financial statements list two short-term interest rates. We have used a simple average of these two rates to calculate Sharp's ESP credit adjustment.

Comment 44: The petitioners assert that Sharp must be consistent in its methodologies for calculating its home market and ESP credit expense adjustments. Sharp calculated its ESP credit expense adjustment on the payment terms applicable to each sale while it calculated its home market credit expense adjustment based on its home market average accounts receivable turnover ratio. The petitioners maintain that the Department should use the U.S. subsidiary's average accounts receivable turnover ratio for the calculation of ESP credit adjustments.

Citing Preliminary Determination of Sales at Less Than Fair Value: Polyethylene Terephthalate Film, Sheet, and Strip from The Republic of Korea (55 FR 49668, 49669–70, November 30, 1990), Sharp contends that there is no requirement that credit expenses be calculated consistently in all markets. Sharp maintains that its methodology for calculating credit expense associated with ESP sales has been accepted by the Department and cites U.S. Department of Commerce, *Study of Antidumping Duty Adjustments Methodology* 47 (November 1985). Sharp also asserts that its records and reporting are conservative in their calculation of credit periods.

DOC Position: We agree with Sharp. At both the U.S. ESP verification and the home market verification we confirmed that Sharp used credit methodologies that accurately reflect Sharp's credit policies. While the petitioners are correct in asserting that the data collection methods used in the two markets differ, both methods ultimately rest on the difference between shipment date and payment date, and we have no reason to believe that these differences results in any distortion or inaccuracy.

Comment 45: The petitioners assert that Sharp improperly used its home market interest rate to calculate SEC's inventory carrying expense. As money is a fungible commodity, the petitioners state, the Department should use SEC's short-term cost of funds to calculate U.S. inventory carrying expense. The petitioners cite Final Results of Antidumping Duty Administrative Review: Color Picture Tubes from Japan (55 FR 37915, 37922, September 14, 1990) as case precedent for utilizing the U.S. subsidiary's weighted-average interest rate for the calculation of U.S. inventory carrying expenses.

Sharp responds that it would be unreasonable to calculate an inventory carrying cost using SEC's weighted-average interest rate when a percentage of the days spent in inventory occurs in Japan. In addition, Sharp Corporation bears the expenses of goods that remain in SEC's inventory prior to payment. It is therefore not realistic to use the U.S. interest rate in this calculation.

DOC Position: We agree with the petitioners. While merchandise remains in Sharp Corporation's inventory for a portion of the sales cycle, for the majority of time the inventory is held by SEC. For the portion of time that the inventory is held by SEC, it is proper to apply SEC's short-term interest rate in the calculation of inventory carrying expense. For the portion of time that the inventory is held by Sharp Corporation, it is proper to apply the short-term interest rate of that entity. It is standard Department practice to use the U.S. subsidiary's interest rate for the U.S. portion of inventory carrying cost and not the home market of the parent company. Therefore, we have applied the simple-average of the two short-term interest rates listed on SEC's financial statements for the U.S. portion of Sharp's inventory carrying cost and have applied Sharp Corporation's short-term interest rate for the Japanese portion of inventory carrying cost.

Comment 46: The petitioners allege that Sharp failed to include certain warranty transportation expenses in the calculation of its U.S. warranty expense adjustment.

Sharp counters that its May 15, 1991, revised computer sales listing submitted to the Department includes the warranty transportation.

DOC Position: We agree with Sharp. The warranty transportation expenses were included in Sharp's recalculation of its warranty expenses.

Comment 47: The petitioners contend that Sharp should have allocated its U.S. price protection discount claim on a customer-specific basis rather than allocating this discount over all ESP sales. The petitioners state that the record clearly shows that this customer-specific methodology can be applied and, unlike the current methodology, is not distortive.

Sharp replies that a customer-specific allocation of these discounts bear no relation to actual sales. Because these discounts relate to merchandise sold months before the discount is granted, discounts granted during the POI in all likelihood do not relate to sales during the POI. Sharp maintains that an attempt to tie these discounts to specific sales on models in the POI would not reflect commercial reality. There are no assurances that these customers received discounts on sales during the POI. Sharp quantified and allocated these discounts in the same manner it did all expenses that cannot be tied to individual sales and contends that this methodology is the most reasonable one available.

DOC Position: We agree with Sharp. We confirmed at verification that Sharp grants price protection "discounts" and "discounts" for meeting competition several months after the sales are completed and that Sharp cannot tie these rebates to specific sales during the POI. Sharp has applied a "slice of time" methodology that is consistent with

Department practice for those adjustments that cannot be tied to specific sales. We have no reason to believe that Sharp's methodology results in any distortion or inaccuracy.

Comment 48: The petitioners contend that the Department should remove sales made to SEC's Canadian customers during the POI from the U.S. sales listing. Furthermore, as the removal of the sales will affect those sales adjustments based on sales value, the petitioners request the recalculation of these adjustments.

DOC Position: We agree in part with the petitioners. Sales to Canada cannot be included in our U.S. sales comparisons and we have removed these sales from the sales listing. See, 19 CFR 353.41(b) and (c). However, because of the negligible impact on total U.S. sales value and the burden that recalculating a myriad of adjustments based on sales value would place on the Department, we have not adjusted the U.S. sales value in order to recalculate the specific adjustments. Therefore, as BIA, we are using the existing calculations.

Comment 49: The petitioners contend that the Department should corect a computer programming error made when calculating the amount of VAT that is not collected by reason of exportation of the merchandise from Japan. The petitioners claim that the Department failed to base the VAT adjustment on Sharp's gross U.S. price, net of discounts, as was indicated in our preliminary determination (56 FR 7008, 7011).

DOC Position: We disagree with the petitioners. Sharp has two adjustments that are discounts in name only. Both price protection and discounts for meeting competition are administered as post-sale rebates, not discounts from the original invoice. For both adjustments, Sharp rebates money to the customer several months after the sale by crediting the customer's account. The Japanese VAT law specifically states that VAT is applied to the gross unit price, net of discounts. These discounts are pre-sale discounts applied to the gross unit price prior to the consummation of the transactions. As Sharp's price protection and discounts for meeting competition are administered as *post*-sale rebates, they are not adjustments to the basis of the Japanese VAT. Therefore, for purposes of calculating the VAT adjustment, it is incorrect to deduct from gross unit price what is, in effect, a rebate.

