CERTAIN LASER LIGHT-SCATTERING INSTRUMENTS AND PARTS THEREOF FROM JAPAN

Determination of the Commission in Investigation No. 731-TA-455 (Final) Under the Tariff Act of 1930, Together With the Information Obtained in the Investigation

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United States International Trade Commission
Washington, DC 20436

UNITED STATES INTERNATIONAL TRADE COMMISSION

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Note.--Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted from this report.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

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-455 (Final)

CERTAIN LASER LIGHT-SCATTERING INSTRUMENTS AND PARTS 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 threatened with material injury[3] by reason of imports from Japan of certain laser light-scattering instruments (LLSIs) and parts thereof[4], provided for in subheadings 9027.30.40 and 9027.90.40 of the Harmonized Tariff Schedule of the United States, that have been found by the Department of Commerce to be sold in the United States at less than fair value (LTFV).

Background

The Commission instituted this investigation effective July 6, 1990, following a preliminary determination by the Department of Commerce that imports of LLSIs and parts thereof from Japan were being sold at LTFV within the meaning of section 733(a) of the act (19 U.S.C. § 1673b(a)). Notice of the

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

[2] Acting Chairman Brunsdale and Commissioner Lodwick dissenting.

[3] Commissioners Rohr and Newquist further determine that, pursuant to section 735(b)(4)(B), they would not have found material injury by reason of the imports subject to the investigation but for the suspensions of liquidation of the entries of the subject merchandise.

[4] The products covered by this investigation are laser light-scattering instruments and parts thereof from Japan that have classical measurement capabilities, whether or not also capable of dynamic measurements. The following parts are included in the scope of the investigation when they are manufactured according to specifications and operational requirements for use only in such an LLSI: Scanning photomultiplier assemblies, immersion baths, sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discriminator circuitry, and optical benches.

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 July 25, 1990 (55 FR 30284). The hearing was held in Washington, DC, on September 25, 1990, and all persons who requested the opportunity were permitted to appear in person or by counsel.

VIEWS OF COMMISSIONER ROHR AND COMMISSIONER NEWQUIST

On the basis of the information obtained in this final investigation, we determine that an industry in the United States is threatened with material injury by reason of imports of certain laser light scattering instruments ("LLSIs") and parts thereof from Japan that have been determined by the Department of Commerce ("Commerce") to be sold at less than fair value ("LTFV"). We further determine that the industry would not have been experiencing material injury but for the suspension of liquidation following Commerce's preliminary determination.

LIKE PRODUCT AND DOMESTIC INDUSTRY

We begin our analysis by defining the "like product" and the "domestic industry."[1] The articles subject to this investigation are laser light scattering instruments from Japan capable of classical measurement, and certain components and subassemblies of such instruments when they are manufactured according to specifications and operational requirements for use only in a classical LLSI.[2] LLSIs are instruments used for analysis of molecular structures. The instruments direct a very fine, focused beam of laser light at a solution containing the material being analyzed. Light

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[1] The "like product" is a "product that is like, or in the absence of like, most similar in characteristics and uses with the article subject to investigation." 19 U.S.C. § 1677(10). The term "domestic industry" means 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." 19 U.S.C. § 1677(4)(A).

[2] These components are scanning photomultiplier assemblies, immersion baths, sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discrimination circuitry, and optical benches. Commerce published a full definition of the scope of the investigation in its final determination of sales at less than fair value. See 55 Fed. Reg. 34952, 34953 (August 27, 1990).

passing through the sample is scattered after the beam strikes the dissolved or suspended particles. The instrument then determines the amount of light that is scattered.[3] An analysis of the amount of light scattered permits determination of such characteristics as the weight, size, and shape of the molecular structure within the sample.[4]

An LLSI with classical measurement capability, the imported instrument within the scope of investigation, measures light scattering intensity as a function of the angle between the laser beam and the light detector(s).[5] There are two types of classical measurement: low-angle and multi-angle. For low-angle measurement, a single, fixed detector is set at close to a zero angle from the path of the laser beam. A low-angle LLSI can determine molecular weight immediately without any extrapolation. It cannot, however, measure particle size.[6] By contrast, in multi-angle measurement, detection is made from a number of angles.[7] The information that multi-angle classical measurement yields concerning the amount of light scattered at each different angle enables the additional determination of particle size.[8]

Multi-angle LLSIs may be equipped to make dynamic, as well as classical, light measurements. A dynamic measurement is one based upon the variation of

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[3] Report at A-2-3.

[4] See Report at A-3-7.

[5] See Report at A-4.

[6] Report at A-6; Tr. at 43 (P. Wyatt).

[7] Report at A-4.

[8] Report at A-4 & n.10.

light scattering intensity as a function of time.[9] Dynamic measurements can be used to determine particle size, which can also be determined in the classical mode.[10] Unlike classical measurement, dynamic measurement cannot directly allow determination of molecular weight, but does provide information concerning size distribution and particle shape.[11]

Like Product

In the preliminary investigation, the Commission determined that all classical LLSIs and the seven components within the scope of the investigation constituted a single like product.[12] It indicated, however, that it would reconsider three like product issues in the final investigation: (1) whether low-angle and multi-angle classical LLSIs constitute separate like products; (2) whether any like product encompassing all classical LLSIs should also include LLSIs capable of dynamic measurement only; and (3) whether those LLSI components within the scope of the investigation constitute separate like products.[13]

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[9] Report at A-6 & n.13. A device capable of dynamic measurement uses an "autocorrelator." Report at A-6-7. An autocorrelator is standard equipment on some models of multi-angle LLSIs. On other multi-angle LLSIs, the autocorrelator is an optional accessory. Report at A-43.

[10] Report at A-4, A-7.

[11] See Report at A-7.

[12] Certain Laser Light-Scattering Instruments and Parts Thereof from Japan, Inv. No. 731-TA-455 (Preliminary), USITC Pub. 2282 at 15 (May 1990) ("Preliminary Determination").

[13] Preliminary Determination at 8 n.23, 12, 15 n.51; see also id. at 27 (views of Commissioner Eckes), Tr. at 42-45, 77-78, 123-24. Only the third issue has been briefed by the parties, with petitioner Wyatt Technology Corp. supporting and respondent Otsuka Electronics Co. opposing including components in the same like product as the finished instruments.

Our decision regarding the appropriate like product(s) in an investigation is essentially a factual determination, and we apply the

(continued...)

Whether low-angle LLSIs and multi-angle LLSIs constitute separate like products

We first determine that the two types of classical LLSIs, low-angle and multi-angle, do not constitute separate like products.[14]

There are some physical differences between low-angle and multi-angle instruments.[15] We do not perceive these differences to be significant, however, because all classical LLSIs involve the assembly of the same or similar electronic components.[16] Physical differences are common even among different producers' classical LLSIs of the same type.[17]

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[13](...continued)
statutory standard of "like" or "most similar in characteristics and uses" on a case-by-case basis. See, e.g., Asociacion Colombiana de Exportadores de Flores v. United States, 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., id. at 1170; Sweaters Wholly or in Chief Weight of Manmade Fibers from Hong Kong, the Republic of Korea, and Taiwan, Inv. Nos. 731-TA-448-450 (Final), USITC Pub. 2312 at 4-5 (September 1990); Certain Residential Door Locks and Parts Thereof from Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253 at 4 (January 1990). No single factor is necessarily dispositive, and we may consider other factors that we deem relevant based upon the facts of a particular investigation. Generally, we have not drawn distinctions based on minor variations between the articles subject to an investigation, and we have sought clear dividing lines among possible like products. See, e.g., Polychloroprene from France and the Federal Republic of Germany, Inv. Nos. 731-TA-446-447 (Preliminary), USITC Pub. 2233 at 3 (November 1989).

[14] Petitioner Wyatt Technology Corp. and respondent Otsuka Electronics Co. both produce multi-angle LLSIs. There is one domestic producer of low-angle instruments, but none are imported from Japan.

[15] While multi-angle instruments have either multiple detectors or one detector with a stepper motor, low-angle instruments have one fixed detector. See Report at A-4.

[16] See Report at A-4-6.

[17] Report at A-7.

The record indicates that customers and producers perceive low-angle and multi-angle instruments to be competitive products. An official of respondent Otsuka Electronics Co. ("Otsuka") testified that the low-angle instrument was directly competitive with some multi-angle models.[18]

Low-angle and multi-angle instruments are distributed and sold in the same manner.[19] There is also no clear distinction in the pricing or production processes of the two types of instruments.[20]

We believe that the additional information obtained during the final investigation confirms the conclusion in the preliminary investigation that the two types of instruments' similarities (in general characteristics and use, price, distribution, and customer and producer perceptions) outweigh their differences. Accordingly, we find that low-angle and multi-angle LLSIs are not separate like products in this investigation.

Whether dynamic LLSIs should be included in the like product

We next determine that the like product should not include LLSIs which are capable only of dynamic measurement.

Dynamic LLSIs differ physically from classical LLSIs. Dynamic measurements are made by instruments using autocorrelators, which are not

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[18] Tr. at 102 (MacKay). Indeed, one LLSI user indicated that his employer evaluated both low-angle and multi-angle instruments in making its purchasing decision. Otsuka Prehearing Brief, ex. 14 at 2-3. Additionally, a paper concerning classical LLSIs prepared by Polymer Laboratories, Otsuka's U.S. distributor, compared Otsuka and Wyatt multi-angle instruments and a low-angle instrument. Wyatt Prehearing Brief, ex. 4.

[19] Preliminary Investigation Conference Transcript ("Preliminary Tr.") at 77 (G. Wyatt).

[20] Report at A-14, Table 14; Confidential Report, Tables 12-13.

necessary for classical light measurement.[21] The measurements are not based on the same principles. The classical measurement is a function of the angle at which the light is scattered; the dynamic measurement is a function of light scattering over time.

The principal uses of the dynamic LLSI are to determine particle sizes, size distributions, and shape.[22] The dynamic LLSI cannot perform the principal function of the classical machine -- determining molecular weight.[23] Moreover, the sizing measurements performed by the multi-angle classical and dynamic machines are not the same.[24] The dynamic size measurement is most useful to confirm the presence of known substances.[25] It is also used with certain types of dense molecules which cannot be measured practically by classical light scattering.[26] Consequently, there are significant differences in the uses of classical and dynamic measurement, and the two types of machines are not close substitutes.

The information that we have obtained on customer and producer perceptions supports the conclusion that dynamic and classical LLSIs are viewed as complementary, rather than competitive, products. Petitioner Wyatt Technology Corp. ("Wyatt"), which expressly characterized dynamic and

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[21] Report at A-6-7.

[22] Report at A-7.

[23] Report at A-7.

[24] See Preliminary Tr. at 56 (P. Wyatt) (dynamic measurement provides hydrodynamic size, while classical measurement provides information about distribution of mass within the molecule); Preliminary Tr. at 127 (Karasz).

[25] Report at A-10; Preliminary Tr. at 59 (P. Wyatt).

[26] Report at A-11; Preliminary Tr. at 60 (P. Wyatt).

classical LLSIs as complementary products, offers an interface that permits its LLSIs to be used with any model of autocorrelator.[27] Customers also generally regard the two types of instruments as complementary.[28] None of the Otsuka purchasers who submitted statements to the Commission indicated that they considered instruments capable of only dynamic measurement when making their purchases.[29]

In sum, although there are some similarities between classical and dynamic LLSIs,[30] fundamental differences exist between the two types of instruments. Classical and dynamic LLSIs do not make light scattering measurements in the same manner, do not make the same type of measurements, and are not generally perceived as competitive products. On the basis of these factors, we have determined not to place the two types of instruments in the same like product. The finished instruments within the like product will be limited to classical LLSIs, the instruments within the scope of the investigation.

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[27] Report at A-36 n.67; Preliminary Tr. at 46 (P. Wyatt). A dynamic LLSI manufacturer has similarly characterized autocorrelators as accessories which may be combined with the Wyatt instrument, rather than as competitive products. Wyatt Postconference Brief, ex. E. As stated above, an autocorrelator is the device necessary to conduct dynamic light-scattering measurements.

[28] See Report at A-10.

[29] Two of the purchasers indicated they did not consider any competitive machines. Otsuka Prehearing Brief, ex. 1 at 2, ex. 2 at 2-3. One indicated he considered an instrument produced by Brookhaven (a domestic manufacturer whose LLSIs are capable of classical measurement). Id., ex. 3 at 1. The remaining purchaser considered both Brookhaven and Wyatt LLSIs. Id., ex. 4 at 2.

[30] Dynamic and classical instruments are sold in the same manner. Report at A-34; Preliminary Tr. at 77 (G. Wyatt). Production processes of the two types of instruments do not differ greatly. Report at A-14.

Whether those components of LLSIs within the scope of the investigation constitute a separate like product

We finally determine whether domestically-produced components of LLSIs like those within the scope of the investigation constitute a separate like product or products.[31] Commerce's scope determination included seven specified components of LLSIs "when they are manufactured according to specifications and operational requirements for use only in a [L]LSI."[32] Five of these components -- scanning photomultiplier assemblies, preamplifier discrimination circuitry, electronic signal-processing boards, sample-containing structures, and immersion baths -- are subassemblies, themselves composed of numerous parts.[33] The sixth component, the optical bench, is a base to which the light scattering apparatus -- including the five subassemblies listed above -- is attached.[34] The seventh component, molecular characterization software, calculates the results of the light-scattering measurement in a manner that can be displayed on a monitor of a computer.[35]

In prior investigations, we have examined numerous factors in determining whether components or "semi-finished" products should be included

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[31] Neither Otsuka nor any other firm currently imports such components from Japan. Report at A-30.

[32] 55 Fed. Reg. at 34953.

[33] See generally Tr. at 46-52.

[34] Report at A-9. It may also contain its own electronic components. See Wyatt Posthearing Brief at 12.

[35] Report at A-9.

in the same like product as finished products.[36] Some of these factors could support designating the components under investigation as a like product separate from finished LLSIs. The components need further processing before they can be used for laser light scattering. The process of assembling an LLSI from its various components involves intricate technical work requiring specially trained employees.[37] The costs of further processing appear to be fairly substantial.[38] The components are not interchangeable at different stages for production.

Other factors, however, strongly support the inclusion of the components in the same like product as finished instruments. Because the components at issue are those "for use only in a [L]LSI," they are clearly dedicated for use in a finished product. The manufacturing process confirms this dedication. Wyatt assembles or produces all but one of the seven components and

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[36] In such an analysis, we have reviewed: (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., Certain Residential Door Locks and Parts Thereof from Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253 at 8 & n.16 (January 1990); Certain Telephone Systems and Subassemblies Thereof from Japan and Taiwan, Inv. Nos. 731-TA-426 and 428 (Final), USITC Pub. 2237 at 5 n.9 (November 1989); Antifriction Bearings (Other Than Tapered Roller Bearings) and Parts Thereof from the Federal Republic of Germany, France, Italy, Japan, Romania, Singapore, Sweden, Thailand, and the United Kingdom, Inv. Nos. 303-TA-19-20 and 731-TA-391-399 (Preliminary), USITC Pub. 2083 at 20-22 (May 1988). We have found that, although a "part" is not a finished product, it does not need to be identical to a finished product in order to be considered within a single like product definition. Shock Absorbers and Parts, Components, and Subassemblies Thereof from Brazil, Inv. No. 731-TA-421 (Preliminary), USITC Pub. 2128 at 12 (September 1988).

[37] Report at A-13-14.

[38] See Wyatt Posthearing Brief at 13-14.

subassemblies at issue in-house; the remaining component, the optical bench, conforms to a proprietary design.[39] Furthermore, Wyatt uses the same workers and facilities for assembly of both subassemblies and the finished instrument.[40]

There are also no known significant independent markets for the components at issue and finished machines. The staff could not identify any domestic producers of the components at issue other than the producers of finished instruments.[41] The producers do not market any of the components at issue separately from finished machines except for the electronic signal-processing board (which Wyatt markets separately) and software.[42] Purchasers of the finished instrument almost invariably purchase these "optional" components, which an LLSI requires to yield usable measurements, from the instrument producer at the same time the LLSI is purchased.[43]

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[39] Tr. at 46-52. Otsuka argues that LLSI "parts" should not be included in the same like product as finished instruments on the grounds Wyatt does not manufacture its parts, but purchases most of them off the shelf. Although Otsuka's assertions are correct, they are not germane to the question before us. The relevant issue is the like product treatment of the seven components within the Commerce scope determination, not whether each individual part found in a Wyatt LLSI belongs in the same like product as the finished LLSI. Otsuka cannot and does not argue that the seven pertinent components are purchased "off the shelf." To the contrary, it has submitted information to the Commission indicating that its production process is basically similar to Wyatt's. See "DLS-700 Production Flow Chart," appended to letter from Arthur S. Lowry to Kenneth Mason (September 21, 1989); Otsuka Production Video (submitted September 19, 1990).

[40] See Wyatt Posthearing Brief at 15-16. This is also true of domestic producers generally. See Report at A-13-14.

[41] See Report at A-17.

[42] Report at A-41-44.

[43] See Confidential Report, Table 12; Preliminary Tr. at 47, 76 (G. Wyatt). Moreover, a customer desiring a replacement component will obtain it directly from the manufacturer from which he purchased an instrument, rather than on

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The record further indicates that the individual components at issue possess or incorporate essential characteristics to an LLSI. For example, the optical bench is critical for accurate illumination of the sample.[44] Software is essential to meaningful analysis of the measurements made by an LLSI.[45] The sample-containing structure and immersion bath are necessary to ensure that the sample is secured and placed at a proper temperature to permit light-scattering measurements.[46] The other components at issue also impart essential functions to an LLSI.[47]

A number of recent Commission investigations have involved a finished product and one or more of its components.[48] In situations in which an identifiable article goes through multiple processing stages, the point at which the article has attained the essential characteristics of the finished product and can be interchanged with it has been important.[49] When a

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[43](...continued)
the open market. Preliminary Tr. at 47 (G. Wyatt).

[44] Report at A-9.

[45] Report at A-9.

[46] Report at A-9; Wyatt Posthearing Brief at 16.

[47] See Report at A-8-9.

[48] See High-Information Flat Panel Displays and Subassemblies Thereof from Japan, Inv. No. 731-TA-469 (Preliminary), USITC Pub. 2311 at 10-13 (September 1990); Certain Residential Door Locks and Parts Thereof from Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253 at 8-10 (January 1990); Certain Telephone Systems and Subassemblies Thereof from Japan and Taiwan, Inv. Nos. 731-TA-426 and 428 (Final), USITC Pub. 2237 at 6-7 & n.10 (November 1989) (adopting determination reached in preliminary investigation).

[49] See Certain Granite from Italy and Spain, Inv. Nos. 701-TA-289, 731-TA-381-382 (Final), USITC Pub. 2110 at 10 (August 1988); Certain Welded Carbon Steel Pipe Tubes from the Republic of Korea and Taiwan, Inv. Nos. 731-TA-131, 132, and 138 (Final), USITC Pub. 1519 at 5-6 (April 1984).

finished product is built up from multiple components, these factors have proven to be of less significance.