Comment 50: The petitioners argue that, because of the significant problems in Sharp's cost of production questionnaire response, the information is not reliable and the Department should use BIA, in accordance with section 776(c) of the Act, to calculate Sharp's cost of production for the final determination. The petitioners claim that Sharp's data contain numerous significant problems, such as the lack of reconciliation of mother glass from inventory records to production records, unverified and unexplained yield information, numerous expenses incorrectly allocated over corporate-wide cost of sales, and unsubstantiated exclusions from the calculation of G&A and R&D expenses. The petitioners are more concerned with Sharp's inaccurate yield data because it affects every component of fabrication costs as well as material. Because all components of Sharp's cost of production data have been significantly understated or incorrectly allocated, the petitioners assert the Department should use as BIA the COP data contained in the petition.

Sharp contends that it provided a complete and accurate response to the Department's questionnaire and this submission was verified. Sharp maintains that it is the completeness of its questionnaire responses that is at issue, and that there can be no question that Sharp submitted a complete response to the Department. "The ITA may *not* properly conclude that resort to the best information rule is justified in circumstances where a questionnaire is sent and completely answered, just because the ITA concludes that that answers do not definitely answer the overall issue presented." *Olympic Adhesives, Inc.* v. *United States*, 899 F.2d 1565 (Fed. Cir. 1990) (emphasis added). Sharp asserts that the rejection of its response, *in toto*, is unwarranted in light of this appeals court decision.

DOC Position: The information submitted by the respondent, except for those areas that were adjusted in the final results, was verified to a degree which did not warrant total rejection of the information. See the "Foreign Market Value" section of this notice for further details of adjustments to Sharp's data.

Comment 51: The petitioners maintain that, if the Department does not totally reject Sharp's COP data, the Department should reject Sharp's yield data and use the yield data contained in the petition as BIA. The petitioners claim that, because Sharp had combined its yield data for both low information content and high information content FPDs and, therefore, overstated its yields for high information content FPDs, its reported material, labor and overhead costs for the subject merchandise are understated. Additionally, because Sharp could not reconcile its standard yield data to its production and inventory records, the Department does not have actual production yield data. The petitioners assert that Sharp should have been prepared for verification and that its failure to reconcile its data at verification is simply due to its own neglect. Furthermore, the petitioners claim that Sharp offers new interpretations for many of the worksheets examined by the Department during verification in its case brief in spite of the fact that Sharp provided the explanations for these worksheets and documents at verification. The petitioners assert that the Department cannot rely on Sharp's standard yield data because it remains unexplained and unverified, and the Department should use as BIA the yield data contained in the petition.

Sharp contends that rejection of its yield data is not warranted because (1) the source of the yield issue stemmed from a misunderstanding of a verification exhibit, (2) labor and overhead costs are not affected by yields, and (3) mother glass inventory is not an issue of consequence.

DOC Position: The verification exhibits to which Sharp refers relate to passive-matrix LCD FPDs. Because passive-matrix LCD FPDs are no longer subject to this investigation, this issue, as it relates to passive-matrix LCD FPDs is moot.

Because Sharp was unable to reconcile the mother glass used in production of its EL FPDs to its inventory records, the Department determined that reconciliation data from other respondents was appropriate as BIA.

Comment 52: The petitioners assert that the use of a factory-wide variance to calculate the cost of the subject merchandise is unreasonable, because it fails to recognize production realities of manufacturing individual products. Therefore, the Department should reject Sharp's use of a factory-wide variance to calculate the cost of materials.

Sharp argues that the variance between standard and actual yields for a model and a variance between standard and actual material costs are not equivalent variants, and it is inappropriate to draw conclusions from a comparison of one against the other. Secondly, Sharp claims that its methodology to derive standard material cost assures that such cost is equivalent to actual cost. Sharp states that the standard cost as shown on its bill of materials is the functional equivalent of actual cost because of the constant updates of acquisition cost. Sharp states that the minuscule variances

experienced during the POI demonstrate that the standard costs do capture the actual costs incurred by the company.

DOC Position: We agree with the petitioners. With respect to EL FPDs only, the Department determined that the standard materials cost adjusted by the factory-wide variance closely approximated the materials cost for EL FPDs as reflected in Sharp's production records. However, the materials costs were adjusted to reflect the difference between the inventory records and the production records. However, the materials costs were adjusted to reflect the difference between the inventory records and the production records, as described in Comment 51 and the "Foreign Market Value" section of this notice.

Finally, because passive-matrix LCD FPDs are not subject to investigation, this issue, as it relates to passive-matrix LCD FPDs, is moot.

Comment 53: The petitioners assert that Sharp should not be allowed to classify certain expenses as factory overhead in its normal books and records but as G&A expenses for purposes of this investigation. The petitioners contend that the Department should classify these expenses in a manner consistent with Sharp's own categorization of these expenses, that is, include these expenses in Sharp's LCD factory overhead.

Sharp argues that these expenses are more appropriately considered G&A because of the reorganization that took place on April 1, 1990 (the LCD Division of the Electronic Components Group became a separate group). Because G&A expenses are calculated on a fiscal year basis and sales and manufacturing costs are calculated on a POI basis, Sharp contends that its G&A ratio should correspond to those ratios in existence after the reorganization.

DOC Position: We agree with the petitioners. The Department verified that these expenses were properly considered factory overhead in Sharp's records. Therefore, the Department classified these expenses as factory overhead of the LCD Division and allocated them over the LCD Division's cost of sales.

Comment 54: The petitioners argue that certain R&D expenses incurred by Sharp were product-specific to the merchandise under investigation and should be treated as a manufacturing expense and not as part of the general R&D. Additionally, the petitioners argue that R&D expenses incurred in three departments of the Opto-Device Laboratory should be included in product-line R&D.

Sharp maintains that none of these expenses were product-specific or product-line because they were not incurred for routine improvements or modifications to products currently in production. Sharp claims that it conducted this research with the hope that discovery of new materials and techniques would contribute to the eventual development of new products. At the time that Sharp conducted its research for a particular class or kind of merchandise, it did not produce or sell any products of that class or kind of merchandise. This research contemplated the production of future products. Additionally, Sharp argues that fundamental advances in display technology benefit the entire corporation and not only the LCD Group. Sharp therefore argues that this R&D should be included as general expenses.

DOC Position: We have allocated R&D for EL FPDs over the cost of sales of EL FPDs during the POI. Class or kind of merchandise R&D in which there were no sales of that class or kind of merchandise was allocated to the general class or kind of merchandise. For a detailed explanation of the Department's allocation methodology regarding R&D, see DOC Response to General Comment I above.

Comment 55: The petitioners argue that, because Sharp was unable to provide the Department with cost of sales for high information content FPDs and low information content FPDs, the Department should use BIA and allocate Sharp's product-line R&D expenses solely to the subject reported high information content FPD sales value.

Sharp contends that its general R&D benefits low information content FPD as well as high information about content FPDs, and therefore, there is no need for high information content FPD and low information content FPD cost of sales. Thus, petitioner's request for BIA has no justification.

DOC Position: We agree with the petitioners. The Department determined that product-specific R&D expenses should be allocated to the class or kind of merchandise. See, DOC Response to General Comment 1. Therefore, since Sharp did not provide high information content FPD cost of sales data, the Department used Sharp's production data to estimate the cost of sales of high information content FPDs as BIA in order to allocate the R&D costs to high information content FPDs.

Comment 56: The petitioners claim that R&D expenses incurred by Sharp's Patent Promotion Department should be allocated solely to Sharp's Electronic Components Group. The petitioners argue that the remaining R&D expenses of the Electronic Components Group should be included as general R&D.

Sharp concedes that the patent promotion department expenses should be allocated over cost of sales of Electronic Components Group. Sharp contends that the remaining expenses have been included and should not be double-counted.

DOC Position: The Department has allocated the Patent Promotion Department expenses solely to the Electronic Components Group. The remaining expenses were incurred in other divisions within the Electronic Components Group which were specifically related to products other than FPDs and were not included in the calculation of general R&D.

Comment 57: The petitioners maintain that certain R&D expenses which Sharp claimed during verification were incorrectly included in its general R&D should remain in the calculation of general R&D. The petitioners state that the R&D work appears to be related to research activities that will benefit all of Sharp's production areas and should be included in general R&D expense.

Sharp maintains that it had erroneously included these costs in its calculation of general R&D. Sharp claims that these expenses are related to products not subject to these investigations and, therefore, should not be included in its calculation of general R&D.

DOC Position: We agree with the petitioners. These expenses appear to be of a general nature and of benefit to all areas of Sharp's production. We have, therefore, included these expenses in the calculation of general R&D.

Comment 58: The petitioners argue that Sharp has understated its G&A expenses by excluding G&A expenses of groups unrelated to FPDs but allocating its FPD-related G&A over its corporate-wide cost of goods sold. The petitioners state that the Department should allocate Sharp's FPD-specific G&A expenses solely to Sharp's FPD sales. The petitioners further argue that certain G&A expenses of the head office were excluded because Sharp claimed that these expenses were not incurred on behalf of the subject merchandise. The petitioners state that G&A expenses are by definition general in nature and not product-related. The petitioners contend that Sharp has not confirmed the appropriateness of excluding certain items. Because these expenses appear to benefit the entire corporation, all of Sharp's Head Office G&A expenses should be included in its calculation.

Sharp concedes that FPD-related G&A should be allocated over the cost of

sales for the group in which the expenses were incurred. Sharp claims that the expenses which it excluded from its G&A calculation were incurred specifically for products other than those under investigation and should not be included in the calculation of G&A expense.

DOC Position: We agree with the petitioners. Sharp understated its G&A expense by excluding all G&A expenses except those which it claimed were specifically related to FPDs, and then allocating these expenses over corporate-wide cost of sales. The Department recalculated Sharp's G&A expense by including all general and administrative expenses from the Head Office Department (selling expenses were not included) and allocating these expenses over corporate-wide cost of sales. Those general and administrative expenses which were incurred at the Group or the LCD Division level were allocated only to FPDs based on the related group or division's cost of sales.

Comment 59: The petitioners assert that enterprise taxes should be included in G&A expense because these taxes are related to Sharp's operations and are classified as operating expenses in Sharp's financial statements.

Sharp contends that the enterprise tax is a tax on profits imposed by the local prefectures in Japan. As such, it does not increase the cost of producing any merchandise and should not be included in the calculation of G&A.

DOC Position: We agree with the respondent. *See*, DOC Response to Comment 21 for further details.

D. Toshiba

Comment 60: The petitioners contend that Toshiba included home market advertising expenses incurred outside the POI in its claim and that it included indirect advertising expenses in its claim for direct advertising. The petitioners maintain that the Department should disallow three of Toshiba's advertising expense claims:

(1) Tohiba's claim for trade show advertising expenses incurred before the POI but not booked until during the POI;

(2) Advertising directed at the first unrelated customer; and

(3) Toshiba's claimed expense to print FPD catalogs, which the petitioners state are not directed at the ultimate user.

Toshiba contends that advertising classified in the home market as a direct selling expense is proper. Toshiba notes that 19 CFR 353.56 states that advertising is considered a direct selling expense when it is directed at the ultimate consumer. In this instance, Toshiba asserts that the ultimate consumer of the FPD is the OEM. Toshiba cites a recent Department decision in Sheet Piling from Canada: Final Results of Antidumping Administrative Review and Cancellation of Suspension Agreement (55 FR 49551, 49552, November 29, 1990) in which the Department stated that advertising expenses targeted at the end-user of a product, as opposed to a middleman, are classified as direct selling expenses even when the end-user incorporates the subject merchandise into a further manufactured product. Toshiba maintains that the purchasers of FPDs cannot be considered middlemen because of the substantial transformation that FPDs undergo to become laptop computers, medical instrumentation, etc.