In this investigation, the subassemblies and components within the scope of the investigation all perform essential functions within the operation of an LLSI, but none can truly be said to provide the essential characteristic of such an instrument. Each assembly is a substantial part of an LLSI and each has been advanced to the point of performing a function in a manner unique to the operation of an LLSI. The assemblies are all generally produced within a single integrated production process which leads to the finished product. In this situation we determine that is appropriate to treat the subassemblies and components and the finished product as a single like product. We note however, that our determination would be the same whether the subassemblies and components are considered part of the same like product or whether they are considered multiple like products.[50]

Accordingly, we have determined that there is one like product in this investigation including both classical LLSIs and those LLSI components like those within the scope of investigation.

Domestic Industry

In light of our like product determination, we determine that there is one corresponding domestic industry, composed of the producers of classical LLSIs and components like those within the scope of investigation. We have

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[50] Under either definition, in light of the way these products are produced, the definition of the domestic industry would be the same, see 19 U.S.C. § 1677(4)(A), the factors rendering it vulnerable to LTFV imports would be the same, and the factors leading to the conclusion that imports pose a real and imminent threat of material injury would be the same. We note that the staff circulated questionnaires to approximately 30 firms that it believed could be components producers, but all respondents indicated that they did not produce the components subject to this investigation. See Report at A-17.

identified the following firms as members of the domestic industry: Wyatt, Brookhaven Instruments Corporation, and LDC Analytical Corp.[51]

CONDITION OF THE INDUSTRY

The domestic industry in this investigation has a number of distinctive characteristics that are of particular relevance to our determination. The legislative history of the antidumping laws indicates that Congress desired the Commission to focus on the particular conditions of trade, competition, and development of the industry before it rather than attempting to evaluate the industry in relation to other industries or manufacturers as a whole.[52]

A number of the factors that we normally consider in assessing the condition of the domestic industry have limited applicability to this industry.[53] For example, analysis of inventories is not productive because inventories are not normally maintained by LLSI producers.[54] Information about capital investments, which tend to be quite small in the industry,[55] are of little weight. Capacity can be expanded easily to meet demand and capacity utilization figures must be viewed with caution.[56]

An examination of more relevant factors indicates that the domestic

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[51] See Report at A-16-17.

[52] See S. Rep. 71, 100th Cong., 1st Sess. 115 (1987); H.R. Rep. 40, 100th Cong., 1st Sess. 127 (1987); S. Rep. 249, 96th Cong., 1st Sess. 88 (1979).

[53] The factors that the Commission normally considers include production, shipments, capacity utilization, employment, wages, financial performance, capital investments, and research and development expenditures.

[54] Report at A-20.

[55] See Confidential Report at A-43.

[56] See Report at A-18.

industry is not currently experiencing material injury.[57] During the period of investigation, total U.S. production of classical LLSIs rose in both volume and value, although the rise was due solely to increased export sales.[58] Wages increased moderately throughout the period, but employment remained stable.[59] The proprietary data concerning profit and research and development expenditures reported by Wyatt, the only domestic industry participant that submitted usable financial performance information, also does not demonstrate material injury.[60]

We do not believe, however, that a mechanical examination of these trends provides conclusive guidance as to future industry conditions which constitute the basis of our affirmative threat determination. Familiarity with the special conditions of trade in this industry is critical to an understanding of its vulnerability to LTFV imports.

One such critical factor is the nature of the domestic market for LLSIs. Classical LLSIs are expensive instruments. The base model instrument sells for in excess of $25,000, and options and accessories available from producers can raise the total instrument price to over $75,000.[61]

The universe of potential customers for classical LLSIs is small.

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[57] Because of the limited number of firms in the domestic industry, much of the information pertinent to the current condition of the industry is business proprietary. We have been granted waivers from Wyatt and the other two domestic industry participants to discuss trends in general terms in these public views.

[58] Confidential Report, Tables 2 and 3.

[59] Confidential Report, Table 5.

[60] Confidential Report at A-43 and Table 7.

[61] Report at A-41-44.

Customers tend to be academic and corporate research laboratories,[62] with a small number of sales made in any given year. Current domestic demand does not appear to exceed 50 instruments per year, and total domestic consumption of classical LLSIs has remained essentially stable during the period of investigation.[63] Repeat sales to customers, which are not uncommon, are important to producers because repeat purchasers are more likely to purchase instruments from the producer from which they made their initial purchase.[64]

Because of the small size and apparently static nature of the domestic market, seemingly small increases in the number of LTFV instruments sold in the United States will have a significant impact on market share and sales revenue of the individual domestic producers.

Also of critical importance is the cost structure faced by the industry. The high prices of LLSIs are not principally a function of the costs of material and labor needed to manufacture an instrument. Such variable costs are relatively small in relation to an instrument's market price.[65] By contrast, the cost of the technology needed to develop the instruments is substantial. Domestic producers incur substantial research and development costs in developing and updating their instruments and in tailoring the instruments for new applications.[66]

Consequently, producers face high fixed costs that they must recoup to

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[62] Report at A-34.

[63] See Preliminary Tr. at 139 (Blow); Confidential Report, Table 1.

[64] Report at A-34.

[65] See Report at A-25.

[66] Tr. at 24 (G. Wyatt); Confidential Report at A-40, A-43.

operate profitably, yet fund and continue the ongoing development of the instruments.[67] Because of such high fixed costs, relatively small changes in sales revenue can substantially affect profitability. Producers perceive incremental sales as essential to profitability.[68] Indeed, Wyatt's experience has been that moderate increases in sales can lead to very large increases in profitability.[69] But the same cost structure dictates that relatively small decreases in sales can cause significant decreases in profitability. These factors make this domestic industry highly vulnerable to sales declines, including those stemming from even small increases in LTFV imports. Moreover, these factors make an examination of current profitability trends a very uninformative and potentially misleading predictor of future industry conditions, even in the short term.

Another factor of note is that this industry does not establish its research and development priorities unilaterally. Most of its research and development work appears to involve working with customers concerned with practical applications of LLSIs.[70] Through such activities, producers can develop both improvements in software and hardware and entirely new instrument applications.[71] Therefore, each individual sale provides the industry with the information it needs to understand better its customers' requirements. Increases in LTFV sales will reduce not only the funds available for current

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[67] Tr. at 20 (G. Wyatt).

[68] Tr. at 20-21 (G. Wyatt); Wyatt Posthearing Brief, ex. 3 at 3.

[69] Confidential Report at A-37 and Table 7.

[70] Tr. at 61 (P. Wyatt).

[71] Tr. at 24, 62-63.

research and development efforts but also a significant source of the opportunities for such efforts.

A further salient point is that decisions to purchase LLSIs are not made in haste. Because LLSIs are expensive and their uses are often not well understood by a firm's purchasing agent, sales can take several years from initial customer contact to consummation.[72] Thus, changes in individual producers' market shares may lag considerably behind the introduction of new products. Similarly, because of the long sales cycle, when a producer seeks to encourage sales by underselling competitors, the effects on both the underselling producer and the competitors are unlikely to be immediately discernible.

THREAT OF MATERIAL INJURY

We have made our affirmative determination on the basis of threat of material injury. Section 771(7)(F) of the Tariff Act of 1930 directs the Commission to determine whether a U.S. industry is threatened with material injury by reason of imports "on the basis of evidence that the threat of material injury is real and actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition."[73] The ten factors that the Commission must consider are:

> (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,

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[72] Report at A-34; Tr. at 8 (G. Wyatt).

[73] 19 U.S.C. § 1677(7)(F)(ii).

> (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 probability that importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of 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 1671 or 1673 of this title or to final orders under section 1671e or 1673e of this title, are also used to produce the merchandise under investigation,
>
> (IX) in any investigation under this title which involves imports of both raw agricultural product (within the meaning of paragraph (4)(E)(iv) and any product processed from such raw agricultural product, the likelihood 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.[74]

In addition, we must consider whether dumping findings or antidumping remedies in markets of foreign countries against the same class of merchandise suggest a threat of material injury to the domestic industry.[75] We consider each

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[74] 19 U.S.C. § 1677(7)(F)(i).

[75] See 19 U.S.C. § 1677(7)(F)(iii).

statutory consideration applicable to this investigation below.[76]

We begin our analysis by examining the prices at which Otsuka sells its LLSIs in the United States.[77] We note that the list price of the Otsuka LLSI is below that for comparably equipped U.S. instruments.[78] Additionally, the majority of Otsuka's sales during the period of investigation were at discounts from list price.[79] There is also material in the record suggesting that the U.S. list price for the Otsuka LLSI was substantially reduced when Polymer Laboratories, Inc. became Otsuka's U.S. distributor in April 1989.[80] Otsuka's strategy of acquiring U.S. market share by underselling U.S. producers will cause those producers, which must meet Otsuka's competition, to depress or suppress their prices.

Otsuka's underselling practices will also increase its share of the U.S.

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[76] Because this investigation does not concern either a subsidy or agricultural products, statutory factors (I) and (IX) are not applicable. Because Otsuka produces no other products subject to antidumping or countervailing duty investigations or orders, statutory factor (VIII) is also inapplicable.

[77] This is pertinent to statutory threat factor (IV).

[78] See Report, Table 14. Otsuka argues that domestic instruments are less expensive by comparing its "base" LLSI, which performs a variety of light-scattering functions without extra options, with domestic "base" classical LLSIs, which cannot perform the same functions absent extra-cost options. See Otsuka Prehearing Brief, ex. 8. This analysis is flawed, particularly since Otsuka purchasers repeatedly stated that they desired the wide range of standard capabilities offered by the Otsuka machine. See Otsuka Prehearing Brief, ex. 2 at 6, ex. 3 at 2, ex. 4 at 3. When similarly-equipped machines are compared, even Otsuka's own calculations indicate that its instrument undersells domestic LLSIs, sometimes by substantial margins. See Otsuka Prehearing Brief, ex. 9 (insofar as it compares Otsuka LLSI with Brookhaven and Wyatt instruments).

[79] See Report at A-47; Otsuka Prehearing Brief, ex. 2 at 5. By contrast, a majority of domestic producers do not discount from list price. See Confidential Report at A-58-59.

[80] See Petition, ex. 14; Wyatt Posthearing Brief, ex. 2.

market.[81] The record shows that LLSI customers consider product price an important factor in their purchasing decision.[82] Academic purchasers in particular have limited funding available for instrument acquisition and frequently mention price as a major factor in their purchasing decisions.[83] The record also indicates that Otsuka's LLSI is a close substitute for domestically-produced models.[84] We consequently conclude that, given the

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[81] This is pertinent to statutory threat factor (III). Significantly, in the final investigation Otsuka abandoned the argument it raised in the preliminary investigation that, because the potential market for its LLSI was extremely limited, its U.S. market penetration could not rise appreciably. See Preliminary Tr. at 139 (Blow). Otsuka instead stated at the hearing that it had nothing beyond "hunches" concerning potential future U.S. market penetration. Tr. at 145-46 (Wechsler). The substance of these "hunches" was never communicated to the investigative staff. Report at A-32 n.56.

[82] Report at A-45 (price frequently listed by purchasers as one of the three major factors generally considered when selecting suppliers).

[83] Tr. at 12, 65-66 (G. Wyatt).

[84] Otsuka's LLSI and all domestically-produced models are near perfect substitutes when making measurements in batch mode, the standard method used in classical measurement. Economic Memorandum at 10 & n.21. Otsuka's instrument is also very similar to comparably-equipped Brookhaven and Wyatt models in making dynamic measurements. Id. at 10 & n. 23.

Otsuka's contrary arguments are flawed because they focus neither on general instrument capabilities nor on distinctions between its machines and U.S.-produced classical LLSIs generally. Instead, Otsuka dwells exclusively on alleged distinctions in specialized capabilities between its instrument and Wyatt's. Even assuming arguendo that Otsuka's arguments are correct, they do not prove that its instruments are not substitutable with those of other domestic producers such as Brookhaven. Indeed, the statement of one Otsuka purchaser who also considered a Brookhaven instrument indicates that he perceived the Otsuka and Brookhaven LLSIs to have equivalent capabilities. See Otsuka Prehearing Brief, ex. 3.

Moreover, Otsuka has had considerable difficulty articulating a consistent theory why its instruments are not substitutable for Wyatt's. In the preliminary investigation, a representative of Otsuka's U.S. distributor asserted that the products were not substitutable because Wyatt's instruments were used for "routine industrial applications," while "the Otsuka DLS-700 is used for precision measurements in laboratories where flexibility, sensitivity and accuracy are more important than speed or ease of use." Preliminary Tr. at 138 (Blow). During the final investigation, the same witness articulated a different explanation for lack of substitutability, and, in response to

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firm's pricing patterns, were LTFV sales to continue, a rise in Otsuka's market penetration would be imminent.[85] Moreover, in light of the industry characteristics described above, even a modest rise in import penetration would cause a significant diminution of domestic producers' market share and profitability and cause material injury to the domestic industry.

But the damage that increased LTFV imports would inflict upon the domestic industry would not be limited to decreasing its market share, revenues, and profits. The domestic industry also engages in ongoing research and development efforts to improve the efficiency and applications of its instruments.[86] The only means by which the industry can fund these efforts are revenues from operations and short-term lines of credit which ultimately must be repaid by revenues from operations.[87] Revenues that the domestic industry loses by virtue of sales of LTFV imports will be unavailable for

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[84](...continued)
questioning by staff at the hearing, effectively disavowed his statements during the preliminary investigation. Tr. at 151-52 (Blow) ("I perhaps may have misled; that previous comment may have been a little bit dogmatic.") Neither of this witness' explanations comport with the experience of Otsuka's most recent U.S. purchaser, who seriously considered a Wyatt instrument when making his purchasing decision, and informed the Commission staff that the Wyatt and Otsuka instruments are both excellent and well-suited for research. See Otsuka Prehearing Brief, ex. 4; Report at A-47; Wyatt Posthearing Brief, exs. 1 and 2.

[85] That market penetration is currently very low is not surprising. Otsuka's current U.S. distributor only began marketing Otsuka's LLSI in April 1989. Report at A-17. Because the time between initial customer contact and consummation of an LLSI sale is so long, we would not expect that the distributor's apparent efforts to stimulate sales by offering LTFV prices would have borne immediate fruit. We do note, however, that the U.S. market share for Otsuka's classical LLSI for the period January-June 1990 exceeded that for both calendar year 1989 and the first six months of 1989. Confidential Report, Table 11.

[86] Tr. at 63-64 (P. Wyatt); see Confidential Report at A-43-44.

[87] Tr. at 36-37 (P. Wyatt); see Report at A-26.

funding of ongoing research and development efforts and will diminish profits and jeopardize access to credit needed to fund future efforts. Moreover, lost sales deprive the domestic industry of the customer interaction critical to focusing research and development efforts, particularly those concerning new applications.[88] Because of the technology-intensive nature of the LLSI industry, the sales of even a relatively small number of LTFV imports would have a serious negative effect on the ongoing efforts of the industry to continue to develop more advanced LLSIs. By virtue of statutory threat factor (X), this consideration is directly relevant to our affirmative threat determination.[89]

Otsuka additionally has the ability readily to increase exports of its LLSIs to the United States.[90] Otsuka's repeated statements that "[t]here is

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[88] Tr. at 61 (P. Wyatt).

[89] We are mindful that this factor was added to the statute by the Omnibus Trade and Competitiveness Act of 1988, the most recent substantive revision of the antidumping laws. The legislative history indicates that "[t]he purpose [of new factor (X)] is to clarify that a threat of material injury can exist when imports affect the industry's research and development for a future generation of related products, as well as its current operations." S. Rep. 171, 100th Cong., 1st Sess. 118 (1987).

[90] This is pertinent to statutory threat factors (II) and (VI). We have given no credence to Otsuka's contention that it has no incentive to increase its level of U.S. imports in light of its plans to shift production of its classical LLSI to the United States. The Commission noted in the preliminary determination that "the record simply fails to establish that Otsuka has made an ironclad commitment to U.S. production of its multi-angle instrument." Preliminary Determination at 23 n.81. We do not find the record in the final investigation to be significantly different or more credible in this regard. Otsuka's plans remain tentative and indefinite. Otsuka has not yet trained any U.S.-based employee how to produce its LLSI. See Otsuka Prehearing Brief, ex. 6 at 18; Tr. at 125 (Nakayama). Nowhere in its extensive statements, testimony, and conversations with investigative staff has Otsuka indicated that it has hired any U.S. employee whose sole function will be LLSI production or made any capital expenses for equipment or facilities dedicated for LLSI production. Cf. Report at A-31-32.

Moreover, Otsuka has materially modified, rather than implemented, the

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no excess capacity in our production facility in Japan,"[91] are not supported by the record which indicates unused capacity during the three full years encompassed in the period of investigation.[92] Even if Otsuka's assertions concerning capacity utilization were true, the firm still could increase capacity easily and relatively rapidly. LLSI production requires little capital equipment and capacity can generally be increased simply by hiring new employees.[93]

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[90](...continued)
plans it announced in the preliminary investigation. Otsuka's continually shifting assertions throughout this investigation concerning its U.S. production plans have seriously diminished the plans' credibility. For example, since the preliminary investigation, Otsuka has changed the site at which its LLSI will be produced. Compare Preliminary Tr. at 149 (MacKay) (LLSI production facility to be located in Haverford, Pa.) with Otsuka Prehearing Brief, ex. 6 at 17 (MacKay statement) (LLSI production facility to be located in Ft. Collins, Colo.). It has delayed by over a year the date on which U.S. commercial production is projected to begin. Compare Preliminary Tr. at 106 (Nakayama) (U.S. LLSI production to begin in 1990) with Otsuka Prehearing Brief, ex. 5 at 8 (Nakayama statement) (U.S. commercial LLSI production to begin in 1992). It has reversed its plan to make the LLSI the first instrument that it will produce in the United States. Compare Preliminary Tr. at 155 (MacKay) (LLSI to be first Otsuka product to be produced in U.S.) with Otsuka Prehearing Brief, ex. 6 at 18 (MacKay statement) (LLSI will not be first Otsuka product to be produced in U.S.). It has ostensibly changed its mind concerning sourcing of components and subassemblies. Compare Preliminary Tr. at 158 (Nakayama) (Otsuka plans to import optical bench subassembly from Japan) with Otsuka Prehearing Brief, ex. 5 at 12-13 (Nakayama statement) (Otsuka "hopes" to source "most, if not all" LLSI parts in the United States). Nevertheless, Otsuka stated its sourcing process is incomplete and that it could not assure that all components it would assemble in the United States would be obtained here. See Tr. at 127 (Wechsler). Thus, we are unpersuaded that even if U.S. production operations were commenced, certain high-value components subject to this investigation would not still be imported from Japan.

[91] E.g., Otsuka Prehearing Brief, ex. 5 at 10.

[92] Confidential Report, Table 9. Furthermore, proprietary information in the record shows trends that, if continued, would permit Otsuka to increase the levels of its U.S. imports without changing its production mix. Id.

[93] Report at A-14. New workers can become productive after a two-to-three month training process. Report at A-14; see also Confidential Report at A-48
(continued...)