DOC Position: We agree with the petitioners that for advertising to be considered a direct expense it must be directed at the customer's customer. The Department will make allowances for advertising "only to the extent such costs are assumed by the producer or reseller on behalf of the purchaser from that producer or reseller." 19 CFR 353.36(a)(2) See, also, DOC Response to Comment 41 above. Toshiba has stated, and information gathered at verification supports, the fact that Toshiba's advertising expenses are not assumed on behalf of the purchaser or reseller of the FPD. Toshiba's FPD catalogs are directed at the first unrelated customer and newspaper and magazine advertisements are directed at purchasers of laptop computers, not FPDs.

However, we agree with Toshiba with respect to charges incurred outside the POI but not booked until during the POI. These charges represent a "slice-of-time" representation of advertising expenses. Charges actually incurred during the POI would not be booked until after the POI, therefore, Toshiba has used a logical method to capture representational advertising expenses. Those advertising expenses previously classified as direct selling expenses have been reclassified by the Department as indirect selling expenses.

Comment 61: The petitioners claim that Toshiba incorrectly based its home market credit expense claim on the cost of its short-term funds for the period April-September, 1990. The petitioners state that Toshiba should calculate this expense using the same period it used to calculate its purchase price and ESP interest rates, February-July, 1990, the POI, in accordance with the Department's questionnaire.

Toshiba maintains that the credit period it selected for home market sales was based on the fact that shipments occurred on average 60 days after an order was placed and that payment occurred at least 90 days after shipment. Therefore, the credit period for the POI runs from April-September, 1990.

DOC Position: We agree with Toshiba. The credit period selected is an accurate reflection of the period between shipment and payment. Information reviewed at verification confirms that home market shipments occur, on average, 60 days after an order is placed and that payment occurs, on average, 90 days after shipment. Therefore, it is reasonable to use the period April-September, 1990, for the calculation of home market credit expense.

Comment 62: The petitioners state that Toshiba incorrectly used its average short-term consolidated corporate borrowing rate to calculate the inventory carrying expenses of the U.S. subsidiary, Toshiba America Information Systems (TAIS). The petitioners assert that, because money is a fungible commodity, Toshiba should be required to used TAIS's interest rate to calculate the U.S. inventory carrying expense. The petitioners cite Final Results of Antidumping Duty Administrative Review: Color Picture Tubes from Japan (55 FR 37915, 37922, September 14, 1990) (CPTs), as case precedent for utilizing the domestic subsidiary's weighted-average interest rate for the calculation of U.S. inventory carrying expenses.

Toshiba asserts that despite the facts in the CPTs case, the facts in this case support the use of the short-term consolidated rate in the calculation of the inventory carrying expense. Toshiba Corporation extends 60 days payment terms to its subsidiary, TAIS, on sales of FPDs to the United States. Toshiba Corporation absorbs the cost of carrying the inventory for the majority of the time that the merchandise is in inventory at TAIS. Therefore, Toshiba asserts that the appropriate rate to be applied is Toshiba Corporation's short-term consolidated rate. Toshiba suggests that the issue is not fungibility of funds, but determining what entity is bearing the cost of carrying the inventory.

DOC Position: We agree with the petitioners that a U.S. interest rate for the U.S. inventory carrying portion of this expense should be applied, as it is the U.S. subsidiary that is bearing the cost of the merchandise while it remains in inventory. However, the payment terms that Toshiba Corporation extends to TAIS in combination with the inventory days the FPD remains in TAIS' inventory indicates that Toshiba Corporation bears the cost of carrying the merchandise for roughly 90 percent

of the time the merchandise is held in inventory. We have recalculated the inventory carrying adjustment to account for the portion of time that the merchandise is in TAIS' inventory using Toshiba's short-term interest rate.

Comment 63: The petitioners maintain that Toshiba understated its United States advertising expense claim by classifying similar advertisements as direct selling expenses in the home market and as indirect selling expenses in the United States. The petitioners state that the Department should classify these U.S. advertisements as direct selling expenses.

DOC Position: The Department verified that all reported direct advertising expenses in the home market are properly classified as indirect selling expenses. See, also, DOC Position to Comment 41 and Comment 60 above.

Comment 64: The petitioners state that Toshiba should recalculate its royalty expense claim due to errors discovered during verification.

Toshiba notes that it has made the necessary adjustments to its royalty expense claim and has incorporated these changes in the computerized sales listing submitted to the Department.

DOC Position: Respondent made the necessary changes uncovered at verification except for the allocation of a monthly royalty fee. As this monthly royalty fee applies to sales of passive-matrix LCD FPDs, this issue is moot.

Comment 65: The petitioners state that Toshiba may have understated its U.S. warranty expense claim by failing to include in total warranty expenses those expenses incurred on products that are returned to Toshiba and classified as "dead on arrival."

Toshiba notes that expenses associated with "dead on arrival" products are classified either as inventory reserve expense, "other selling expenses", and/or G&A. Toshiba maintains that all expenses associated with products "dead on arrival" were fully reported as indirect selling expenses by TAIS.

DOC Position: We agree with Toshiba. Information reviewed at verification and detailed in the verification report shows that all warranty expenses were properly reported. The expenses incurred for products returned "dead on arrival" are classified by Toshiba differently than those for warranty expenses. These expenses are properly classified either as inventory reserve expense, "other selling expense", and/or G&A. It would be impossible for the Department to categorize "dead on arrival" expenses as warranties and accurately allocate this expense to the FPD, because we have no way of knowing whether a scrapped laptop computer had a defective FPD. The computer may have been scrapped for any number of reasons. It would be arbitrary and inaccurate to attempt to quantify how many defective FPDs, if any, were in "dead on arrival" computers during the POI. Nevertheless, Toshiba fully reported the expenses incurred on these returns in its indirect selling expenses for TAIS.

Comment 66: Citing Cell-Site Transceivers from Japan: Final Determination of Sales at Less Than Fair Value (49 FR 43080, 43083, October 26, 1984), the petitioners state that R&D expenses which can be identified directly with the product under investigation are considered manufacturing expenses and are part of fabrication costs. Thus, the petitioners contend that R&D expenses incurred for high information content FPDs should be allocated over the cost of sales of high information content FPDs.

Toshiba claims that product-specific R&D can only be allocated to the specific product involved. As passive-matrix LCD FPDs and active-matrix LCD FPDs are inherently different, any R&D expenses incurred for active-matrix LCD FPDs, which were not sold during the POI, must be allocated in a different manner than that for passive-matrix LCD FPDs. Toshiba asserts, citing Cyanuric Acid and Its Chlorinated Derivatives from Japan (55 FR 1694, January 18, 1990), that the proper methodological approach is to allocate the product-specific R&D over the cost of sales of the specific product. Where R&D cannot be allocated to a specific product, it should be allocated to the business division with which it is organizationally associated.

DOC Position: We agree with the petitioners in part. R&D expenses specifically identified with a class or kind of product are properly allocated over the sales of that class or kind of product. R&D expenses for specific classes or kinds which were not sold are properly allocated over the general class or kind. See the DOC Response to General Comment 1 for further details of R&D allocation.

Comment 67: The petitioners claim that the expenses incurred by a particular group laboratory should be included in general R&D expenses because the research activities benefit all products of the company.

Toshiba claims that this laboratory performs basic materials research and is not organizationally related to those groups responsible for flat panel production and research. Therefore, these expenses should be excluded from general R&D.

DOC Position: We agree with the petitioners. The Department verified that R&D expenses of the materials laboratory were incurred to benefit all products of the corporation. Therefore, these expenses were included in general R&D.

Comment 68: The petitioners maintain that enterprise taxes should be included in Toshiba's general expenses because the taxes are classified as SG&A on Toshiba's financial statements.

Toshiba counters that the enterprise tax is a government tax on income. Toshiba notes that income-based taxes are viewed by the Department as unrelated to the cost of production, and therefore, not included in general expenses. The Japanese enterprise tax has been identified as a tax that is excluded from G&A expenses, even where the G&A expense was classified as an operating expense. (See, Final Determination of Sales at Less Than Fair Value: Color Picture Tubes from Japan (52 FR 44171, November 18, 1987); Television Receivers, Monochrome and Color, from Japan; Final Results of Antidumping Duty Administrative Review (54 FR 13917, April 6, 1989); and Final Results of Antidumping Duty Administrative Review; Color Picture Tubes from Japan (55 FR 37915, September 14, 1990).)

DOC Position: We agree with Toshiba. See, DOC Response to Comment 21 above.

Comment 69: The petitioners contend that certain Toshiba basic R&D expenses are related to the subject merchandise. Therefore, these expenses should be charged specifically to FPDs based on cost of sales.

Toshiba argues that basic R&D expenses should be allocated to all products of the corporation.

DOC Position: We agree with the petitioners. The Department verified that some of the R&D which Toshiba considered basic for the total corporation as research conducted specifically for active-matrix LCD FPDs. The Department allocated this R&D over the general class of kind of FPDs because there were no sales of active-matrix LCD FPDs. See the DOC Response to General Comment 1 for further details.

The remaining corporate R&D was considered general R&D because there was no evidence on the record that this R&D was related to a specific product line and was allocated to the corporate cost of sales.

Comment 70: The petitioners argue that any R&D expenses incurred by the

Electron Device Engineering Lab that are related to FPDs must be allocated specifically to FPDs and included in the cost of manufacture. The petitioners maintain that Toshiba improperly accounted for this expense by allocating it to all products manufactured by the Electron Tube and Device Group, a group that manufactures other products in addition to FPDs.

Toshiba claims that the Electron Device Engineering Lab concentrates on products for the Electron Tube and Device Group, and, therefore, its R&D expenses should be allocated over all products of the group consistent with Toshiba's organizational and cost accounting system.

DOC Position: We agree with the petitioners. The Department verified that a portion of the R&D expenses were incurred mainly for active-matrix LCD FPDs. The Department allocated these expenses over the general class or kind of merchandise because there were no sales of active-matrix LCD FPDs during the POI. See the DOC Response to General Comment 1 for further details. Expenses related specifically to merchandise not under investigation were excluded. Administrative cost were allocated over all products of the Electron Tube and Device Group.

Comment 71: The petitioners state that Toshiba improperly allocated the G&A expenses from its unconsolidated financial statements based on the cost of sales from its consolidated financial statements, thus mixing data that were prepared using two different methodologies. The petitioners maintain that G&A expenses should be allocated over the unconsolidated cost of sales of Toshiba.

Toshiba asserts that if G&A expenses are allocated over unconsolidated cost of sales, the expenses should not be included in U.S. value added expenses.

DOC Position: We agree with both the petitioners and Toshiba. We have allocated unconsolidated G&A over unconsolidated cost of sales (parent company). The G&A percentage was not applied to U.S. value-added because the unconsolidated financial statements do not include the results of operation of the U.S. subsidiary.

Comment 72: The petitioners contend that Toshiba improperly allocated rework expenses incurred by TAIS to all sales of International Operations—Information and Communications Systems (IOIC). The rework expenses which were tied to specific models of FPDs should be charged only to those models, while the remaining expenses should only be charged to U.S. further manufactured sales.

Toshiba claims that all rework expenses were included and allocated over all sales in accordance with its own books and records. Therefore, no adjustment is necessary.

DOC Position: The rework expenses tied to specific models of FPDs were for a class or kind of merchandise not under investigation. The remaining rework expenses related to gas plasma FPDs are negligible under either allocation, therefore, we have not made this adjustment.

Comment 73: The petitioners claim that inventory reserves for obsolescence reported in Toshiba's records should be included for purposes of the submission.

Toshiba asserts that inventory reserves expenses should not be included because the Department verified that no charges were made against the reserve account until Toshiba reversed the adjusting entry after the POI.

DOC Position: We agree with Toshiba. The Department verified that inventory reserve expenses were recorded and then reversed. Since there were no charges to the reserve account, no expenses were actually incurred.

Comment 74: The petitioners assert that the overhead allocation for U.S. fabrication should be based on Toshiba's methodology used during the POI in its normal books and records.