There is no indication that Otsuka has significantly changed its level of inventories of classical LLSIs during the period of investigation.[94] This factor, however, is of limited significance because LLSI producers generally do not maintain inventories.[95] Finally, there do not appear to be any dumping findings or antidumping orders in effect in third countries with respect to classical LLSIs imported from Japan.[96]

The record thus indicates that LTFV imports are entering the United States at prices likely to divert sales from the domestic industry, that Otsuka has the ability promptly to increase significantly the level of U.S. imports, and that even small increases in import market penetration are likely to injure the domestic industry and imperil its research and development efforts. We believe that these factors all support our determination that a threat of material injury exists.

Finally, there is no evidence of record that imports of classical LLSIs and parts thereof from Japan would have caused material injury but for the suspension of liquidation of entries as a result of Commerce's preliminary affirmative determination.[97] The statute requires that when the Commission makes a final affirmative determination on the basis of threat, it also make a

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[93](...continued)
n.49.

[94] Confidential Report, Table 9. This is pertinent to statutory threat factor (V).

[95] Report at A-20.

[96] Preliminary Tr. at 166.

[97] Commerce's affirmative preliminary determination was published in the Federal Register on July 10, 1990. 55 Fed. Reg. 28271 (July 10, 1990).

finding on this issue.[98] Accordingly, we conclude that there would not have been material injury to the domestic industry but for the suspension of liquidation of entries.

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[98] See 19 U.S.C. § 1673d(b)(4)(B).

DISSENTING VIEWS OF ACTING CHAIRMAN ANNE E. BRUNSDALE

Certain Laser Light-Scattering Instruments and Parts Thereof From Japan (Inv. No. 731-TA-455 (Final))

I dissent from the Commission's determination that an industry in the United States is threatened with material injury by reason of imports from Japan of certain laser light-scattering instruments (LLSIs). In the preliminary investigation in this case, I found that there was no reasonable indication of material injury or threat thereof. As the additional information gathered in this final investigation merely reinforces my earlier conclusions, I now find that the domestic industry producing LLSIs is not materially injured, nor is it threatened with material injury, by reason of imports of Japanese LLSIs that are sold at less than fair value.[1]

Like Product and Domestic Industry

I concur in the majority's discussion of the like-product issues in this case. That is, I agree that there is a single like product which consists of all LLSIs capable of making classical measurements, including both low-angle and multi-angle LLSIs. The like product also includes the seven subassemblies that the Department of Commerce defined as being within the scope of the

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[1] 19 U.S.C. 1673d(b)(1). Material retardation is not an issue in this case and will not be discussed further.

investigation, provided these parts are produced only for use in an LLSI. Parts that can be used for other purposes are not within the scope of Commerce's investigation and are not included in the like product. I also agree that there is one domestic industry composed of producers of classical LLSIs and those components within the scope of the investigation.

Threatened Injury to an Advanced Technology Industry

In my view, petitioner Wyatt Technology's most interesting claim is that production of LLSIs is an advanced technology activity and that the loss of even one or two sales could endanger future progress in product development.[2] I therefore discuss this issue and the other issues related to threat of future injury, before setting out the details supporting my negative finding on the issue of material injury.

I find little evidence to suggest that this industry is a particularly innovative, high technology industry. There is nothing particularly high tech about the production process. It is merely a precision assembly operation. To produce a finished LLSI, firms merely assemble parts purchased off the shelf or produced to the firm's specifications.[3]

There is no evidence of significant innovations in LLSIs either in the recent past or in the immediate future. Wyatt's

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[2] Prehearing Brief of Wyatt Technology at 7.

[3] Staff Report at A-13.

current models were introduced almost six years ago, in 1985.[4] The same is true of respondent's DLS-700.[5] There is no evidence of forthcoming new models. When asked about forthcoming innovations at the hearing, the Wyatts testified that their aim was primarily to have their customers so pleased with the reliability and longevity of their current models that they would make repeat purchases.[6] The record shows that Otsuka has no plans to introduce any new LLSIs.[7]

In arguing that it produces a high technology product where the loss of a single sale would have disastrous consequences, Wyatt repeatedly compared its situation to that of Cray Technologies, the primary producer of supercomputers.[8] It is therefore instructive to examine the experience of Cray, whose first supercomputer went into commercial production in 1976. That product, the CRAY-1, was discontinued in 1982 and was replaced by the CRAY X-MP, which was three to five times faster than the earlier model. The CRAY-2, which had six to twelve times the performance ability of the CRAY-1, was introduced in June 1985. It was discontinued in 1989, following the

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[4] Transcript at 81 (Testimony of Philip Wyatt).

[5] Letter to Wyatt Technologies Corp. from Union Giken Co. Ltd., dated October 28, 1985, reproduced as Exhibit 3 to the Petition.

[6] Transcript at 83 (Testimony of Philip Wyatt).

[7] Posthearing Brief on Behalf of Otsuka Electronics Co., Ltd., at 16.

[8] See, e.g., Prehearing Brief of Wyatt Technologies at 21.

introduction in 1988 of the CRAY Y-MP, which had thirty times the performance of the CRAY-1.[9] Each Cray model has been discontinued within six years of its introduction, and the performance of the current model is thirty times greater than that of the model produced less than fifteen years ago.

It is also useful to compare the history of the dynamic random access memory (DRAM) semiconductor chip, certainly one of the most widely discussed advanced technology products in recent years. In 1985, the largest DRAM in commercial production could store 256 kilobits (256K) of information. Today, the most commonly used DRAMS have 1 megabit of storage, and production is beginning on 4 megabit DRAMs. In other words, during the six years that the current models of LLSIs have been on the market, there have been two new models of DRAMs, each of them representing a significant improvement--a four-fold increase in chip density. Indeed, since the early 1970s, the amount of information that can be stored on a single computer chip has regularly increased by a factor of four every three to four years.[10]

Clearly, the rate of progress in LLSIs does not compare with that in supercomputers and semiconductors or with what is

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[9] "Company History," publication of Cray Research Inc., furnished to USITC staff, October 25, 1990.

[10] Jack Worlton, "Existing Conditions" in Supercomputers: Directions in Technology and Applications, National Academy Press, 1989, at 37.

generally associated with advanced technology industries. LLSIs produced 20 years ago are still in use,[11] and the expected average life for an LLSI is about 10 years.[12] No doubt a new LLSI is superior to the 20 year old model. For one thing, a new LLSI uses a computer to do much of the work of setting the angles for measurement and storing and analyzing the resulting data. However, this is the kind of innovation that has been occurring in many, if not most, U.S. industries in the past 10 years. I see nothing about LLSIs that would make them advanced technology.

Another aspect of the comparison with DRAMs and other semiconductors is also informative. In semiconductors it is often argued that the information a firm learns in producing one type of chip or a chip of a certain density is crucial for commercial success in the production of another chip or the next, higher-density generation of the same chip. That is, it is alleged that there are "intergenerational learning curve effects." If a firm fails to produce one chip generation, it will be unable to produce those that follow.

There is no evidence of such intergenerational effects in the production of LLSIs. At the hearing, petitioner testified that one could successfully compete in the LLSI market by copying

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[11] Transcript at 82 (Philip Wyatt). In the petition, Wyatt reported that "In the 1950's and 60's, the Brice-Phoenix (U.S.) photometer enjoyed high sales levels--it was, perhaps, the most successful light scattering instrument ever sold, and many are still in use to this day. . . ." (Petition at 18)

[12] Transcript at 82 (Philip Wyatt).

improvements made by another firm.[13] One would not be foreclosed from competing on a new generation of machines because one had not first produced the earlier model.

The strongest evidence that LLSI production might involve advanced technology is found in the high research and development (R&D) to sales ratios reported to the Commission by Wyatt Technologies. I agree that these ratios are quite high in comparison to most other industries the Commission has examined. I note, however, that the data cover only one of the three domestic producers of LLSIs. We know nothing about the research and development outlays of the two other domestic producers--Brookhaven and LDC Analytic.

Because the R&D data are for only one firm, one must be cautious about accepting the data as an accurate measure of industry research efforts. Determination of what is appropriately charged to R&D is not an exact science. This is particularly true for a company like Wyatt where the testimony indicates that research takes place not in a separate laboratory,

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[13] Transcript at 69-70 (Testimony of Philip Wyatt). In its posthearing brief, Wyatt submitted evidence of a learning curve effect in the production of LLSIs--that is, the amount of labor needed to assemble an LLSI declines as the company gains more experience assembling the product. (Posthearing Brief of Wyatt Technologies at 21-25 and Exhibit 5) Since this information was submitted in a posthearing submission, respondents have not had an opportunity to rebut it. This causes me to be less certain of the reliability of this evidence. However, even assuming the evidence is accurate, it says nothing about learning effects in research and development. It deals only with the assembly of an existing product.

but rather as part of the production process and where the physicists "help field customer complaints and customer calls."[14] My skepticism is increased by the conclusion of Commission staff that Wyatt [***].[15]

In addition to the accuracy of the data reported to us, there are questions about whether the data for a single firm are representative of the entire industry. We do not know whether Wyatt engages in more extensive research and development than the other LLSI producers. Also, we do not know whether Wyatt's R&D to sales ratio is extraordinarily high because it only produces LLSIs. Are there synergies in research that Wyatt is not able to exploit because it does not produce other instruments? If we had data for a number of firms, these problems would be less severe because the data would cover firms using different practices and having broader product lines than Wyatt.[16] However, where, as here, our data are for a single firm, we have no way of knowing how representative they are.

The specific threat language in Title VII applicable to advanced technology industries was included in the Omnibus Trade

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[14] Transcript at 61-62 (Testimony of Geofrey Wyatt).

[15] Staff Report at A-26.

[16] While virtually [***] percent of Wyatt's sales from its single plant are sales of LLSIs, less than [***] percent of LDC Analytic's sales total were sales of LLSIs. (Staff Report at A-22)

and Competitiveness Act of 1988. It directs the Commission to consider

> (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.[17]

As I have shown, the technology in LLSIs is not the kind of advanced technology I believe this provision was intended to address. But, even if LLSIs do embody an advanced technology, the available data does not support the claim that the industry's ability to continue necessary R&D would be compromised by the loss of one or two sales. Wyatt was highly profitable in 1989, and its profits were considerably higher in the first half of 1990 than for the corresponding period of 1989.[18] Wyatt's own submissions suggest that it would be able to cover all of its fixed costs--which include R&D expenditures--even if it had made several fewer sales in 1989 and the first half of 1990.[19] Given that respondent has never made more than one sale per year and that respondent's LLSIs are only moderately substitutable for

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[17] 19 U.S.C. 1677(7)(F)(i)(X).

[18] Staff Report at A-24, Table 7. I note that the only reasonably reliable data in the record on the financial performance of the domestic LLSI industry are for a single firm --Wyatt.

[19] Wyatt claims that it must make between [***] sales per year in order to cover all of its fixed costs. (Petition at 21, Wyatt's Prehearing Brief at 22). There were [***] sales in 1989--well above the break-even point; and the [***] sales during the first half of 1990 suggest that Wyatt will easily make the necessary sales level in 1990. (Staff Report at A-21, Table 3)

Wyatt's,[20] there is no reason to believe that future lost sales, if any, would threaten Wyatt's continued ability to fund its R&D efforts.

In addition to the ability to carry on research and development, the statute identifies nine other factors the Commission is to consider in evaluating the threat of future injury.[21] Three of these factors are irrelevant in the current investigation.[22] As to the others, (1) there is no evidence of a rapid increase in U.S. market penetration or evidence of a likelihood of future increases in penetration (Factor III);[23] (2) while capacity figures in an assembly operation such as this may be somewhat questionable since workers can be shifted from one product to another and additional workers can be trained, there is no evidence of any substantial expected increase in capacity to produce the imports or of unutilized or underutilized productive capacity (Factors II and VI);[24] (3) none of Otsuka's

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[20] See pp. 40-42 and 45-50, below.

[21] 19 U.S.C. 1677(7)(F)(i).

[22] Factor I is irrelevant because there is no allegation of subsidies, and factors V and IX are irrelevant because LLSIs are not normally held in inventory and are not an agricultural product, respectively.

[23] There was [***]. (Staff Report at A-27, Table 1)

[24] Staff Report at A-29 - A-30. Otsuka [***].

other products is subject to an antidumping investigation or final order (Factor VIII); and (4) there is no basis for concluding "that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices", nor are there "other demonstrable adverse trends that indicate that importation . . . will be the cause of injury" (Factors IV and VII). I therefore conclude that imports of classical LLSIs from Japan pose no threat of future injury.

Material Injury by Reason of Dumped LLSIs

In concluding that the domestic industry producing classical LLSIs is not materially injured by reason of dumped imports, I have considered, as the statute directs, the volume of subject imports, the effects of these imports on the price of the like product, and the effects on the domestic industry producing the like product.[25] As is obvious from these statutory factors, and as I have stated so often in the past,[26] a coherent and

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[25] 19 U.S.C. 1677(7)(B).

[26] See, e.g., Certain Steel Pails from Mexico, Inv. No. 731-TA-435 (Final), USITC Pub. 2277, at 24-28 (May 1990) (Additional Views of Chairman Anne E. Brunsdale); Certain Residential Door Locks and Parts Thereof From Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253, at 33-36 (January 1990) (Additional Views of Chairman Anne E. Brunsdale); Certain Electrical Conductor Aluminum Redraw Rod from Venezuela, Inv. Nos. 701-TA-287 (Final) and 731-TA-378 (Final), USITC Pub. 2103, at 42-46 (August 1988) (Dissenting Views of Chairman Anne E. Brunsdale); and Color Picture Tubes from Canada, Japan, the Republic or Korea, and

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transparent analysis of the kind demanded by the statute requires an assessment of the domestic market and an understanding of the role of the subject imports within that market. Economics, which is the study of markets and how they change, is an ideal source of the tools necessary for making that assessment. Its time-tested methods for evaluating and organizing evidence of the sort accumulated by the Commission provide just the framework called for by the statute.

Application of the tools of economics involves little more than organizing and evaluating the evidence in the record in a manner that permits me to assess the impact of the dumped imports in a rigorous fashion. These tools are not surrogates for the statutory factors. Rather, they permit me to analyze in a direct fashion the volume effect, the price effect, and the overall impact of the dumped imports on the domestic industry as the law specifically and unambiguously requires.[27]

In order to place my analysis in the proper context, I have also considered the condition of the domestic industry producing LLSIs. I have scrutinized the data on the industry's capacity, shipments, production, capacity utilization, employment, productivity, and financial performance. I find the industry to

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[26](...continued)
Singapore, Inv. Nos. 731-TA-367-370 (Final), USITC Pub. 2046, at 23-32 (December 1987) (Additional Views of Vice Chairman Anne E. Brunsdale).

[27] Id.

be in reasonably strong condition and to have been improving during the period of investigation.[28] It is with this picture in mind that I assess the impact of the subject imports on the domestic industry.

The Minor Role of Japanese Imports. The role of Japanese imports in the domestic LLSI market is minimal. The DLS-700, the only LLSI model currently being produced by the Japanese producer Otsuka, was first sold in Japan in May 1985.[29] Since that date, only four of these machines have been sold in the United States.[30] The first sale occurred in late 1986, prior to the beginning of the period of investigation in this case. During the period of investigation, one DLS-700 was sold to Dr. Karasz

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[28] See Staff Report at A-18 - A-27. Because most of the information relating to the condition of the industry is confidential, I do not believe it would be useful to recount that information here. I note, however, that one must be cautious in drawing conclusions from some of the information--particularly the financial and research and development information--because it covers only one domestic producer. (Financial data were provided by an additional producer. However, because these data were for the overall operation of an establishment whose production of LLSIs accounted for less than [***] percent of total output, they are unlikely to provide reliable information on LLSI operations.)

[29] Letter to Wyatt Technologies Corp. from Union Giken Co. Ltd. dated October 28, 1985, reproduced as Exhibit 3 to the Petition in the case.

[30] Prehearing Brief on Behalf of Otsuka Electronics, Co. Ltd., Attachment 5 at 4.

of the University of Massachusetts in 1988; one was sold to a researcher at the University of Oklahoma in 1989; and [***].[31]

In contrast to the extremely limited number of U.S. sales of the subject imports, several dozen U.S.-made LLSIs were purchased annually in the U.S. during the period of the investigation.[32] LLSIs that are capable of classical measurement are produced by three domestic firms -- Wyatt Technologies, Brookhaven Instruments Corp, and LDC Analytical, Inc.[33] In addition, several times as many LLSIs as have been imported from the Japanese producer Otsuka have been imported from the United Kingdom by Malvern Instruments.[34] Finally, industry sources report that a German producer is preparing to enter the U.S. market.[35]

Thus, sales of LLSIs imported from Japan accounted for far less than 10 percent of U.S. consumption.[36] The tiny import

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[31] Staff Report at A-40.

[32] Id. at A-19, Table 1.

[33] Id. at A-15 - A-16.

[34] Id. at A-17 and A-19, Table 1.

[35] Staff Report at A-17.

[36] Id. at A-33, Table 11. On the basis of quantity, Japanese imports were only [***] percent of total U.S. consumption in 1988 and 1989 and [***] percent in the first half of 1990. On the basis of value, subject imports accounted for [***] percent of total U.S. apparent consumption in 1988, [***] percent in 1989, and [***] percent in the first half of 1990. Given that the value figures are based on the total price paid for an LLSI and any accessories purchased at the same time and the very small

(continued...)

penetration figures in this case preliminarily suggest that the domestic LLSI industry is not being materially injured by the dumped imports. As discussed below, the record of this investigation overwhelmingly supports this conclusion.

The Dumping Margin. The dumping margin computed by the Department of Commerce in this case is 129.71 percent.[37] A margin of this magnitude suggests that the dumping caused the price of the imported product to fall by a considerable amount and that, if the import was a reasonably good substitute for the domestic like product, the subject imports might well be totally eliminated from the U.S. market if offered only at a non-dumped price.[38]

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[36](...continued)
number of units involved, quantity data may be preferable to value data in this case. (See Transcript of Commission meeting, October 23, 1990, at 4-7.)

[37] Staff Report at A-15. I note that respondent chose not to participate in the Commerce Department's investigation and that therefore the margin is based only on information contained in the petition. (55 Fed. Reg. 34953 (August 27, 1990))

[38] In considering whether any Japanese LLSIs could have been sold in this country if they had not been dumped, it is important to note that dumping reduces the final consumer's price for a Japanese LLSI by less, on a percentage basis, than it reduces the ex factory price used to calculate the dumping margin. Additional equipment or accessories, which Commerce did not find to have been dumped, are often purchased along with an LLSI. Such accessories can include personal computers, cathode ray tube displays, refractometers, special lasers, and printers. (Staff Report at A-8 and A-43) Furthermore, even the purchase of the basic LLSI unit involves substantial domestic value added. Considerable amounts of pre- and post-sales service are included
(continued...)

If that occurred and all sales of subject imports were replaced by domestic LLSIs, sales of domestic producers would have increased by only [***] percent in 1989 and [***] percent in 1990.[39] Whether an impact of this magnitude would constitute

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[38](...continued)
in the purchase. For example, Wyatt testified that it provides software upgrades to its customers free of charge for at least a year. (Transcript at 62 (Testimony of Geofrey Wyatt).) Moreover, warranties are often included in the purchase price, as is training on the use of the equipment. (Staff Report at A-34 - A-35) As a result, the price paid by the ultimate consumer is considerably greater than the ex-factory price of the LLSI.

Some indication of the domestic value added can be obtained by comparing the unit values of imported products based on the data on U.S. apparent consumption, which represent the final purchase price of the whole package, with the unit values of U.S. imports for consumption. (See Id. at A-19, Table 1, and A-33, Table 10.) The proper adjustment is also discussed by respondent's economic expert. (See Prehearing Brief on Behalf of Otsuka Electronics Co., Ltd., Attachment 12 at 2.)

[39] In 1989, Otsuka's sales made up [***] percent of U.S. apparent consumption by quantity, while domestic producers' sales accounted for [***] percent of consumption. In the first half of 1990, Otsuka's sales amounted to [***] percent of U.S. apparent consumption, compared to the domestic industry's [***] percent of consumption. (Staff Report at A-33, Table 11)

It is unlikely that changes of this magnitude would have any significant affect on the price received by domestic producers since domestic producers' production of LLSIs appears able to expand significantly in response to a slight increase in price. Both staff of the Commission's Applied Economics Division and respondents place the elasticity of supply at 5 or above. (Memorandum to the Commission from the Applied Economics Division, Office of Investigations, entitled "Economic Memorandum Investigation No. 731-TA-455 (Final), Certain Laser Light-Scattering Instruments from Japan," October 19, 1990 (INV-N-121) at 5-8 ("Economics Memorandum"); Prehearing Brief on Behalf of Otsuka Electronics Co., Ltd., at 37-38) I agree that the available evidence suggests that the supply of domestic LLSIs is reasonably price elastic. However, I note that this conclusion relies, in part, on evidence of excess capacity and that the presence of substantial excess capacity is inconsistent with the claim that this is a high fixed-cost industry, since in such

(continued...)

material injury is questionable. However, the actual impact is considerably smaller than this--and clearly below the threshold of materiality--for a variety of reasons.

The Role of the Export Market. First, the statute directs the Commission to examine the effect of the dumping on the domestic industry in the context of production that occurs in this country. Since LLSIs produced for export constitute production occurring in this country, they must be considered in assessing the impact on the domestic industry.[40] However, dumping in the U.S. market has no effect on sales in any foreign country. As a

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[39](...continued)
industries it is generally profit-maximizing to cut price to maintain output so long as the price covers the incremental cost of producing an additional unit.

[40] The statute mandates that the Commission "evaluate all relevant factors which have a bearing on the state of the industry in the United States," including "actual and potential decline in output, sales, market share, [and] profits. . . ." (19 U.S.C. 1677(7)(C)(iii)) There is no indication that this examination is to be limited to domestic sales. Another provision of the statute directs the Commission to consider "the impact of imports . . . on domestic producers of like products, but only in the context of production operations in the United States." (19 U.S.C. 1677(7)(B)(i)(III) (emphasis added)) Again, there is no distinction between production for export and production for domestic consumption.

In previous cases, the Commission has examined export operations in assessing the condition of the domestic industry. (See, e.g., Calcined Bauxite Proppants from Australia, Inv. No. 731-TA-411 (Final), USITC Pub. 2172, at 7 (March 1989) (Commission cites "significant increases" in export sales as supporting its conclusion that domestic industry has not incurred material injury) and Digital Readout Systems and Subassemblies Thereof from Japan, Inv. No. 731-TA-390 (Final), USITC Pub. 2150, at 18 (January 1989) (Commission references domestic industry's increased export sales).

result, the dumped imports affect only that part of the domestic industry's production that is sold in this country.

In this case, more than [***] percent of the LLSIs produced by the three domestic firms during the period of investigation were exported from the U.S. For 1989 and the first half of 1990, more than [***] percent of sales were foreign sales.[41] Therefore, the impact of dumped LLSI imports on domestic producers is roughly half of that suggested by the figures on import penetration.

Substitutability. The impact of dumped imports on a domestic industry depends to a large degree on the substitutability between the import and the domestic like product. In this case, the evidence indicates that domestic LLSIs are only moderately substitutable for those produced by Otsuka. Therefore, some purchasers might still choose to purchase an Otsuka DLS-700 at the higher, non-dumped price. Alternatively, some purchasers might decide to forego the purchase of an LLSI if the price of the DLS-700 increased substantially.

The issue of substitutability was one of the most hotly disputed issues between the parties in this case. Petitioner argued that its product and that made by Otsuka are good substitutes because they perform the same basic function.[42]

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[41] Staff Report at A-21, Table 3.

[42] Prehearing Brief of Wyatt Technology at 5.

Respondent Otsuka did not dispute the basic similarity of the systems but focused, instead, on differences in the various systems which, it argued, make one machine better for some applications and another better for other tasks. It is these differences, more than price differences, that determine which instrument a given buyer will purchase, according to respondent.

The record in this investigation contains considerable evidence that there is only limited substitutability between the LLSIs produced by Otsuka and those produced domestically. In my view the most important evidence consists of the affidavits supplied by all of the U.S. purchasers of Japanese LLSIs. In these affidavits, each purchaser discusses why he chose the Japanese product and states that the capabilities of the particular LLSI to perform the research he was conducting, rather than price, were the most significant determinants in his purchase decision.[43] These affidavits speak to the substitutability between the DLS-700 and all of the other LLSIs, since these purchasers chose, either explicitly or implicitly, among all of the LLSIs available in the market.

I find this evidence persuasive in spite of petitioner's belated challenges to the factual accuracy of some statements

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[43] Prehearing Brief on Behalf of Otsuka Electronics, Inc., Attachments 1 through 4 and 7.

about differences among the various LLSIs.[44] As Geofrey Wyatt acknowledged at the hearing, it is customer perceptions concerning differences in the various machines that determine which will be purchased.[45] If actual and potential users believe that there are significant differences among the capabilities of different LLSIs, this will limit their willingness to change their purchase decisions in response to changes in price. This is true whether the perceived differences are based on actual technical capabilities of the equipment or not. Petitioner's rebuttal evidence may indicate that there is substantial confusion in the marketplace about what the instruments of different producers will do. It does not, however, establish a high degree of substitutability.

Several other pieces of evidence also support a general finding of limited substitutability among the LLSIs of different producers. First, in response to questions from my colleague Commissioner Rohr, both Dr. Philip Wyatt and Mr. Geofrey Wyatt

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[44] See, e.g., Posthearing Brief of Wyatt Laboratories, Attachment B. Since this information was submitted in a posthearing submission, respondents have not had an opportunity to rebut it. Furthermore, over my objections, the Commission accepted this material even though the length of the submission violated Commission rules. In my view, the Commission sets a dangerous precedent and draws into question our compliance with fundamental notions of due process when, as here, it chooses to permit parties to place unsolicited new information on critical issues in the record at the very end of the case without an opportunity for opposing parties or the staff to examine the evidence critically.

[45] Transcript at 53.

testified that they had never been told that a firm was going to purchase another firm's LLSI rather than a Wyatt because the price of the other product was lower.[46] Second, staff notes that LLSI producers differ in the extent to which accessories, or even equipment that must be purchased from other vendors, are needed to make their equipment perform both classical and dynamic measurement. If significant additional equipment is needed to perform certain tasks, potential users may fail to appreciate the full capabilities of the equipment and therefore may not consider it a good substitute for the more fully equipped model.[47]

Finally, buyers who need more than one LLSI tend to buy all the same brand because of the significant costs of learning to use any LLSI.[48] As a result, the various LLSIs are less substitutable for repeat purchasers than for first-time buyers. This is significant because multiple sales account for a substantial share of LLSI sales--approximately one-third of sales by two domestic manufacturers for whom data are available.[49]

In addition to the evidence of limited substitutability among Japanese and domestic LLSIs in general, there is additional evidence dealing specifically with the limited substitutability

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[46] Transcript at 66 (Testimony of Dr. Philip Wyatt) and 67 (Testimony of Geofrey Wyatt).

[47] Economics Memorandum at 11.

[48] Prehearing Brief Submitted on Behalf of Otsuka Electronics Co., Ltd., at 35.

[49] See Staff Report at A-37, Table 12, and A-39, Table 13.

between the Otsuka and Wyatt LLSIs. Reports by two experts commissioned by respondents point out various differences between the two firms' products that make one or the other preferable for specific tasks.[50] Most purchasers of petitioner's LLSI also purchase software designed for use in GPC analysis.[51] A survey of purchasers of Wyatt's LLSI found that the vast majority of those surveyed stated that they had purchased their LLSIs primarily for use with GPC equipment.[52] The DLS-700 cannot be used with GPC equipment. In contrast, only [***] of petitioner's machines were sold with the equipment necessary to permit dynamic measurements.[53] The Otsuka instruments can do dynamic measurements without the purchase of additional equipment.

While comparisons of Wyatt's and Otsuka's instruments certainly demonstrate that the LLSIs produced by these two firms are not highly substitutable, they do not provide direct evidence about the substitutability between the DLS-700 and the LLSIs of the other domestic producers. The Brookhaven product is probably

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[50] See Guy C. Berry, "A Comparison of two Light Scattering Photometers" and Julius G. Vancso, "A Comparative Analysis of Features and Applications of the Wyatt DAWN and Otsuka DLS-700 Laser Light Scattering Instruments," Attachments 13 and 14 to the Prehearing Brief on Behalf of Otsuka Electronics, Inc. It should be noted that while Professor Vancso had used both instruments being compared, Professor Berry had not. (Berry at 5, Vancso at 2 and 5.)

[51] Prehearing Brief Submitted on Behalf of Otsuka Electronics, Co., Ltd., at 28-29, Staff Report at A-37, Table 12.

[52] Economics Memorandum at 13.

[53] Staff Report at A-71.

more substitutable for the DLS-700 than are the Wyatt DAWN instruments because Brookhaven utilizes the same basic design as Otsuka--a single detector that is rotated around the sample by the use of stepper motor.[54] On the other hand, the Wyatt LLSIs are better substitutes for the DLS-700 than the low-angle LLSIs produced by LDC Analytic, which cannot be used to determine molecular size.[55]

Based on all of the evidence, I believe that the LLSIs produced by the Japanese firm Otsuka are only moderately substitutable for those produced by domestic firms.[56]

Increased Sales of Fair Imports. Finally, it is unlikely that all purchasers that bought the subject imports would have purchased domestic LLSIs if they chose not to buy the Japanese product at a non-dumped price. Some likely would have chosen

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[54] Posthearing Brief of Wyatt Technology Corp., Exhibit 3. See also Prehearing Brief on Behalf of Otsuka Electronics Co., Ltd., Attachment 4, at 3.

[55] Id.

[56] Staff of the Commission's Applied Economics Division places the elasticity of substitution between imported and domestic LLSIs in the range of 2 to 4. (Economics Memorandum at 10) However, staff does not appear to place as much significance on the statements of purchasers of the Otsuka product and on the importance of repeat purchases as I do. Therefore, I conclude that this elasticity probably lies in the lower end of this range --in the range of 2 to 3. This value is similar to respondent's recommendation of 2.5 based on an elasticity of substitution in the range of 2 to 4 for first time purchasers and of less than 1 for repeat purchasers. (Prehearing Brief on Behalf of Otsuka Electronics Co., Ltd., at 35-36.)

another imported product. Malvern Instruments currently imports an LLSI from Great Britain that is not subject to investigation. This LLSI is a multi-angle machine capable of doing both classical and dynamic measurements. Further, it uses the same basic technology as the Otsuka product--a single detector that is rotated around the sample.[57] Thus, it is likely to be a better substitute for the Otsuka product than either the products of Wyatt Technology or LDC Analytic.

Conclusion: There Is No Material Injury. I find that the domestic industry producing laser light-scattering instruments capable of performing classical measurements has not suffered material injury as a result of dumped imports from Japan. Imports of subject imports have been very low throughout the period of investigation. Even if the elimination of dumping would result in domestic LLSIs replacing all purchases of the subject imports, it is not clear that the resulting effect on the domestic industry would be material. Further, the importance of the export market to domestic producers, the limited substitutability of the Otsuka and domestic LLSIs, and the presence of other imported products all reduce the impact of the

[57] Prehearing Brief on Behalf of Otsuka Electronics, Co., Ltd., Attachment 6, Exhibit C.

dumped imports to a level that is well below the threshold of materiality.[58]

As discussed above, I also find that the domestic industry is not threatened with future injury. I therefore find in the negative in this case.

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[58] Another factor that could reduce the impact of the dumping is a high elasticity of demand for LLSIs as a whole. If demand was elastic, some of the sales of the dumped imports would likely be sales that would not be made in the absence of the dumping. However, on the basis of the record in this case, I conclude that the demand for LLSIs is not very elastic. While there are other instruments that measure molecular size and weight, none of these measures molecules of the size measured by an LLSI with the precision needed by purchasers of LLSIs. (Economic Memorandum at 15-17, Staff Report at A-12 - A-13) In terms of numeric value, staff of the Commission's Applied Economics Division places the elasticity of aggregate demand at 0.5 or below.

At the hearing and in its prehearing submissions, respondent's counsel argued that the elasticity of demand is somewhat greater--i.e., in the range of 0.75 to 1.5. This was based on the argument that there are a variety of other instruments that can substitute for an LLSI and that therefore the demand for LLSIs is somewhat elastic. (See Prehearing Brief on Behalf of Otsuka Electronics Co., Ltd., at 17 and 36-37 and Transcript at 95 (Testimony of Mr. Kruth).) However, in its posthearing brief respondent states that the various instruments differ in the way they measure size and weight, in the size of particles they are used to measure, and whether they can measure particles in solution. As in the choice among LLSIs, scientists tend to pick that instrument that best meets their needs. (Posthearing Brief on Behalf of Otsuka Electronics Co., Ltd., at 12-14) Thus, I conclude that the demand for LLSIs is relatively inelastic and that staff's estimate of the value is reasonable.

Dissenting Views of Commissioner Seeley G. Lodwick

Inv. No. 731-TA-455 (Final)
Certain Laser Light Scattering Instruments and Parts Thereof from Japan

I find that there is no material injury or threat of material injury to a domestic industry by reason of less than fair value (LTFV) imports of certain laser light scattering instruments ("LLSIs") from Japan. [1]

I. Like Product, Domestic Industry, and Condition of the Domestic Industry.

I concur with the views of Commissioners Rohr and Newquist regarding like product, domestic industry and the condition of the domestic industry. [2] I do not consider the domestic industry to be especially vulnerable to future material injury for reasons set forth in this opinion.

II. No Threat of Material Injury by Reason of the Subject Imports.

In assessing the threat of material injury, the Commission considers a number of factors that provide insight as to the likelihood that unfairly traded imports will be a cause of material injury to a domestic industry in

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[1] Material retardation is not an issue in this case.

[2] I join the discussion concerning the condition of the industry through the conclusion in the third paragraph of that section.

the near future. The threat must be real and actual injury imminent, or "on the point of happening." [3] The Commission's "determination may not be made on the basis of mere conjecture or supposition." [4]

The statute does not suggest that the fundamental analysis of whether unfairly traded imports will be the cause of future material injury is any different than the analysis of whether LTFV imports are a cause of present material injury. The difference is that the time horizon shifts from the present to the near future and the record is expanded to take into account conditions that lend basis to an analysis of the probability of future injury by reason of the unfairly traded imports. The directions to avoid "mere conjecture and speculation" and that there must be an "imminent danger" of actual injury, require a thorough analysis of the probability, not possibility, of increased levels of LTFV imports to the point of being the cause of material injury.

To analyze whether a threat of material injury exists, I organize my analysis here around three questions. These questions are a) whether there is a potential for significantly increased sales of the LTFV imports to the U.S. market, b) whether there is a probability that there will be significantly increased levels of LTFV imports in the U.S. market, and c) if there is the probability of such increased imports, whether such increased levels of LTFV imports will be the cause of material injury. The nine statutory factors are discussed here in the context of these three questions.[5]

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[3] Black's Law Dictionary, Fifth Edition.

[4] Id.

[5] The statute requires a consideration of the following factors:

(continued...)

A. Whether there is a potential for significantly increased sales of LTFV imports to the U.S. market.

The record suggests that imports can be increased in substantial quantities from Japan. There is both significant unused capacity [6] and there

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[5](...continued)

(1) information as to the nature of the subsidies, particularly whether they are export subsidies;

(2) the ability and likelihood of the foreign producers to increase the level of exports to the United States due to increased capacity or unused capacity;

(3) any rapid increase in penetration of the domestic market by imports, and the probability that the penetration will increase to injurious levels;

(4) the likelihood that imports will enter this country at prices that will have a depressing or suppressing effect on domestic prices of the merchandise;

(5) any substantial rise in inventories of the merchandise in the United States;

(6) underutilized capacity for producing the merchandise in the exporting country.

(7) "any other demonstrable trends" that indicate that unfairly traded imports will be the cause of actual injury;

(8) the potential, if any, for product-shifting to the products under investigation from other products subject to a separate antidumping or countervailing duty investigation or final order; and

(9) actual and potential negative effects on the existing development and production efforts of the domestic industry and production efforts of the domestic industry, including efforts to develop derivatives or more advanced versions of the like product.

19 U.S.C. 1677 (7) (F) (i).

I have grouped the above listed factors in my analysis pertaining to the three questions presented as follows:

Question 1: "whether there is a potential for significantly increased sales of LTFV imports to the U.S. market" includes discussion of factors numbered (2), (5), (6) and (8).

Question 2: "whether a likelihood or probability exists that there will be significantly increased levels of LTFV imports in the U.S. market" includes discussion of factors numbered (1), (3), and (7), as well as additional discussion of (2).

Question 3: "whether such increased levels of LTFV imports will be the cause of material injury" includes discussion of factors numbered (4) and (9).

[6] Report at Table 9.

is the potential to increase capacity in response to favorable market conditions. [7] In addition, since the U.S. market represents a small share of Otsuka's production, there would be little difficulty to divert shipments from the home or other export markets to the United States. [8] [9] Thus, I do find there is the potential to significantly increase subject imports to the United States within a short time frame.

B. Whether a likelihood or probability exists that there will be significantly increased levels of LTFV imports in the U.S. market.

Next we turn to whether there is a probability of increased subject imports to significant levels. Here we analyze whether there is linkage between the current subject market share and whether there is a basis on the record to predict with confidence significantly increased subject market share.

I note that subsidies particularly export subsidies, are not an issue. I also do not consider there has been a rapid increase in imports from either an absolute or relative standpoint. [10] There is thus no momentum to increased imports based upon these two factors.

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[7] See Office of Investigations Memorandum INV-N-121 at 8. Since LLSI production is primarily an assembly operation, no special equipment is necessary for production. Workers can be trained in a short time period and easily transferred from other assembly operations.

[8] Id.

[9] I note that there is not a potential for product shifting to the products under investigation from products currently subject to a separate anti-dumping or countervailing duty order. I also note that there are not any significant quantities of inventories of the subject imports in Japan (Report at Table 9) or currently existing in the United States. Report at A-29. If any of these conditions existed, it would have increased the potential to increase imports to the United States.