Toshiba claims that is headquarters overhead allocation should be accepted because the allocation methodology is currently used in its cost accounting system, and is more accurate than the allocation used in its cost accounting system during the POI.

DOC Position: We agree with Toshiba. The overhead allocation methodology was used as a part of Toshiba's standard recordkeeping, and reflects a more specific allocation than the methodology used during the POI.

Comment 75: The petitioners argue that miscellaneous material usage variances should not have been excluded from further manufacturing costs, as the Department determined that these variances related to Toshiba's further manufacturing process.

Toshiba agrees that the usage variance should have been included in the submitted costs, however, the amount is negligible.

DOC Position: We agree with the petitioners and have included the miscellaneous material usage variances in further manufacturing costs.

Comment 76: The petitioners state that the "further manufacturing" costs should include the commission paid to a related subsidiary in conjunction with the purchase of a laptop computer component, and the G&A expenses of the related subsidiary.

Toshiba counters that the commission should be excluded because no significant services were provided to TAIS by the related subsidiary. If the Department includes some amount to reflect the subsidiary's theoretical costs it should not exceed the commission.

DOC Position: We have included the commission paid by TAIS to the related subsidiary because the commission reflected the costs incurred by the subsidiary in providing the purchasing services. We have not added the G&A of the related subsidiary because doing so would double-count the expenses incurred by the subsidiary and TAIS.

Continuation of Suspension of Liquidation

We are directing the U.S. Customs Service to continue to suspend liquidation of entires of active-matrix LCD FPDs and EL FPDs from Japan, as defined in the "Scope of Investigations" section of this notice, that are entered, or withdrawn from warehouse, for consumption on or after the date of publication of this notice in the Federal Register. The U.S. Customs Service shall require a cash deposit or posting of a bond equal to the estimated amounts by which the foreign market value of the subject merchandise from Japan exceeds the United States price, as shown below. This suspension of liquidation will remain in effect until further notice. The weighted-average margins are as follows:

Manufacturer/producer/exporter	*Weighted-average margin*
Active-Matrix LCD:	
Hosiden Corporation	62.67%
All others	62.67%
Electroluminescent:	
Sharp Corporation	7.02%
All others	7.02%
Gas Plasma:	
Matsushita Electric Industrial Co., Ltd.	0.23% de minimis
Toshiba Corporation	0.32% de minimis

Termination of Suspension of Liquidation

We are instructing the U.S. Customs Service to terminate the suspension of liquidation of passive-matrix LCD FPDs from Japan, pursuant to our finding that the petitioners do not have standing with respect to this class or kind of merchandise. The U.S. Customs Service shall release any cash deposits or bonds posted on entries of this product made prior to this determination.

In addition, we are instructing the U.S. Customs Service to terminate the suspension of liquidation of all entries of gas plasma FPDs from Japan. The U.S. Customs Service shall release any cash deposits or bonds posted on entries of gas plasma FPDs made prior to this determination.

ITC Notification

In accordance with section 735(d) of the Act, we have notified the ITC of our determination. In addition, we will make available to the ITC all nonprivileged and nonproprietary information relating to these investigations. We will allow the ITC access to all privileged and business proprietary information in our files, provided the ITC confirms that it will not disclose such information, either publicly or under administrative protective order, without the written consent of the Deputy Assistant Secretary for Investigations, Import Administration.

If the ITC determines that material injury, threat of material injury, or retardation of the establishment of an industry, does not exist with respect to any of the products under investigation, the applicable proceeding will be terminated and all securities posted as a result of the suspension of liquidation will be refunded or cancelled.

However, if the ITC determines that such injury does exist, the Department will issue an antidumping duty order directing Customs officials to assess antidumping duty on FPDs from Japan entered or withdrawn from warehouse, on or after the effective date of the suspension of liquidation, equal to the amount by which the foreign market value exceeds the United States price.

This determination is published pursuant to section 735(d) of the Act and 19 CFR 353.20(a)(4).

Dated: July 8, 1991.

Eric I. Garfinkel,

Assistant Secretary for Import Administration

[FR Doc. 91-16909 Filed 7-15-91; 8:45 am]

BILLING CODE 3510-DS-M

APPENDIX B

LIST OF WITNESSES APPEARING AT THE COMMISSION'S HEARING

CALENDAR OF PUBLIC HEARING

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

Subject : HIGH-INFORMATION CONTENT FLAT PANEL DISPLAYS AND SUBASSEMBLIES THEREOF FROM JAPAN

Inv. No. : 731-TA-469 (Final)

Date and time: July 11, 1991 - 9:30 a.m.

Sessions were held in connection with the investigation in the Main Hearing Room of the United States International Trade Commission, 500 E St. SW., Washington, DC.

In support of the imposition of antidumping duties

Collier, Shannon & Scott
Washington, DC
On behalf of--

Advanced Display Manufacturers of America

Planar Systems, Inc.

James M. Hurd, President and Chief Executive Officer

Curt Stevens, Chief Financial Officer

Plasmaco, Inc.

James L. Kehoe, President and Chief Executive Officer

OIS Optical Imaging Systems, Inc.

Dr. Zvi Yaniv, President

The Cherry Corporation

Electro Plasma, Inc.

Photonics Technology, Inc.

Magnascreen Corporation

Dr. Patrick J. Magrath, Economic Consultant, Georgetown Economic Services

Paul C. Rosenthal)
Robin H. Gilbert) --OF COUNSEL

--Continued--

In opposition to the imposition of antidumping duties

PANEL 1: Computer Systems Manufacturers Group (CSMG)

O'Melveny & Myers
Washington, DC
On behalf of--

Computer Systems Manufacturers Group (CSMG)

Kermit W. Almstedt)
Gary N. Horlick)--OF COUNSEL
Peggy A. Clarke)

Apple Computer, Inc.

Randy Battat, Vice President, Portable Computers

Baker & McKenzie - Co-Counsel for Apple Computer, Inc.