[10] Memo INV-N-121 at 5.

I recognize that given the small quantity of sales each year, it would not take a very large quantity of imports to reach what may be considered a significant level. There is no basis in the record to predict that the U.S. market will become more profitable to Otsuka than its home market (especially given the magnitude of price based dumping margins alleged by the petitioner [11]) or based upon the relative attractiveness of other export markets.

Further, I recognize that the respondents do have a distributor in the United States, Polymer Laboratories. [12] However, this relationship in itself does not enable one to predict significantly increased imports. Often, companies represent foreign products and have little or no success or emphasis in a given product line. The petitioner has failed to demonstrate any linkage in this regard other than the foreign product does have an importing and distribution source in this country. There is no evidence that Polymer has invested substantially in the sales of these particular import products.

Over the past two years, the respondent, Otsuka, has made two acquisitions giving it manufacturing capabilities in the United States, one in Pennsylvania and the other in Colorado. [13] There is some question as to whether and when the facilities may be ready for production of the like product and to what extent the factory will need to import parts subject to the investigation. To the extent that the production comes on line in a short time frame and to the extent that such production does not need to source parts from Japan, it reduces the likelihood that the dollar values of imports would increase to injurious levels.

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[11] Report at A-15.

[12] Memo INV-N-121 at 15.

[13] Report at A-31.

While it is difficult to resolve these time frame issues with certainty, there is a basis to conclude that Otsuka is developing the capacity in the United States in terms of facilities, research and assembly to produce the like product here. [14] Although there may be some question as to the timing and assurances of U.S. assembly operations that will actually replace the source of subject imports, it would be speculative to predict that Otsuka will choose to expand such operations in Japan and not the operations in the United States, should market conditions change creating a surge in Otsuka's share. To the extent parts only need to be sourced in Japan, representing a significantly lesser value per device than assembled imports, this occurrence would require the capability to predict an even greater surge in the demand in the U.S. for Otsuka's products to warrant an affirmative threat finding.

For these reasons, I do not believe the record supports the conclusion that there is a basis to predict increased imports to significant levels.

C. Whether such increased levels of LTFV imports will be the cause of material injury. [15]

In regards to causation of future material injury, one may first assess the impact of the subject imports in the present tense as a foundation from which to determine whether predicted future imports will cause material

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[14] Id.

[15] While the preceding analysis precludes an affirmative threat finding based upon insufficient evidence of a probability of significantly increased import levels, it is necessary to complete the analysis of all statutory factors, lending a judgment of the potential impact of possibly increased levels of LTFV imports on prices and the performance related indicators of the domestic industry.

injury. I turn to the questions of 1) price suppression [16] and 2) the LTFV imports' effects on the domestic industry by reason of the LTFV imports in both the present and future contexts.

1. Future price suppression. [17] In previous opinions, I have outlined basic market characteristics that would support a case of the existence of price suppression. [18] In this case, there is very weak evidence of price suppression at present due to the small import penetration levels [19], less than tight domestic supply of the domestic like product [20], and evidence supporting the conclusion that the imports and the like product are not close substitutes [21]. I therefore do not believe an argument could be made for

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[16] I note that based upon list prices of the domestic producer, prices have increased throughout the period. Therefore, my analysis concerns the question of price suppression, not price depression. Report at A-36.

[17] I note the difficulty in collecting any meaningful underselling data which one may have been able to use to help ascertain any significant price effects. Report at A-41.

[18] See my views in New Steel Rails from Canada, Inv. No. 731-TA-422 (Final), USITC Pub. No. 2217 at 235. Among the economic factors which determine whether price suppression may exist are the subject import penetration levels, the excess capacity of the domestic industry, and the substitutability of the subject imports for the like product.

[19] Report at Table 11.

[20] The record supports the finding that domestic supply is not tight because the domestic industry can easily respond to price increases because of the ease of increasing capacity utilization or of expanding capacity, the ability to assemble other products, and the ability to divert shipments from other markets. See Memo INV-N-121 at 7.

[21] The degree of substitutability in this industry depends upon product differentiation between domestic and imported products, and upon the extent domestic and imported products are sold to different markets and for different uses.

One factor which differentiates these products is how many options and features are included in the base system. The Japanese LLSI comes equipped to make both classical and dynamic measurements. Only two domestic LLSIs,

(continued...)

future price suppression, unless one was able to predict significantly increased import penetration levels.

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[21](...continued)
Wyatt's and Brookhaven's, can make dynamic measurement; however, these LLSIs are equipped only to make classical measurement. This factor helps differentiate the foreign and domestic machines, for although some of the domestic LLSIs can be modified to make dynamic measurements, the domestic machines are clearly marketed for classical measurement. In fact, none of Wyatt's devices sold were equipped to do dynamic measurement. Report at A-41.

While I agree that all of the LLSIs that make classical measurements are near perfect substitutes when making these measurements in batch mode, their versatility in performing other functions, whether related or unrelated to classical measurement, significantly reduces the overall substitutability between domestic and Japanese LLSIs. In addition, the versatility of these machines in performing these other functions has an important impact on marketing and purchasing decisions.

Although the different types of LLSIs perform many of the same functions, whether fixed array, goniometer, or low angle, each has certain advantages and disadvantages in how their usage compares to the other LLSIs. For example, both Wyatt's and LDC's machines are used in gel permeation chromatography (GPC), an application that neither the Japanese or Brookhaven's LLSIs are capable of performing. In another example, the primary reason the Japanese instrument, a goniometer LLSI, was purchased in one instance over the Wyatt fixed array system was because of its superior ability to block fluorescence and its superior depolarization filter.

In addition, the buyers in this particular market have very technical requirements for the use of a LLSI. Because buyers are generally aware of the types of LLSIs available, the method of detection used, and the applications of each LLSI, they will purchase a LLSI that meets their particular needs.

For example, the record suggests that GPC is an important feature for many purchasers. Both Wyatt's and LDC's machines are used extensively in GPC, an application that the Japanese LLSI is incapable of performing. In fact, 18 of Wyatt's customers contacted by the Commission stated they specifically purchased the Wyatt system for GPC technology. Report at A-44. LDC's instrument apparently is used primarily in GPC applications as is evidenced by the number of GPC options purchased by LDC's customers. Report at Table 13. This greatly reduces substitutability between the imports and domestic product. This in turn, reduces the likelihood that increased imports will result in significantly lost sales by reason of LTFV imports that will harm the domestic industry in the near future.

For a thorough discussion of these issues, see discussion in Memo INV-N-121 beginning at 10 and discussion in Report beginning at A-44.

2. Present and Future Effects on the Domestic Industry. The very small import penetration levels also suggest that at present the LTFV imports are not significantly affecting the output of the domestic industry. I do not think there is a basis to predict increased importation levels to the point where any of the output related indicators, such as employment, production, shipments, or capacity utilization would show signs of injury by reason of the LTFV imports. [22]

Finally we turn to the question of whether future subject imports may impede the efforts of the domestic industry to develop derivatives of the like product. This question is relevant to this case because of the technical nature of the product in terms of both characteristics and uses [23], the significant research and development expenses of the domestic industry [24], and that a relatively small number of sales are made each year [25], thus suggesting that a relatively small number of lost sales due to LTFV imports may have a significant affect on the capability to make future R&D expenditures.

Although the like product is continually being improved with computer technology and upgrades to existing software, and being modified for specific industry applications, there is no evidence of potential major break throughs

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[22] I note the generally improving condition of the domestic industry, especially the improvements in net sales, profits, and cash flows (Report at A-23), production (Report at Table 3), and wages (A-22). I note the employment losses (id.), however this was the result of productivity gains as evidenced by increasing output. The performance period marked an improved condition of the domestic industry and thus the industry is not especially vulnerable to future material injury.

[23] Report at A-2 to A-12.

[24] The record supports the finding that R&D for the petitioner represents a significant portion of its budget and as a percentage of net sales. Report at A-23 and A-26.

[25] Report at Table 3.

towards derivatives of the like product that are at risk of being prevented due to potential poor financial performance of the domestic industry. [26]

Industries finance research and development either internally through cash flows or through external sources of finance. The improving condition of the domestic industry makes it easier to finance R&D from either source. There is no basis on the record to predict a surge in subject import market share which may cause insufficient cash flow to finance R&D for the domestic industry in the near future. [27] This is buttressed by the fact that the international market for the like product is increasing, which should bode well for the development of domestic cash flows for all producers. [28]

Due to the maturity of the core technologies involved and the continuing improved capability of the domestic industry to make research investments and

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[26] Light scattering instruments have been available since the 1950's. The laser technology enables better and easier focussing. The use of computers saves several hours worth of time for simple measurements because of the ability to avoid all of the calculations by hand. Such software implementation has been applied to many processing and manufacturing related products and does not in itself represent a unique technology. Memo INV-N-121 at 16.

[27] Internal cash flows are generated through new sales and through service contracts to upgrade software, although the petitioner states they do not collect substantial money from service contracts because they have been "somewhat informal" in terms of collecting for improvements. Along with increasing sales and prices, this is another source of future cash flows. Transcript of the Hearing at 63. I especially note the cash flow position of Wyatt Technology Corp. Report at Table 7.

[28] The record suggests that both total and especially exports sale values are significantly increasing. Report at A-20.

The petitioner has recognized that further markets are developing for the like product for applications such as cancer treatment techniques, AIDS customer therapy and water quality monitoring techniques. Tr. at 24. As more companies recognize the potential applications of these devices, demand should increase. These new product variations do not appear to dramatically change the basic functions of the product, but will serve specific application markets and thus increase demand for the like product.

no reason to predict that in the imminent future these conditions will change, I do not believe that development efforts of the domestic industry are threatened by potentially increased subject imports.

Therefore, while there is the possibility of significantly increased levels of subject imports, I do not believe the record supports a finding of a probability of significantly increased imports that will be the cause of material injury in the near future.

In conclusion, based on the record, I find that there is no material injury or threat of material injury to a domestic industry by reason of less than fair value imports of certain laser light scattering instruments from Japan.

INFORMATION OBTAINED IN THE INVESTIGATION

Introduction

Following a preliminary determination by the U.S. Department of Commerce (Commerce) that imports from Japan of certain laser light-scattering instruments (LLSIs) and parts thereof[1] are being, or are likely to be, sold in the United States at less than fair value (LTFV), the U.S. International Trade Commission (Commission), effective July 6, 1990, instituted investigation No. 731-TA-455 (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 of the 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 July 25, 1990 (55 FR 30284).[2] The hearing was held in Washington, DC, on September 25, 1990.[3]

In its final determination, published in the Federal Register of August 27, 1990 (55 FR 34952), Commerce determined that imports of certain LLSIs and parts thereof from Japan are being, or are likely to be, sold in the United

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[1] The products covered by this investigation are light-scattering instruments, and the parts thereof specified below, from Japan that have classical measurement capabilities, whether or not also capable of dynamic measurements. The subject products employ laser light and may use either a single-angle or multi-angle measurement technique. The following parts are included in the scope of the investigation when they are dedicated for use only in a LLSI: Scanning photomultiplier assemblies, immersion baths, sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discriminator circuitry, and optical benches. LLSIs may be sold inclusive or exclusive of such accessories as personal computers, cathode ray tube displays, software, and printers. LLSIs are used primarily for characterization of macromolecules and submicrons in solution.

LLSIs are provided for in subheading 9027.30.40 of the Harmonized Tariff Schedule of the United States (HTS) (previously in item 712.49 of the former Tariff Schedules of the United States), a provision for electrical spectrometers, spectrophotometers, and spectrographs using optical radiations. Parts of LLSIs are provided for in HTS subheading 9027.90.40, covering parts and accessories of electrical instruments and apparatus. For further details on the scope of this investigation refer to Commerce's Federal Register notice in Appendix B.

[2] Copies of the Commission's Federal Register notices concerning the investigation are presented in app. A.

[3] A list of witnesses appearing at the hearing is also included in app. A.

States at a LTFV margin of 129.71 percent.[4] The Commission to voted on this investigation on Tuesday, October 23, 1990.

Background

On March 19, 1990, a petition was filed with the Commission and Commerce by Wyatt Technology Corp., Santa Barbara, CA, alleging that an industry in the United States is being materially injured, and is threatened with further material injury, by reason of imports from Japan of certain LLSIs and parts thereof that were alleged to be sold in the United States at LTFV. Accordingly, effective March 19, 1990, the Commission instituted antidumping investigation No. 731-TA-455 (Preliminary), under section 733(a) of the Tariff Act of 1930. On April 30, 1990, the Commission determined in that investigation that there is a reasonable indication that an industry in the United States is threatened with material injury by reason of such imports. This determination was published in the Federal Register of May 16, 1990 (55 FR 20315).

The Commission has not conducted a previous investigation on the subject products.

The Products

Description and uses

The imported products subject to the investigation are LLSIs and parts thereof that have classical measurement capabilities (basically molecular weight), whether or not also capable of dynamic measurements (basically molecular size).[5] LLSIs are used primarily for the characterization of macromolecules and submicron particles in solution.[6] To make these characterizations, LLSIs direct a very fine, focused beam of laser light at a solution containing the particles of interest.[7] Light passing through the sample, at one or multiple locations,

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[4] A copy of Commerce's notice of its final determination is presented in app. B.

[5] Petition, p. 5; see description presented later in this section.

[6] The terms macromolecule, giant macromolecule, and polymer are often used to designate high-molecular-weight materials of either synthetic or natural origin that are important components of such materials as plastics, rubbers, fibers, latexes, and other natural and man-made substances. Macromolecules and polymers are complex molecules formed from a number of simpler molecules of the same or different sorts. Smaller molecules or submicron particles are made up of smaller, less complex molecules.

[7] The lasers used with light-scattering instruments are light sources capable of producing a single frequency of light at high intensity in the optical region. This is important for light-scattering measurements since they involve the

(continued...)

is scattered after the beam strikes the dissolved or suspended particles. The instrument then detects how much light is scattered at different angles. By making light-scattering measurements from different angles and at different concentrations of the same sample, certain physical properties of the particles can be determined.[8] On the basis of these properties, researchers can determine the weight (mass) of the particles, their size, and/or how they interact with their solvent or solution.[9] LLSIs are used by a variety of industries--including, but not limited to, the chemical, petrochemical, pharmaceutical, and biotechnological industries--for new product development, research and development, quality assurance, and quality control.

There are two types of LLSIs with classical measurement capabilities: single-angle and multi-angle. These two types of instruments, along with dynamic LLSIs (not within the scope of the investigation unless also capable of classical measurements), are discussed below. Within each type, there are various models of domestically produced and imported instruments. Moreover, classical and dynamic LLSIs are sometimes combined into a single apparatus to provide versatility and produce additional information on absolute weight and size characteristics of particles. For further discussion of differing features of the various models refer to the section of this report entitled "Price comparisons of instruments, software, and options."

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[7] (...continued)
measurement of light at a single wavelength. Prior to the commercialization of lasers, light-scattering utilized mercury lamps that produced a spectrum, or number of different wavelengths, in their discharge. Such light sources were difficult to use and required filtering undesired wavelengths to perform light-scattering measurements. Because they are monochromatic (produce light at a single wavelength), lasers are easier to use in such measurements. Most LLSIs incorporate a helium-neon laser, which produces a red light (a particular wavelength). However, other lasers are also used. One more expensive variation sometimes incorporated in LLSIs is the argon-ion laser, which produces green or blue light as an alternate wavelength, depending on the application or precision required by the users. Other lasers could also theoretically be used with light-scattering instruments.

[8] Two principal characteristics that are obtained from such measurements are the intensity, or strength or amount of radiation, and the "spectral character," or spectrum of scattered light.

[9] This information is provided by the absolute molecular weight, the root-mean square radius, and the second virial coefficient. Molecular weight is the sum of the atomic weights of all of the atoms in a molecule, macromolecule, or other particle; the root-mean square radius, or radius of gyration, is the second movement of the size expansion of any molecule or particle and is usually used to measure the size of polymers or other particles; and the second virial coefficient provides information that permits analysis of solvent/solution interaction. The latter is a chemical term that comes from a type of chemical thermodynamics and represents a measure of the interaction of a molecule with the solvent in which it has been dissolved.

Classical laser light-scattering instruments.--Classical LLSIs can be either single (low-angle) or multi-angle instruments. Classical LLSIs use the variation of total light-scattering intensity as a function of angle to make their weight measurements.[10] Single, low-angle LLSIs utilize detectors set at one, low angle to measure scattered light from a sample. In multi-angle instruments, one detector that moves around the sample cell, or an array of detectors spaced around the sample cell, collects the scattered light at multiple scattering angles. In some classical multi-angle instruments, a single detector is moved around the sample by a manually controlled device, known as a stepper motor, to collect scattered light sequentially over many angles at many different locations (fig. 1). This instrument is sometimes referred to as a goniometer. In other instruments, rather than scanning the sample with a moving detector, a fixed detector array instrument is used which employs a number of discrete detectors placed at various locations around the sample (fig. 2). The detector array functions similarly to the single, moveable detector in that it also collects scattered light sequentially over many angles.

Measurements obtained by using classical multi-angle LLSIs are usually analyzed using a Zimm plot, or another calibration technique, which provides (1) absolute (weight-average) molecular weight, (2) the root-mean square radius, or

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[10] Size can also be determined by classical multi-angle light-scattering (but not by single, low-angle light scattering). Because light is a wave phenomenon, as macromolecules or other particles become larger, different parts of them become excited by different parts of the light wave striking them. This causes them to rescatter the light from different physical locations on the particle. By the time the scattered light recombines at the detector, the different contributions may be out of phase in that they may cancel in certain directions, or add together in other directions. The result is a variation of light as a function of angle. That variation depends solely on the size of the molecule or particle. For micromolecules, the molecule is so small that the different parts do not contribute enough to make a difference in angle, and the variation with angle is too small to measure. The scattering in all directions is the same (Rayleigh scattering). But as the molecule, or particle of interest, gets larger (macromolecules, polymers) and interacts with different parts of the wave incident on it, interference occurs. This interference provides a variation of the intensity of light with angle and that variation, therefore, is directly correlated with the size of the molecules whose molecular weight has already been determined. The LLSIs under study in this investigation are primarily used to measure macromolecules. Based on testimony by Philip J. Wyatt, Ph.D., and Frank E. Karasz, Ph.D., during the Commission's conference on Apr. 11, 1990, and on information provided to staff in telephone conversations with C.C. Han, Ph.D., and R.F. Chang, Ph.D., of the National Institute of Standards and Technology during the week of Apr. 2-6, 1990.