Thomas P. Ondeck)
Nicholas F. Coward)--OF COUNSEL
Kevin M. O'Brien)

Compaq Computer Corporation

Richard Knox, Panel Engineering Manager, Flat Panel Technology

Vinson & Elkins - Co-Counsel for Compaq Computer Corporation

Theodore W. Kassinger)
Michael J. Coursey)--OF COUNSEL

Stoel Rives Boley Jones & Grey - Co-Counsel for Compaq Computer Corporation

Bill Alberger)
Timothy C. Bladek)--OF COUNSEL

Venable, Baetjer, Howard & Civiletti - Co-Counsel for Compaq Corp.

William D. Coston--OF COUNSEL

International Business Machines, Inc. (IBM)

Paul R. Low, Vice President and General Manager, Technology Products

O'Melveny & Myers - Counsel for IBM

Kermit W. Almstedt)
Gary N. Horlick)--OF COUNSEL
Peggy A. Clarke)

--Continued--

In opposition to the imposition of antidumping duties--Continued

PANEL 1: Computer Systems Manufacturers Group (CSMG)--Continued

Computer Systems Manufacturers Group--Continued

Tandy Corporation/GRiD Systems Corporation

George Washburn, Program Director, Laptop Products, GRiD Systems Corporation

Cushman, Darby & Cushman - Co-Counsel for Tandy Corp./GRiD Systems Corp.

Arthur Wineburg)
Marcia H. Sundeen) --OF COUNSEL

Texas Instruments Incorporated

Jones, Day, Reavis & Pogue - Co-Counsel for Texas Instruments Inc.

Thomas F. Cullen, Jr.)
David G. Schryver) --OF COUNSEL

nVIEW Corporation

James H. Vogeley, Chairman and CEO

PANEL 2: Japanese Manufacturers

Graham & James
Washington, DC
On behalf of--

Japanese Manufacturers

Tannas Electronics

Lawrence E. Tannas, Jr., President

The Stern Group

Dr. Paula Stern

ICF Consulting Associates

Daniel Klett, Consultant

Lawrence R. Walders)
Brian E. McGill) --OF COUNSEL

--Continued--

In opposition to the imposition of antidumping duties--Continued

PANEL 2: Japanese Manufacturers--Continued

Donovan Leisure Newton & Irvine
Washington, DC
On behalf of--

Sharp Corporation

Sharp Electronics Corporation

Stephen P. Sedaker, Product Marketing Manager, Display Products, Microelectronic Group, Sharp Electronics Corp.

Peter J. Gartland)
David S. Versfelt)
Christopher K. Tahbaz)--OF COUNSEL
Christopher P. Johnson)
Nicole M. van Ackere)

McDermott, Will & Emery
Washington, DC
On behalf of--

Hitachi, Ltd.

Hitachi America, Ltd.

Jim Aden, Vice President and General Manager

Carl W. Schwarz)
David J. Levine)--OF COUNSEL
William H. Barrett)

Also present at the Commission's public hearing were the following:

Adduci, Mastriani, Meeks & Schill
Washington, DC
On behalf of--

Hosiden Corporation

Akin, Gump, Strauss, Hauer & Feld
Washington, DC
On behalf of--

Fujitsu Limited
Fujitsu Microelectronics, Inc.

--Continued--

In opposition to the imposition of antidumping duties--Continued

PANEL 2: Japanese Manufacturers--Continued

Also present at the Commission's public hearing were the following:

Coudert Brothers
Washington, DC
On behalf of--

NEC Corporation
NEC Technologies, Inc.

Fenwick & West
Washington, DC
On behalf of--

Seiko Instruments, Inc.
Seiko Instruments USA, Inc.

Howrey & Simon
Washington, DC, and
Spensley Horn Jubas & Lubitz
Los Angeles, CA, and
Capital Accounting
Washington, DC
On behalf of--

Kyocera Corporation
Kyocera Industrial Ceramics Corporation

Morrison & Foerster
Washington, DC
On behalf of--

Seiko Epson Corporation
Epson America, Inc.
Epson Portland, Inc.

Mudge Rose Guthrie Alexander & Ferdon
Washington, DC
On behalf of--

Toshiba Corporation
Toshiba America Electronic Components, Inc.
Toshiba America Information Systems, Inc.

Willkie Farr & Gallagher
Washington, DC
On behalf of--

Matsushita Electric Industrial Co., Ltd.
Matsushita Electronics Corporation
Matsushita Electric Corporation of America

APPENDIX C

ADDITIONAL INFORMATION ON MANUFACTURING PROCESSES

DESCRIPTION AND UTILIZATION OF CLEAN ROOMS

A major vulnerability of semiconductor devices and HIC FPDs is the small feature size and the thinness of deposited layers on a surface. Only a small amount of contaminants in a wafer or in the layers on a wafer surface can change the electrical characteristics, changing device performance and reliability.

Clean rooms are special rooms where steps are taken to reduce the possibility of contamination of wafers by particles, metallic ions, chemicals, and bacteria. The temperature and humidity of the atmosphere within the clean room are carefully controlled. The air flowing through a clean room is filtered and the flow is directed to force contaminants away from the surface of wafers or substrates. Workers in clean rooms are garbed in "bunny suits," hoods, masks, gloves, and boots, all of which are manufactured from materials that won't shed contaminating particles and will confine particulate contaminants shed by the individual. The chemicals and water used to coat, strip, and rinse the wafers are deionized and purified to the specifications of the fabricator. The design of a clean room is integral to its ability to produce contamination-free wafers and substrates.

A major consideration in the design is the maintenance of clean air in the process areas. Air quality is designated by the class number of the air in the area as defined in Federal Standard 209D, Clean Room and Work Station Requirements. This standard designates air quality by particle size and density. The class number of an area is defined as the number of particles above a specified diameter in a cubic foot of air. The air in a typical city, filled with smoke, smog, and fumes, can contain up to 5 million particles per cubic foot, which is a class number of 5 million.

The class number and allowable particle size required for a particular processing area are determined by the feature size of the devices being produced. A rule of thumb is that the allowable particle size should not exceed one-half of the feature size, thus a fabrication area producing circuits with a 1-micron (millionth of a meter) feature size should have air with no more than 0.5-micron-diameter particles, and those particles should have a density (or class number) of 10 or less. Most fabrication for flat panel displays is based on features of 3-4 microns.

OPERATIONS ON COLOR (TSTN) PASSIVE MATRIX LCDs BY IN FOCUS: PROCESSING STEPS

* * * * * * *

APPENDIX D

INCOME-AND-LOSS DATA ON RESEARCH AND DEVELOPMENT AGREEMENTS FOR PLANAR'S EL HIC FPDs

Table D-1
Income-and-loss experience of Planar on its research and development agreements for HIC EL displays, fiscal years 1988-90

* * * * * * *

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

Table D-2
Value of assets and return on assets of Planar's establishment wherein EL HIC FPDs' research and development agreements are completed, fiscal years 1988-90

* * * * * * *

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

Table D-3
Capital expenditures for Planar's EL HIC FPDs' research and development agreements, fiscal years 1988-90

* * * * * * *

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

Table D-4
Research and development expenses for Planar's EL HIC FPDs' research and development agreements, by products, fiscal years 1988-90

* * * * * * *

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

APPENDIX E

INCOME-AND-LOSS DATA ON IN FOCUS' OVERALL OPERATIONS AND ON ITS OPERATIONS ON VIEWERS FOR OVERHEAD PROJECTORS USING HIC COLOR PASSIVE MATRIX LCDs

Table E-1
Income-and-loss experience of In Focus on its overall operations wherein overhead projector viewers using HIC color passive matrix LCDs are produced, fiscal years 1988-90

* * * * * * *

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

Table E-2
Income-and-loss experience of In Focus on its operations producing overhead projector viewers using HIC color passive matrix LCDs, fiscal years 1988-90

* * * * * * *

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

IN FOCUS' FOREIGN CONTENT AND VALUE ADDED

In Focus provided the foreign content of raw material costs and the value added of its operations for overhead projector viewers using HIC color passive matrix LCDs. These data are summarized in the following tabulation (in thousands of dollars except as noted):

* * * * * * *

Table E-3
Value of assets and return on assets of In Focus' establishments wherein overhead projector viewers using HIC color passive matrix LCDs are produced, fiscal years 1988-90

* * * * * *

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

Table E-4
Capital expenditures for In Focus' establishments wherein overhead projector viewers using HIC color passive matrix LCDs are produced, fiscal years 1988-90

* * * * * *

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

Table E-5
Research and development expenses for In Focus' establishments wherein overhead projector viewers using HIC color passive matrix LCDs are produced, by products, fiscal years 1988-90

* * * * * * *

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

APPENDIX F

COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS OF FLAT PANEL DISPLAYS FROM JAPAN ON THEIR GROWTH, INVESTMENT, ABILITY TO RAISE CAPITAL, AND DEVELOPMENT AND PRODUCTION EFFORTS

COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS OF FLAT PANEL DISPLAYS FROM JAPAN ON THEIR GROWTH, INVESTMENT, ABILITY TO RAISE CAPITAL, AND DEVELOPMENT AND PRODUCTION EFFORTS

The Commission requested U.S. producers to describe and explain the actual and potential negative effects, if any, of imports of flat panel displays from Japan on their firms' growth, investment, ability to raise capital, and development and production efforts (including efforts to develop a derivative or advanced version of their products). Their responses are shown below.

Actual Negative Effects

* * * * * * *

Anticipated Negative Effects

* * * * * * *

Influence of Imports on Capital Investment

The Commission also asked U.S. producers whether the scale of capital investments undertaken had been influenced by the presence of imports of the subject merchandise from Japan. [1] Their responses are presented below.

* * * * * * *

[1] At the time the question was asked, "subject merchandise" consisted of all types of HIC FPDs from Japan.

APPENDIX G

JAPANESE FOREIGN INDUSTRY DATA FOR NON-SUBJECT PRODUCTS

Table G-1
Passive matrix LCD HIC FPDs: Japanese capacity, production, inventories, capacity utilization, and shipments, 1988-90, and projected 1991 and 1992

* * * * * * *

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

Table G-2
Plasma HIC FPDs: Japanese capacity, production, inventories, capacity utilization, and shipments, 1988-90, and projected 1991 and 1992

* * * * * * *

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

APPENDIX H

DISCUSSION OF DOCUMENTATION PROVIDED BY PARTIES

DISCUSSIONS BETWEEN APPLE AND OIS

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DISCUSSIONS BETWEEN APPLE AND PLANAR

* * * * * * *

APPENDIX I

INFORMATION RECEIVED FROM FIRMS ON THEIR SELECTIONS OF HIC FPD TECHNOLOGIES AND VENDORS

Table I-1
Information received from firms on their selections of HIC FPD technologies

CUSTOMER NAME	END PRODUCT IN WHICH THE HIC FPD IS USED	HIC FPD TECHNOLOGY CHOSEN	WHICH OTHER TECHNOLOGIES WERE CONSIDERED?	WHEN WAS THE DECISION TO USE THE CHOSEN HIC FPD TECHNOLOGY MADE?	WAS RELATIVE COST OF THE ALTERNATIVE TECHNOLOGIES EVER A CRITICAL FACTOR?
*	*	*	*	*	*

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

Table I-2
Information received from firms on their selections of HIC FPD vendors

DECISION STAGE(S) AND DATES (IF REQUIRED)	VENDORS EVALUATED/ SELECTED, COUNTRY OF MANUFACTURE, AND (IF APPLICABLE) TECHNOLOGY USED	WHETHER U.S. MANUFACTURER; WERE CONSIDERED AND, IF NOT, WHY THEY WERE NOT	ANNUAL QUANTITY OF FUTURE CRYSTAL ORDER (UNITS)	DID VENDOR HAVE CURRENT CAPABILITY TO PRODUCE AND CURRENT DEVELOPMENT STAGE OF FPD	REASON(S) WHY NOT PURCHASE CONSIDERING DISQUALIFIED VENDORS OR REASON(S) FOR SELECTING VENDORS	WAS DISPLAY CONSIDERED
*	*	*	*	*	*	*

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