Figure 1
Multi-angle laser light-scattering instrument - scanning type

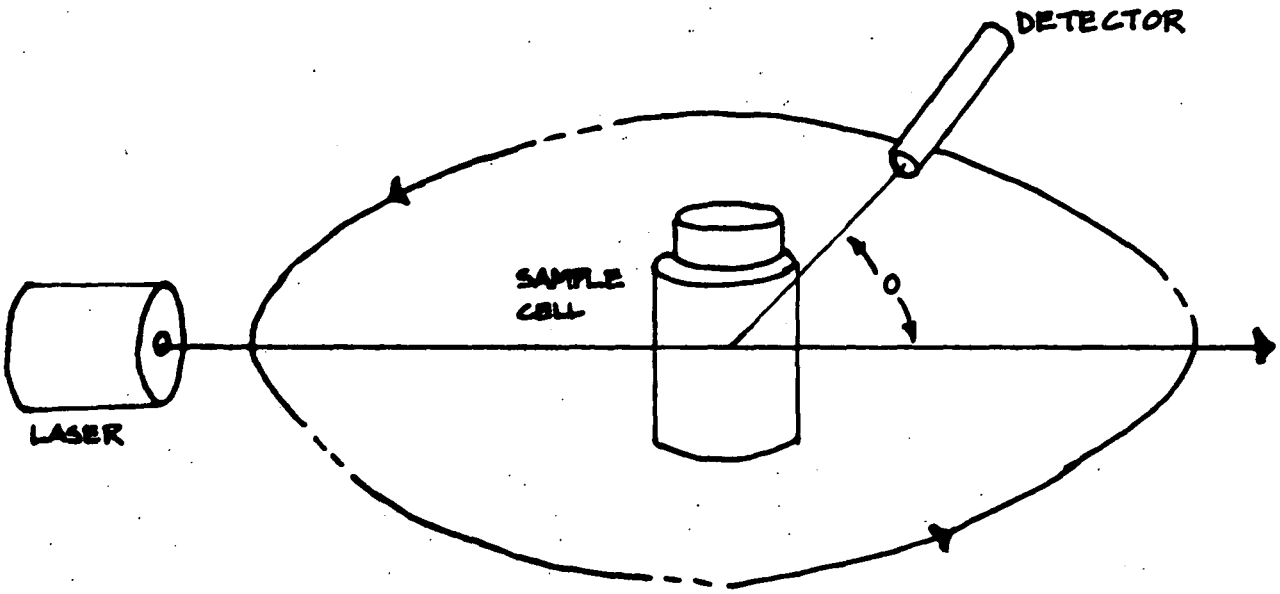
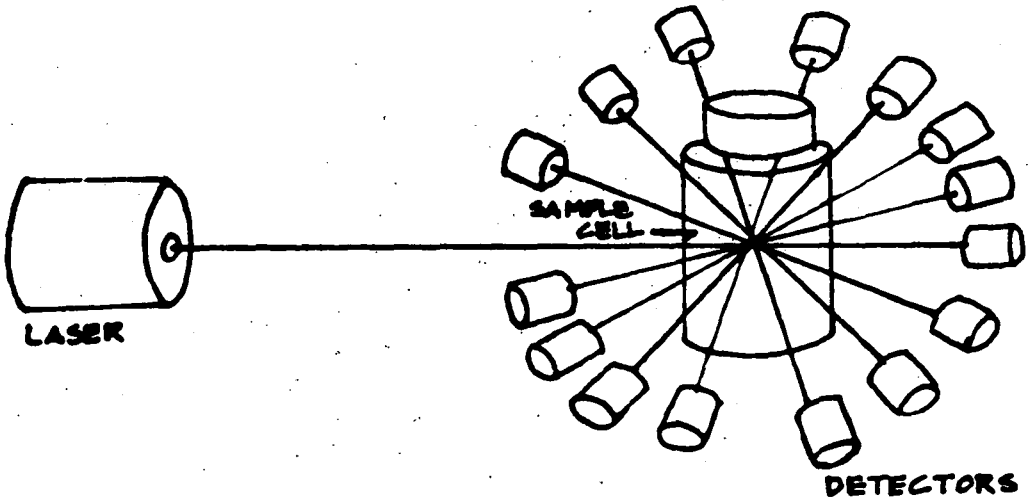


Figure 2
Multi-angle laser light-scattering instrument - fixed array type



Source: Wyatt Technology Corp.

average radius of gyration, and (3) the second virial coefficient.[11] Multi-angle laser light-scattering is purported to be the only absolute method of making such measurements without reference to standards over a broad range of molecules of various shapes, sizes, and weights.[12] The single, low-angle LLSI is similar to the classical multi-angle LLSI above except that it is used to determine molecular weight only. It cannot be used by itself to determine the size of a macromolecule or other particle since it is not capable of providing information on the root-mean square radius or the average radius of gyration of a particle.

Dynamic laser light-scattering instruments.--A dynamic LLSI uses the variation of light-scattering intensity as a function of time as the basis of its measurements.[13] One or more detectors (if only one detector is used, it is normally set at 90°) is used to collect scattered light.[14] A distinguishing

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[11] The Zimm technique is a mathematical algorithm for extracting this information from the measurements. There are other means of processing such data, but whatever the method used, in order to obtain such information in an absolute sense, one must have the absolute amount of light scattered at different angles, and the means to measure the variation with the angle of the scattered light. Extraction from such data is not difficult. The important thing is making the measurements that will serve as the basis for extracting the absolute molecular weight and size. This can only be done by light scattering. Based on testimony by Drs. Philip J. Wyatt and Frank E. Karasz at USITC conference on Apr. 11, 1990.

[12] Based on testimony at USITC conference on Apr. 11, 1990, and on interviews by USITC staff with industry officials during Apr. 2-6, 1990.

[13] These measurements are made possible by the instrument's capability of detecting shifts in the motion of molecules due to differences between frequencies in scattered light and the incident light beam generated by the laser. This shift, known as the Doppler shift, is similar to the phenomenon of the change in the sound of the whistle of a train as it approaches, then moves away from, a subject. A similar effect occurs with light. Because of molecular motion, some of the light scattered by solutions or dispersions of various substances from the incident light is shifted in frequency, and therefore wavelength (inelastic light scattering). Thus, the light scattered and the incident laser light are different in frequency and wavelength from one another. By measuring this Doppler shift, the motion of the particles can be determined. Further, if one knows the temperature of the solution in which the particle is contained, the viscosity of the liquid can be determined. Because large objects, or particles, move more slowly through a liquid than smaller ones, knowledge of the viscosity of a solution, and the velocity of the particles moving through the solution, can be used to determine the size of the particles in question. Thus, dynamic laser light scattering is a means for deriving the size of particles by the measurement of inelastic light scattering. Based on testimony by Dr. Philip J. Wyatt at USITC conference on Apr. 11, 1990.

[14] In exhibit B of the postconference brief on behalf of Otsuka Electronics Co., Ltd., Dr. Frank Karasz states that "While it is technically correct that

(continued...)

feature of dynamic LLSIs is that they contain autocorrelators. In general, autocorrelators determine particle size, size distributions, and shape from measurements of the fluctuations in light-scattering intensity caused by the relative motion of the particles. To obtain this information, a photomultiplier tube counts photons, or units of light. Dynamic LLSIs, sometimes referred to as quasi-elastic light-scattering instruments, do not determine absolute molecular weight.

LLSI systems.--Some LLSI systems are modular systems consisting of various assemblies spread out over an optical bench in what is known as an open architecture. Other LLSIs are contained in a box or in a cabinet that prevents ambient light from entering. Such self-contained instruments can be operated in a room with the lights on and where other people are working.[15] Self-contained units may incorporate both classical and dynamic elements as a built-in feature of their componentry, or may have modular designs that permit the attachment of an autocorrelator to a classical instrument to allow for dynamic capabilities.

Although various LLSIs generally operate on the basis of the same principles and have many of the same applications, their physical makeup and componentry may differ. For example, LLSIs utilizing a fixed-detector array for detecting the scattered light do not require the stepper-motor required in the goniometers. The goniometer also usually requires other moving parts not needed in the fixed-array instrument. Also, some instruments use very sensitive photomultiplier tubes for their detectors, and others use photodiodes to detect the scattered light.[16] Some systems include filters to correct for undesired fluorescence; others do not.[17] The sample-containing structure often differs in design depending on whether the instrument is to be used as a stand-alone instrument or whether it is to be used in connection with another analytical

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[14] (...continued)
under optimal conditions measurements at a single angle can provide information about the diffusion of the scattering polymer molecule which can be related to its size, the assumptions involved in doing so are severe. It is far preferable in terms of reliability and precision to make measurements at a series of angles."

[15] The producer of a multi-angle LLSI system of the open-architecture type states that such systems also are capable of operating in open, lighted rooms when provided with narrow band interference filters that are installed in front of the photomultiplier. Letter dated Apr. 12, 1990, to the Secretary of the U.S. International Trade Commission, from Dr. Walther Tscharnuter, President, Brookhaven Instruments Corp.

[16] See section on parts and components for a description of photomultipliers and photodiodes.

[17] Fluorescence occurs when particles or polymers themselves emit light at a different (or sometimes the same) frequency as the scattered light of interest. Such fluorescence can interfere with the intended intensity measurements. Filters have been developed to filter out undesired frequencies to correct for this phenomenon.

procedure such as chromatography.[18] Finally, LLSI systems may be sold inclusive or exclusive of such accessories as personal computers, cathode ray tube displays, software, or printers.

Parts and components.--Components and parts of LLSIs subject to this investigation include, and are limited to, scanning photomultiplier assemblies, immersion baths, sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discriminator circuitry, and optical benches, if dedicated only for use in a LLSI.

LLSIs incorporate either photomultiplier tubes or photodiodes as detectors. Photomultiplier tubes are always incorporated in instruments that perform dynamic light-scattering functions since such dynamic (or autocorrelation) measurements require greater sensitivity and the counting of each photon of scattered light.[19] Instruments that perform classical measurements only may incorporate either photodiode detectors[20] or photomultiplier tubes. Single photomultiplier tubes are sometimes incorporated into assemblies for scanning around a sample-containing structure to make light-scattering measurements at multiple angles at different locations.

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[18] See section on substitute products for a description of chromatography.

[19] Photomultipliers are devices that make use of the phenomena of photoemission and secondary-electron emission in order to detect very low light levels. Photoemission is the ejection of electrons from a substance as a result of radiation falling on it. The electrons released from the photocathode by incident (source) light are accelerated and focused onto a secondary-emission surface called a dynode. Several electrons are emitted from the dynode for each incident primary electron. These secondary electrons are then directed onto a second dynode where more electrons are released. The whole process is repeated a number of times depending upon the number of dynodes used (the overall effect is known as the "cascade effect"). In this manner, it is possible to amplify the initial photocurrent by a factor of 10^8 or more in practical photomultipliers. Thus, the photomultiplier is a very sensitive detector of light. In exhibit A of Otsuka's postconference brief, Dr. Karasz states that "the discrete pulse output of the photomultiplier detector is essential to the autocorrelation techniques basic to dynamic mode light scattering instruments."

[20] A photodiode is a semiconductor diode in which the reverse current varies with illumination. The light scattered by the sample changes the illumination of the photodiode detector. The changes in illumination (which is a type of light energy) are converted to changes in electrical energy. The sensitivity of photodiode detectors can be strengthened by using them with amplifiers, as does the petitioner in this investigation. In Wyatt's postconference brief (pp. 3-4), the firm maintains that "the efficiency of the DAWN photodiodes to convert a single photon into an electron is far greater than that of the DLS-700's photomultiplier tube. When coupled to the amplifiers that are built into every one of the DAWN's detectors, the DAWN photodiodes produce an output signal *at least as sensitive* as that of the DLS-700 photomultiplier using a laser producing red light."

An immersion bath is a solution or solvent at a constant temperature in which the cell containing the substance or material of interest is immersed for performing the light-scattering applications. The sample-containing structure is a cell, cell holder, or flow tube designed to hold the samples that are being examined.

Electronic signal-processing boards are subassemblies containing the electronic componentry configured in a manner to perform the various functions of the light-scattering applications and measurements of a particular light-scattering instrument. A preamplifier is an amplifier whose primary function is boosting the output of a low-level signal, low-level audio-frequency, radio-frequency, or microwave source to an intermediate level so that the signal may be further processed without appreciable degradation of the signal-to-noise ratio of the system. A discriminator is a circuit in which magnitude and polarity of the output voltage depend on how an input signal differs from a standard or from another signal.

Molecular characterization software consists of the proprietary programs and instructions used to perform the necessary calculations and provides the information on molecular weight, size, and/or configuration from the measurements resulting from laser light-scattering techniques.

Optical benches are base structures used for attaching various optical components used in a particular system or assembly. In light-scattering instruments optical benches often consist of a rigid horizontal bar or track for holding optical devices. The optical bench is critical for accurate illumination of the sample and allows the positions of devices to be changed and adjusted easily.

Uses

LLSIs are used as either batch-type or flow-through instruments. In batch-type measurements, a sample of a solution containing the substance or particles of interest is placed in a sample-containing structure, or cell, through which the laser beam is directed. Once the desired measurements are obtained, the sample is removed and replaced with another sample. This process continues until all of the desired samples have been characterized. Flow-through instruments permit the continuous monitoring of sample solutions flowing through a long tubular sample-containing structure or flow cell.

Batch-type measurements are much slower to use but permit measurements to be made on particular samples readily, and at different concentrations. Flow-through LLSIs, however, are able to provide the light-scattering characteristics of a large volume of solution and to facilitate the measurement of molecular weight distribution of the sample. Classical flow-through LLSIs (both single and multi-angle instruments) are often used as detectors in connection with chromatographic processes to perform process and quality control functions.

However, according to some industry officials, such instruments may also be used for batch-type measurements.[21]

LLSIs are analytical instruments with numerous applications in basic and applied research, including quality control and product development. They are often used by chemists, physicists, biologists, and other scientists in university, medical, and industrial laboratories. They are also used by engineers and technicians in industry for commercial applications, such as process and quality control, and in advanced research for the development of new materials.

Dynamic light-scattering measurements are particularly useful for researchers who are interested primarily in particle size. They are most useful when a researcher is working with known molecules and he wants to confirm their presence. However, researchers who know little about the particles in the substance or solution of interest or who are interested in other molecular characteristics, such as solvent/solution interaction, or the distribution of mass within a molecule,[22] require classical light-scattering instruments to perform these measurements.

In some cases, researchers require both classical and dynamic light-scattering capabilities for their needs. Although dynamic light-scattering techniques are chiefly concerned with determining the size, and classical techniques with determining the absolute molecular weight and the molecular weight distribution of macromolecules, many researchers desire information on both size and weight. Knowledge of the size of a particle (from dynamic light-scattering) can also help researchers verify absolute molecular weight determinations made using classical laser light-scattering means. Therefore, many researchers acquire separate instruments dedicated to classical and dynamic light-scattering measurements, or purchase an apparatus with combined classical and dynamic light-scattering capabilities. Larger laboratories may have several different LLSIs to address different applications.

Practical applications for laser light-scattering have been particularly evident in the petrochemical, pharmaceutical, and latex industries, where they have been used for quality control and for new product development. The size and characteristics of particles in latex paint, for example, will determine its color, glossiness, viscosity (thickness), and consistency. Dynamic laser light-scattering techniques permit quality control technicians to make sure that they have the correct combination of input materials and that they have no unwanted particles. Light-scattering is similarly used in new product development to determine the characteristics of new or improved paint or other products.

Other latex products for which classical and dynamic laser light-scattering particle characterization has been used include adhesives, coatings,

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[21] Based on USITC staff interviews with industry officials during Apr. 2-6, 1990, and on testimony provided at USITC conference on Apr. 11, 1990.

[22] This is usually referred to as molecular-weight distribution, which is the frequency of occurrence of the different molecular-weight chains in a homologous polymeric solution.

rubber, and plastics. New adhesives, for example, have been developed for composite materials that have replaced the rivets for holding together aircraft parts such as wings. Laser light-scattering has been instrumental in the development of such new materials because of its ability to measure the structural characteristics of the new materials.

Researchers in the petrochemical and plastics industries have been especially interested in classical laser light-scattering methods in new product development and quality control. Contact lens manufacturers, for example, are interested in the molecular weight distribution of polymers (determined by classical means) in lens materials since such a parameter can be used to predict the strength or brittleness of the lenses. Classical LLSIs have also been used extensively by firms that manufacture plastics like polypropylene or polyethylene (plastic bags).

Biotechnology research has also benefitted from laser light-scattering techniques. Researchers in this area are particularly interested in dynamic light-scattering applications because of their interest in the size and shape of macromolecules in biological substances and materials such as proteins. For example, certain types of molecules form contact spheres.[23] The most prevalent material used in this application, polystyrene latex, is utilized in many types of medical applications where the spheres themselves are employed as a substrate on which reagents are attached. Producers that manufacture the spheres for subsequent incorporation into medicines or into reagents must know the size of these spheres and use dynamic light-scattering to determine it. Laser light-scattering is also used to characterize the size and weight of the lattices of polystyrene coatings used in drug delivery systems. The size of the lattices in these coatings is important in determining whether drugs can be efficiently delivered into the body. Other uses of light-scattering in the biotechnology field include the sizing and characterization of particles in liposomes and blood.

LLSIs are used for pure research by physicists, chemists, engineers, and technicians in academic and basic research laboratories (such as Bell Laboratories) in both the private and public sectors. Biochemists, for example, use LLSIs in their basic research on colloidal particles and systems. Physical chemists and physicists use classical and dynamic light-scattering techniques to study the complex interaction and characteristics of macromolecules and other particles, and the complex materials and substances they make up. Finally, some physicists use LLSIs to study the properties, characteristics, and principles of light-scattering itself.

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[23] Contact spheres are spherically shaped particles which cause resins or materials in which they are contained to thicken or polymerize on heating. Contact resins are often used for bonding laminates because they require little or no pressure for adherence.

Substitute products

Industry officials and research scientists state that there are no close substitutes for LLSIs.[24] There are no other instruments that provide information on the absolute molecular weight, size, and various other characteristics of particles without reference to other standards.

Experts state that there is much misunderstanding about these instruments because they are often referred to and classified in industry and trade statistics with other electrical instruments for physical and chemical analysis such as spectrometers, spectrophotometers, and spectrographs. However, although LLSIs do measure spectral characteristics of light, they operate at a single wavelength and make measurements of scattered light at angles. Spectrophotometers and other similar spectral instruments, are usually concerned with measuring the absorption (or nonabsorption) of light energy and are capable of making measurements at different wavelengths.

Spectrophotometers and similar spectral instruments are usually used to identify the molecular composition and structure of materials with respect to known standards. LLSIs, on the other hand, are used to characterize the particle size, absolute molecular weight, and other characteristics of macromolecules, polymers, and other particles.

Two other techniques that are also used in determining molecular weight and size are gel permeation chromatography (GPC) and viscometry. However, the measurements from these techniques are derivative measurements based on comparisons with other standards. GPC and viscometry are often used in conjunction with low-angle and multi-angle classical LLSIs, which provide them with the absolute measurements which serve as the standards for the derivative measurements they are concerned with. Thus, classical laser light-scattering is often complementary to GPC and viscometry.

LLSIs often serve as detectors to GPC apparatus. GPC is a separation process in which polymers or particles of interest contained in a gel-like substance are separated as the substance flows slowly through a gel contained in a tube in an on-line process. Due to this separation, each portion of the substance can be looked at with laser light-scattering. GPC is often used with classical low-angle and multi-angle light-scattering to perform commercial quality control functions.

Viscometry is a method for determining certain hydrodynamic properties of molecules that cannot be determined by classical and dynamic multi-angle laser light-scattering. Often, light-scattering is combined with viscometry to provide more information about macromolecules, polymers, or other particles of interest.

Another light-scattering technique used for physical and chemical analysis is electrophoretic light-scattering, or electrophoresis. However, industry

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[24] USITC staff interviews with industry officials and telephone conversations with research scientists at the National Institute of Standards and Technology during Apr. 2-6, 1990. Also based on testimony at USITC conference on Apr. 11, 1990.

officials and researchers state that this type of light-scattering has little relationship to the measurements or functions performed by classical LLSIs. The technique involves the migration of molecules in the presence of electrical fields. To perform electrophoresis measurements, high voltages and special cells are required that are not normally sold with traditional laser light scattering equipment.

Manufacturing processes

The LLSI industry is highly technical and research-intensive. In many cases, the manufacturing facilities are owned or managed by highly trained physicists or other scientists with many years of experience in the field of light scattering. These scientists are generally intimately involved in designing and managing the production of the light-scattering instruments. Many of their employees are engineers, chemists, computer experts, or highly trained technicians.

LLSIs are systems that combine a number of subassemblies[25] and many component parts, mostly machined component parts. The majority of the component parts are off-the-shelf items. Each system is made up of a computer and software, and subassemblies and component parts that may include all, or part of the following elements: scanning photo-multipliers, stepper motors, photodiode detectors, laser devices, optical benches, autocorrelators, thermocouples, electronic signal processing boards, preamplifier/discriminator circuitry, photometers,[26] cells and cell holders, analog-to-digital converters, and cabinets. The required software packages to generate molecular weight and/or size information for the systems are primarily produced in-house.

The level of in-house and outside acquisition of subassemblies and component parts differs among producers. However, the bulk of component parts, including laser devices, photodiodes, and photometers, are purchased from outside sources, whereas the bulk of subassemblies are assembled in-house. All subassemblies and component parts purchased from outside sources must conform to the purchaser's specifications whether or not the product is an off-the-shelf item or specially manufactured for the purchaser.[27] Because a high percentage of component parts are bought from outside sources, the production processes consist principally of assembling the various component parts into subassemblies, interconnecting the subassemblies into instruments, and conducting tests during and after the assembly of the product. Because of the labor-intensive nature of the assembly process, capacity can generally be expanded

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[25] A subassembly is a structural unit, which although manufactured separately, is designed for incorporation with other parts or subassemblies in the final assembly of an instrument or system.

[26] Photometers are instruments for making measurements of light or electromagnetic radiation.

[27] In Wyatt's posthearing brief, petitioner states that for an illustrative model of its LLSIs there are * * *.

easily to meet increased demand without the need to purchase a significant amount of new capital equipment.[28] It takes two to three months to train a worker to assemble an instrument.

The assembly processes for the various types of LLSIs and systems do not differ greatly, with the exception that some of the subassemblies and component parts are different. The first step in the assembly process is the assembly of subassemblies that are assembled in-house. This is generally done apart from the final assembly.

The optical bench is usually designed in-house and determines how the LLSI system will function as a whole and often differentiates it from other LLSIs.[29] The assembly of the integrated optical bench is one of the most important operations that is completed in-house. Industry officials indicate that the proper assembly of the integrated optical bench is of critical importance and requires highly experienced employees. The solder joints must be of high quality and the leads must be shielded and of the specified lengths.

The proper assembly of the laser to the laser mount is also of great importance and is done by a highly experienced technician. The precise mounting of the laser to the laser mount must assure that the laser beam is directed straight and parallel to the bore of the cell holder.

The assembly of the electronic subassembly generally includes mounting and interconnecting electronic component parts onto a printed circuit. The required soldering may be done manually or automatically.

The final assembly is usually performed by a team or teams of technicians, with each worker performing a specified task or tasks. It entails assembling, securing, and interconnecting all subassemblies and component parts into one coherent system. Soldering in the final assembly is generally done manually. Accuracy tests and inspections are conducted during and after the assembly of the system.

U.S. tariff treatment

Laser light-scattering instruments are provided for in subheading 9027.30.40 of the HTS, a provision that includes electrical spectrometers, spectrophotometers, and spectrographs using optical radiations.[30] Parts and accessories of LLSIs are classified under HTS subheading 9027.90.40, covering parts and accessories of electrical instruments and apparatus; by judicial

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[28] Based on interviews by USITC staff with industry officials during Apr. 2-6, 1990, and on testimony at USITC conference on Apr. 11, 1990.

[29] Based on USITC interviews with industry officials during Apr. 2-6, 1990, and on testimony at USITC conference on Apr. 11, 1990. In Wyatt's post-conference brief (pp. 22-23), the firm states that * * *.

[30] LLSIs were formerly provided for in item 712.49 of the Tariff Schedules of the United States, now repealed.

rulings, such goods must generally be essential to the functioning of the completed article and must not be provided for eo nomine in the tariff schedule. The column 1-general duty rate (the most-favored-nation rate of duty, applicable to imports from Japan and most other countries) for these subheadings is 4.9 percent ad valorem.[31]

The Nature and Extent of Sales at LTFV

On August 27, 1990, Commerce published in the Federal Register its final determination that imports of certain LLSIs and parts thereof from Japan are being, or are likely to be, sold in the United States at LTFV. Since the respondent, Otsuka Electronics Co., Ltd., declined to participate in the investigation, Commerce used the best information available as required by section 776(c) of the Act. The estimated margins of sales at LTFV presented in the following tabulation (in percent) were based on data contained in the petition:

Manufacturer/producer/exporter	LTFV margin
Otsuka Electronics Co., Ltd.....	129.71
All others.....	129.71

Commerce directed the U.S. Customs Service, under section 733(d)(1) of the Act, to continue to suspend liquidation[32] of all entries of LLSIs and parts thereof from Japan that are entered, or withdrawn from warehouse, for consumption, and to require a cash deposit or the posting of a bond equal to the estimated dumping margin.

The U.S. Market

U.S. producers

The domestic industry producing LLSIs is made up largely of small business concerns and may be characterized as highly fragmented. The businesses are highly technical, often having founders or principals who are Ph.D. physicists and who have worked in the light-scattering field for many years. Educating the U.S. market as to the possible uses of LLSIs, training customers to use the instruments, and providing continued technical advice once an instrument has been purchased are major challenges facing the industry.

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[31] In addition, pursuant to the Omnibus Budget Reconciliation Act of 1986, a user fee is charged on most U.S. imports to cover the cost of the U.S. Customs Service's processing of imports. The user fee is currently 0.17 percent ad valorem.

[32] Liquidation was originally suspended at the time of Commerce's preliminary determination (July 6, 1990).

The petitioner, Wyatt Technology Corp., located in Santa Barbara, CA, was founded in 1982 by Dr. Philip J. Wyatt upon the award of a Defense Small Business Advance Technology contract by the U.S. Army Bioengineering Medical Research and Development Laboratory to establish the feasibility of a light-scattering instrument for the detection of toxicants in drinking water. A pioneer in the field, Dr. Wyatt invented the first commercial LLSI in the late 1960s. Wyatt also won a Small Business Innovation Research grant from the U.S. Army Armament Munitions and Chemical Command to develop and commercialize state-of-the-art light-scattering instrumentation and a development contract from the Office of Naval Research. Recently, Wyatt received NIH funding for a project on improving the efficiency in the treatment of AIDS. In 1988, Wyatt Technology did approximately *** percent of its business with the U.S. Government and *** percent with the commercial sector. At its single plant, the firm produces two multi-angle LLSIs capable of classical measurement, the Dawn Model F and the Dawn Model B. * * *.

Brookhaven Instruments Corp., located in Holtsville, NY, was founded in the mid-1970s by Dr. Walther Tscharnuter and Dr. Bruce Weiner. Brookhaven manufactures a series of instruments, such as particle sizers, correlators, and goniometers for laser light-scattering. Its BI-200SM goniometer system * * *, in combination with either the BI-2030AT or BI-8000AT, is capable of classical measurement. In 1987, Brookhaven completed a new building that houses the factory and laboratory facilities. The firm expects to eventually quadruple in size. * * *.

LDC Analytical, Inc., located in Riviera Beach, FL, was a division of Milton Roy Co. prior to April 1989, when it was purchased * * * by Thermo Instrument Systems, Inc., Waltham, MA. In addition to a light-scattering detector and laser differential refractometer, LDC produces two low-angle LLSIs capable of classical measurement, the KMX-6 and the CMX-100. * * *.

Langley Ford Instruments, a division of Coulter Electronics, Inc., Hialeah, FL, is located in Amherst, MA. Coulter, the largest LLSI manufacturer in the United States, produces particle size analyzers that are capable of dynamic laser light-scattering only. Although Coulter's products are outside the scope of this investigation, * * *.

Leeds and Northrop, a unit of General Signal, introduced in March 1990 an instrument with dynamic measurement capabilities, the Series 9200, with the intent of giving it classical measurement capabilities within 2 years. Located in St. Petersburg, FL, Leeds and Northrop's single plant employs over 200 people. Leeds and Northrop's instrument is outside the scope of the investigation.

Nicomp, Particle Sizing Systems, Santa Barbara, CA, was founded by Drs. David Nicoli and Virgil Elings in 1978. In 1984 it was acquired by the HIAC/ROYCO division of Pacific Scientific with the two founders retained as consultants. In 1989 all marketing and sales rights reverted back to Drs. Nicoli and Elings, operating under the new corporation Particle Sizing Systems. Its principal products are the Model 370 Submicron Particle Sizer and the Model 170 Computing Autocorrelator. On occasion, the Model 170 Computing Autocorrelator has been combined with Wyatt's Dawn Model F instrument to create an instrument capable of both classical and dynamic measurements. Nicomp's instruments, by themselves, are outside the scope of the investigation.

C.N. Wood Mfg. Co., Inc., Newton, PA, the oldest U.S. producer of multi-angle light-scattering instruments, produces a "low-tech" instrument that is outside the scope of this investigation. The Wood product is a basic instrument that utilizes a white light. The instrument is adaptable to a laser, but the firm does not sell lasers or software with its product.

Questionnaires were sent out to approximately 30 parts producers. Roughly half of these questionnaires were returned, all stating that they were not a part of the LLSI industry.

U.S. importers

Polymer Laboratories, Inc., Amherst, MA, is currently the only importer of LLSIs from Japan with classical measurement capabilities.[33] Polymer is the U.S. subsidiary of Polymer Laboratories, Ltd., located in the United Kingdom. The Japanese product is produced by the Photal Division of Otsuka Electronics Co., Ltd., Osaka, Japan. Polymer began marketing the DLS-700 in April 1989 along with a dynamic instrument produced by Otsuka. Munhall Company, Worthington, OH, imported Otsuka's DLS-700 instruments from 1986 until 1988, when it lost its distributorship.

Malvern Instruments, located in Southborough, MA, imports LLSIs from the United Kingdom. In addition to a particle sizer, Malvern imports the 4700PS system, which is capable of classical measurement.

According to industry sources, there is a German producer preparing to enter the U.S. market with a LLSI. The German company, * * *, produces a multi-angle instrument with a goniometer system.

Channels of distribution

Imported and domestic LLSIs are marketed and shipped directly to end users. A major means of marketing such instruments in the United States is through trade shows. There are approximately six trade shows held each year that are attended by most producers and importers. Other means of marketing LLSIs include the following: advertising in trade magazines and journals; holding workshops where technical papers are presented (often held at the same time as trade shows); and word of mouth (extremely important in the close-knit community of users). Repeat sales to customers sometimes occur. Because of the complex nature of LLSIs and the training needed to use them, a purchaser that subsequently needs additional LLSIs to perform the same functions is probably more likely to source them from the producer of its original equipment. More detailed information on marketing methods is presented in the pricing section of this report.

Apparent U.S. consumption

Data on apparent U.S. consumption of LLSIs with classical measurement capabilities (whether or not also capable of dynamic measurement), and parts thereof, were compiled from information submitted in response to questionnaires

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[33] Polymer does not import parts from Japan.

sent by the Commission. These data, presented in table 1, are comprised of U.S. producers' domestic shipments, U.S. producers' intracompany consumption, and U.S. shipments of imports.

Apparent U.S. consumption of such LLSIs remained relatively stable during 1987-89, fluctuating only between * * * instruments annually. Apparent consumption in January-June 1990 amounted to *** units, compared with an estimated *** units during the like period of 1989. The value of apparent U.S. consumption increased by *** percent from 1987 to 1989 and by an estimated *** percent from January-June 1989 to January-June 1990. The value of apparent U.S. consumption of parts of such LLSIs (i.e., parts not included in complete instruments) increased by *** percent between 1987 and 1989. Parts of LLSIs accounted for * * * percent of the annual value of total U.S. consumption of such instruments and parts thereof from 1987 to 1989.

Consideration of Alleged Material Injury to an Industry in the United States[34]

The information in this section of the report is based on data received from three U.S. producers of LLSIs (and parts thereof) with classical measurement capabilities, whether or not such instruments are also capable of dynamic measurements. The three firms represent an estimated 99 percent of total U.S. production of such merchandise during the period covered by the investigation.

U.S. producers' capacity, production, and capacity utilization

Data for production, capacity, and capacity utilization for the firms producing LLSIs with classical measurement capabilities are summarized in table 2. Reported capacity to produce such instruments increased by *** percent from 1987 to 1989, and by *** percent from January-June 1989 to January-June 1990. It should be noted that measurement of capacity may not be precise for those producers in the industry who also produce dynamic LLSIs, which are not covered by the scope of this investigation unless they are also capable of classical measurements. Moreover, as discussed previously, the production process consists principally of assembling and interconnecting the various subassemblies and component parts and conducting tests during and after the assembly of the product. Because of the labor-intensive nature of the assembly process, capacity can generally be expanded easily to meet increased demand without the need to purchase a significant amount of new capital equipment.

Production of classical LLSIs increased by *** percent from 1987 to 1989, and increased by *** percent from January-June 1989 to January-June 1990. Capacity utilization decreased by *** percentage points from 1987 to 1989. The drop in capacity utilization can, in part, be attributed to the newly emerging and ever improving technological nature of LLSIs and the learning curve of the

[34] Percentage changes in industry data for the period covered by the investigation are presented in app. C.

Table 1
Classical LLSIs and parts thereof: U.S.-produced domestic shipments, U.S. intracompany consumption, U.S. shipments of imports, and apparent U.S. consumption, 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

Table 2
Classical LLSIs: U.S. capacity, production, and capacity utilization, by firms, 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

producers. As the producers' skill improves with each product, the production time for each instrument decreases, thus increasing their capacity. One producer has been able to cut its lead time from * * * due to such improvements.

U.S. producers' shipments

The U.S. producers' company transfers, domestic shipments, and export shipments of classical LLSIs instruments and parts thereof are presented in table 3.

Company transfers.--Company transfers of classical LLSIs were *** in 1987 and *** in 1989. * * * were reported by * * *, which used them for demonstration and application testing purposes.

Domestic shipments.--U.S. producers' domestic shipments of classical LLSIs decreased overall by *** percent from 1987 to 1989, and remained the same from January-June 1989 to January-June 1990. The value of U.S. shipments of such instruments decreased overall by *** percent from 1987 to 1989. The value of U.S. producers' shipments of parts for LLSIs decreased by *** percent from 1987 to 1989.

Export shipments.--U.S. producers' export shipments of classical LLSIs increased by *** percent from 1987 to 1989, but decreased by *** percent from January-June 1989 to January-June 1990. The value of these exports increased by *** percent from 1987 to 1989. Included in these numbers are company transfers abroad made by * * *. The industry has exported to * * *. The value of exported parts of LLSIs increased by *** percent during 1987-89.

Total shipments.--Total U.S. producers' shipments of domestically produced classical LLSIs increased in quantity by *** percent between 1987 and 1989, but decreased by *** percent from January-June 1989 to January-June 1990. The estimated value of total shipments increased by *** percent during 1987-89.

U.S. producers' inventories

Yearend inventories of completed classical LLSIs were reported by * * * (table 4). * * * inventories rose from *** at yearend 1987 and 1988 to *** instruments at yearend 1989. At the end of June 1990 * * * reported an inventory of *** instruments and * * * reported an inventory of *** instruments. It should be noted that inventories are not ordinarily maintained. Most instruments are made to order and are shipped shortly after completion. The rapid change of technology in this industry discourages the maintenance of inventories because producers do not want to run the risk of being left with outdated instruments. However, it is possible to upgrade instruments.

U.S. employment, wages, and productivity

Data on employment and productivity for the U.S. producers of classical LLSIs are shown in table 5. The number of workers and hours worked producing such instruments each decreased from 1987 to 1989 by *** percent. Hours worked

Table 3
Classical LLSIs and parts thereof: U.S. producers' company transfers, domestic shipments, export shipments, and total shipments, by firms, 1987-89, January-June 1989, and January-June 1990[1]

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

[1] * * * are estimated.

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

Table 4
Classical LLSIs: U.S. producers' end-of-period inventories, inventories as a share of U.S. shipments, and inventories as a share of total shipments, by firms, as of December 31 of 1987-89, and as of June 30, 1989-90[1]

Item	As of December 31 of-- 1987	1988	1989	As of June 30 of-- 1989	1990
*	*	*	*	*	*	*

[1] Parts of laser light-scattering instruments are not included in inventory data.

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

Table 5
Average number of production and related workers producing classical LLSIs and parts thereof and all products, hours worked, wages paid, hourly wages, total compensation paid, unit labor costs, and average number of hours worked in producing one instrument, 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

increased by *** percent from January-June 1989 to January-June 1990 while the number of workers remained the same. Total compensation and average hourly wages increased by *** percent and *** percent, respectively, from 1987 to 1989, and increased by *** percent and *** percent, respectively, from January-June 1989 to January-June 1990. Unit labor costs rose by *** percent from 1987 to 1989. The average number of production and related worker hours required to produce a classical LLSI declined irregularly from 1987 to 1989, by *** percent, and continued to fall, by another *** percent, from January-June 1989 to January-June 1990.

Financial experience of U.S. producers

Two companies * * * provided income-and-loss data on their overall establishment operations in which classical LLSIs are produced.[35] Wyatt accounted for approximately *** percent of the value of U.S. producers' total domestic and export shipments of classical instruments in 1989, and * * * accounted for *** percent. * * * also had sales of LLSI parts. A summary of the two producers' sales data for 1989 is shown below (in thousands of dollars):

* * * * * * *

[35] * * *.

The combined establishment income-and-loss experience of the two producers is shown in table 6.

Neither of the two producers furnished separate income-and-loss data on their operations producing classical LLSIs and/or types of these instruments or parts thereof. Most of Wyatt's establishment operations are devoted to * * *.

Data for Wyatt were verified by the Commission's staff. Prior to 1989 there was a * * *.

Wyatt was founded in 1982 and in its first years the company * * *. * * *. Shown below is a tabulation of the number of instruments sold[36] commercially since inception:

* * * * * * *

Wyatt's overall establishment operations.--The income-and-loss experience of Wyatt Technology is presented in table 7. Net sales * * *. In 1989, sales were * * *. Operating income was * * *. Operating income margins * * *. For the January-June 1990 period, sales were * * *. Operating income was * * *. The operating income margins were * * *.

Analysis of Wyatt's LLSI data.--During the period of investigation there was a * * *. A breakdown of Wyatt's establishment sales (including domestic and export) by product type is shown in the following tabulation * * *:

* * * * * * *

The estimated income-and-loss for * * * in 1989 is shown below * * *:

* * * * * * *

Wyatt uses numerous parts in its assembly process. In its posthearing brief the company provided a listing of all of the off-the-shelf parts and custom

[36] * * *.

Table 6
Income-and-loss experience of U.S. producers on the overall operations of their establishments within which classical LLSIs are produced, accounting years 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

Table 7
Income-and-loss experience of Wyatt Technology Corp. on its overall establishment operations, accounting years 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

parts used in the assembly of a typical Dawn F instrument. A total of * * *.[37] Wyatt indicated that it costs *** to build this instrument, as follows:[38]

* * * * * * *

However, these costs do not constitute the * * *. This industry is different than the typical industry whose cost structure is mainly in its raw materials, labor, and overhead. The factors involved in the cost structure of a Dawn instrument might be considered more as intangible than tangible. As indicated in its posthearing brief, Wyatt's * * *. Most of their development costs are * * *. They must be * * *.[39] In addition, the * * *.

There is a difference in profitability between exports and domestic LLSI instruments and parts. Wyatt sells its exports * * *. Parts and assembly costs for domestic and exports are * * *. Expenses for marketing and travel costs may * * *. As a result, the profitability of domestic LLSI sales is * * *.

Based on the information provided by Wyatt, an estimated income-and-loss summary for both a domestic and export sales of a Dawn F instrument, without software and optional equipment, is shown in the following tabulation * * *:

* * * * * * *

The SG&A expenses include general and administrative expense, research and development, customer service, and marketing. * * *

Because Wyatt is essentially a * * *, its LLSI * * *.

Evaluation of Wyatt's financial condition.--It is difficult to measure profitability in this industry because certain current expenses such as marketing and software development may benefit future periods. These marketing expenses consist of advertising, attendance at trade shows, seminars, and so forth. Also, the company tests samples at its own expense as a promotional technique. A contact or lead made through these mediums may or may not result in business. According to Geofrey Wyatt, executive vice-president of Wyatt Technology, a sale resulting from one of these contacts might occur 2 to 5 years from the point of contact.[40] Thus, current profitability may be affected to a large extent by marketing expenses that relate to future income streams.

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[37] Wyatt's posthearing brief, Exhibit 4.

[38] Wyatt's posthearing brief, p. 13.

[39] Wyatt's posthearing brief, p. 14.

[40] Meeting with Geofrey Wyatt, Aug. 30, 1990.

During the hearing, Geofrey Wyatt was asked to explain the most important factors in analyzing the financial condition of the industry. Mr. Wyatt indicated that working capital and the current ratio are vitally important and the company needs commercial bank lines to make it through the lean parts of a year.[41] The company has a * * *. The company has * * *. A summary of the working capital and current ratios is shown below * * *:

* * * * * * *

Investment in productive facilities.--Wyatt's asset data and its return on assets are shown in table 8.

Capital expenditures.--Wyatt furnished data on its capital expenditures for its overall establishment operations. The capital expenditures were * * *.

Research and development expenses.--Research and development costs were * * *.[42] [43]

Research and development efforts include * * *.[44]

Capital and investment.--The Commission requested U.S. producers to describe any actual or potential negative effects of imports of classical LLSIs from Japan on their firm's growth, investment, ability to raise capital, and existing development and production efforts. Their responses are shown in appendix D.

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[45]--

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[41] Transcript of hearing, pp. 35-38.

[42] The amounts shown for * * *.

[43] Wyatt's * * *.

[44] * * *.

[45] 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

(continued...)

Table 8
Assets of Wyatt Technology Corp., as of the end of accounting years 1987-89, and as of June 30, 1989, and June 30, 1990

Item	As of the end of accounting year--			As of June 30--	
	1987	1988	1989	1989	1990
*	*	*	*	*	*	*

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

(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,

[45] (...continued)
is imminent. Such a determination may not be made on the basis of mere conjecture or supposition."

> (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,
>
> (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.[46]

No subsidies were alleged in this investigation; 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)) was presented in the section entitled "Consideration of alleged material injury to an industry in the United States." Available information on U.S. inventories of the subject products (item (V)); foreign producers' operations, including the potential for "product-shifting" (items (II), (VI), and (VIII) above); any other threat indicators, if applicable (item (VII) above); and any dumping in third-country markets, follows.

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[46] 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."

U.S. inventories of laser light-scattering instruments from Japan

The only importer of classical LLSIs from Japan, Polymer Laboratories, has *** Otsuka DLS-700 model on hand in the United States. Polymer claims that it maintains * * * for demonstration and evaluation purposes only and not inventory as such. However, it is Polymer's policy to lease demonstration units. In its questionnaire response, Polymer reported that * * *.[47] For further information on * * *, see the "Lost sales and lost revenues" section of this report.

Ability of the Japanese producer to generate exports and the availability of export markets other than the United States

Otsuka Electronics Co., Ltd., the only known producer of the subject LLSIs in Japan, began as an independent company, Union Giken, in 1970. In 1980, Otsuka Pharmaceutical acquired a controlling interest in Union Giken.[48] In its facilities in Shiga and Osaka, Japan, Otsuka Electronics designs and manufactures a range of electronic analytical instruments, including dynamic light scattering instruments, differential refractometers, electrophoretic light scattering instruments, magnetic resonance spectrometers, and multichannel photodiode array detectors. According to Otsuka Electronic's response to the Commission's questionnaire, sales of LLSIs represented *** percent of the firm's total sales in its most recent fiscal year. The firm employs *** people, over one-half of whom are engaged in research and development activities.

Otsuka's DLS-700 model LLSI, which was designed in 1984, is assembled by two workers who also produce two other instruments in the same facility. Otsuka maintains that because these two workers are fully occupied and have no extra time to increase production, the only way Otsuka could immediately increase its capacity to manufacture the DLS-700 would be to shift production from the other two instruments.[49] Otsuka states that it has no plans to increase production of the DLS-700 in Japan because of the anticipated production of this instrument in Otuska's Fort Collins, CO, facility beginning in * * *.[50] Likewise, Otsuka reports that it has no plans to shift its production mix for two reasons: first, the * * * and, second, the * * *.

Data on Otsuka Electronics' operations in Japan on classical LLSIs (i.e., on the DLS-700), as supplied by counsel for Otsuka, are presented in table 9. The capacity reported for producing the DLS-700 in Otsuka's Japanese facility was *** instruments in 1987 and *** in both 1988 and 1989. The reason given by

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[47] As noted in Otsuka's prehearing brief (Appendix 2, p. 2), * * *.

[48] Prehearing brief of Otsuka, Appendix 5, p. 1, statement of Kenji Nakayama, President of Otsuka Electronics Co., Ltd. (Japan) and Chief Executive Officer of Otsuka Electronics (U.S.A.), Inc. According to the petitioner, Otsuka Pharmaceutical has annual sales of over $1 billion.

[49] Otsuka reports that * * *.

[50] Commercial production of the DLS-700 will begin in January 1992.

Table 9
Classical LLSIs:[1] Otsuka Electronics Co., Ltd.'s, capacity, production, capacity utilization, end-of-period inventories, shipments, and exports, 1987-89, January-June 1989, and January-June 1990[2]

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

Source: Data submitted by counsel for Otsuka Electronics Co., Ltd., in response to a request for information by the Commission.

Otsuka for * * *.[51] Otsuka's capacity for producing the DLS-700 was projected at *** units in 1990 and *** units in 1991. The projected * * *. It currently takes Otsuka *** hours to manufacture, test, and inspect a single DLS-700 instrument before the device can be shipped to a customer.[52] Otsuka does not produce or export any parts for LLSIs, but purchases them from third-party suppliers, either off-the-shelf or manufactured to Otsuka's specifications.

The firm reported that its total exports of the DLS-700 to the United States were as follows: none in 1987, one in 1988, one in 1989,[53] and one in 1990. (Otsuka's total exports of DLS-700 models to the United States, including those outside the period of investigation, amount to five instruments.)[54] Otsuka

[51] As indicated previously, the production of a LLSI, whether carried out in the United States or in Japan, is basically an assembly operation. The "capacity" of a multi-product firm, especially one like Otsuka that also makes dynamic LLSIs, to produce the LLSIs subject to this investigation is largely a function of the availability of trained labor and the firm's desired product mix. In contrast to * * *.

[52] Otsuka's prehearing brief, statement of Kenji Nakayama, * * *.

[53] Polymer Laboratories, the importer of the DLS-700 from Japan, reported in its questionnaire response that it imported *** instruments in 1989.

[54] Four of these instruments have been sold. The first DLS-700 was purchased in late 1986 by Dr. Asakura, a professor at the University of Pennsylvania and the director of the Hemoglobin Laboratory at the Children's Hospital of Philadelphia, PA. Dr. Karasz of the University of Massachusetts, the second (continued...)

reports that profits on the DLS-700s sold in Japan * * *. Because the firm is * * *. Otsuka's production * * * from *** units in 1987 to *** units in 1988 and *** units in 1989, but * * * from *** units in January-June 1989 to *** units in January-June 1990. Otsuka's exports to the United States represented *** percent of its production in 1988 and 1989. The firm projected exports of *** units to the United States in both 1990 and 1991.

Otsuka's future U.S. LLSI operations

In 1988, Otsuka Pharmaceutical and Otsuka Electronics Japan * * * a Philadelphia-based manufacturer of magnetic resonance spectrometers, Phospho-Energetics, now Otsuka USA. Otsuka USA initially leased space in a building in Havertown, PA, where it planned to do research and development, manufacturing, marketing, service, and support for a number of electronic analytical instruments, including the DLS-700. In November 1989, Otsuka hired Dr. John MacKay in the United States to develop and implement plans for U.S. production of the DLS-700. During the preliminary investigation, Otsuka stated that it would begin production of its DLS-700 instrument in its Havertown facility in 1990 and that by mid-1991 all DLS-700 instruments sold in the United States would be produced in Havertown. It submitted to the Commission various architectural drawings and invoices purporting to show that it was committed to beginning production operations in Havertown. It has a * * *.

In December 1989, Otsuka Pharmaceutical * * * Chemagnetics, a Colorado manufacturer of scientific analytic instruments, and in April 1990, Otsuka USA hired Timothy O'Sullivan as its new president. Under Mr. O'Sullivan's recommendation, Otsuka USA relocated its headquarters and production facilities to Fort Collins, CO, with plans to phase out the Havertown facility as production at Fort Collins comes on-line. Otsuka states that * * *.

Otsuka USA broke ground on a major optical instrument factory in Fort Collins on July 19, 1990, and the facility is scheduled to be completed on October 15, 1990. The facility will be a * * *. Otsuka USA occupies the land on which the facility is located * * * obtained from * * *. Otsuka entered into the lease agreement on * * *. The lease itself commenced on * * *. Otsuka also obtained an * * *.

Chemagnetics and Otsuka USA currently employ between * * *,[55] *** of whom are presently carried on the Otsuka USA payroll. Otsuka anticipates that the employment level will rise to *** workers by the end of 1990 and *** workers by the end of 1991. * * *. In the * * *. Commercial production of the DLS-700 is

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[54] (...continued)
purchaser of a DLS-700 model in the United States, obtained it in 1988. The third DLS-700 was purchased by * * * of the University of Oklahoma in 1989. The fourth instrument was purchased by * * * of Dow Chemical in 1990. These purchases are discussed more fully in subsequent sections of this report.

[55] * * *.

slated to begin in January 1992 in Fort Collins.[56] Otsuka anticipates that some of the DLS-700 units produced in Fort Collins will be * * *, primarily * * *.

Otsuka USA does not plan to manufacture component parts of its instruments. During the preliminary conference, Mr. Nakayama testified that the firm planned to source most components and parts in the United States, but would import from Japan the optical benches for its DLS-700 models. Mr. Nakayama stated that the optical bench would amount to about 20 to 25 percent of the value of the total cost of the DLS-700 instrument.[57] Otsuka USA now maintains that it will attempt to source all major components in the United States.[58] However it will not begin to search for and evaluate U.S. parts vendors until * * *; this process is expected to take several months. Otsuka is considering the possibility of fabricating some parts, for example the optical bench, in Chemagnetics' existing metal shop.

In Japan, Otsuka is * * *. Otsuka's hardware is * * *. There has also been some discussion of a possible * * *.[59] * * *.

Consideration of the Causal Relationship Between Imports of the Subject Merchandise and the Alleged Material Injury

U.S. imports of laser light-scattering instruments

Imports of classical LLSIs are presented in table 10. As described earlier in the report, imports of such instruments from Japan have been few. Munhall Company, of Worthington, OH, imported *** Japanese instruments, * * *. In 1988, Munhall lost its distributorship with Otsuka. In April 1989, Polymer Laboratories entered the market as the sole importer of classical LLSIs from Japan. Polymer reported that *** instruments were imported in 1989 and *** in January-June 1990. The imports from Japan in 1989 and 1990 were valued at *** and *** respectively. Malvern, an importer of British instruments, imported *** instruments in 1988 valued at ***, *** instruments in 1989 valued at ***, and *** instruments in January-June 1990 valued at ***.

U.S. market penetration by imports

Data on penetration of imports of classical LLSIs from Japan into the U.S. market are presented in table 11. On the basis of quantity, market penetration of imports from Japan was *** percent in 1988 and 1989 and *** percent in

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[56] Otsuka did not specify what its planned level of "commercial" production in the United States would be.

[57] As indicated previously, * * *.

[58] * * *.

[59] Otsuka's posthearing brief, p. 17.

Table 10
Classical LLSIs: U.S. imports for consumption, 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

Table 11
Classical LLSIs: Share of U.S. consumption supplied by Japan and all other countries, 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
*	*	*	*	*	*	*

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

January-June 1990.[60] Respondent reports that it hopes to * * * in 1990 and at * * * instruments a year for the next 2 years. It is important to note that LLSIs are not commodity products. The market is characterized by infrequent sales preceded by long lead times. The sales cycle is very lengthy. It can take 1 to 5 years to consummate a single sale, and one sale to a large company or research institute may lead to additional future sales.

Market characteristics and prices

LLSIs are scientific instruments used to study macromolecular particles, to perform quality control tests, and to develop new products. The primary users are commercial and university chemistry and physics research laboratories, and industrial facilities that need to test the macromolecular characteristics of their products. The demand for LLSIs depends upon the research, quality control testing, and new product development needs of users. Firms which produce chemical, petrochemical, pharmaceutical, and biotechnological products are the main industrial users.

Marketing methods.--Because LLSIs are expensive and the uses are often not well understood by a firm's purchasing agent, the sale of a LLSI could take several years from the initial contact of a potential customer to the consummation of a sale.

LLSI producers and importers use various methods to market their products. All these firms attend trade shows where they exhibit their wares and provide potential customers with an opportunity to compare their equipment with that of competing firms.[61] There are several shows each year, such as the American Chemical Society show and the International Biotechnology Exposition. Firms selling LLSIs also advertise in trade journals such as Analytic Chemistry, American Laboratory, and Biotechnology. Some LLSI manufacturers also use sales agents to sell their machines, and sometimes employ direct mailing of sales literature. Sales also occur indirectly by word-of-mouth, since many of the professionals in the field know one another and purchase the machine suggested by their associates.

In some cases an individual user's experience with a firm may lead to repeat sales. If a firm's research laboratory uses a particular LLSI for product development, the production side of the firm is more likely to use the same machine. Repeat sales have mostly been made to large companies, since many users have a need for only one machine. For example, * * *.[62]

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[60] Dow's lease/purchase of a DLS-700 in 1990 is included in the data for January-June 1990. Although the instrument was apparently not purchased until after the January-June period, it was originally leased in * * *, and for the purposes of this report is included in consumption for January-June 1990.

[61] * * *.

[62] * * *.

On occasion, LLSI producers lease instruments to prospective buyers. A lease gives a purchaser the opportunity to determine whether a particular LLSI suits its needs. Typically, the terms of a lease are such as to make it economically advantageous to purchase the instrument within 3 months. Virtually every LLSI leased has resulted in a sale. * * *.[63]

Wyatt Technology is the sole U.S. producer of fixed-array LLSIs. Its machines have been sold * * *, f.o.b. Santa Barbara, CA. A 1-year warranty applies to parts and labor. * * *. Training at Wyatt's laboratory is included in the cost of each purchase. Lead time is from *** weeks from date of order.

Brookhaven is the sole U.S. producer of goniometer LLSIs. Its machines are also sold f.o.b. point of origin. Prices are typically * * *. A 1-year warranty on parts and labor is also applicable. * * *. Brookhaven also offers training in the cost of each purchase. Lead time is longer than * * *, ranging from * * * weeks from date of order.

LDC Analytical, a producer of low-angle LLSIs, sells * * * on a f.o.b. shipping point basis. Again, a 1-year warranty applies on parts and labor. * * *. LDC offers * * * training but charges ***. Lead time is from * * * weeks from date of order.

Polymer Laboratories, the importer of the Japanese goniometer LLSI, the Otsuka DLS-700, sells on a delivered rather than a f.o.b. basis. Polymer reports that it does * * *.[64] Polymer also offers a 1-year warranty on parts and software. Payment terms are * * *. Polymer offers * * * training, but charges *** for each additional day. Lead time is from * * * weeks from date of order if the instrument is not in stock.

Prices.--The Commission requested price information on all sales during January 1987-July 1990 from U.S. producers and importers of classical LLSIs. Price lists were also requested from all participants. Three domestic producers and the sole importer of Japanese instruments submitted price information.[65]

Products offered range from LLSIs equipped with the hardware and software necessary for both classical and dynamic measurement, to basic versions to which the purchaser may choose to add any combination of desired features. The Japanese LLSI sells at one end of the spectrum, e.g. it is a machine equipped to measure both molecular weight and particle size. Wyatt sells its LLSIs at the other end, providing an "a-la-carte" opportunity to purchase only those features required for a particular application.[66] One problem that sometimes occurs when selling a-la-carte is that the purchaser does not realize the full extent of the capabilities of the particular LLSI. This has occasionally been a problem for

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[63] * * *.

[64] However, Polymer's sale to the * * *.

[65] Of the three domestic producers, * * *.

[66] * * *.

Wyatt. For example, * * * stated that "Wyatt has only the static capability," although the extra-cost option for dynamic measurement was available.[67]

The price of an instrument can vary widely depending upon the different options that are purchased. For example, in January-July 1990 Wyatt sold its Dawn Model F LLSI for as much as *** and as little as ***. The average sale price for the Dawn Model F LLSI, including software and hardware options, during this period was ***. Table 12 lists all of Wyatt's sales in January 1987-August 1990. Figure 3 presents the average percentage share of Wyatt Technology's price accounted for by the Dawn Model F, software, and other options. Figure 4 presents the average price per month of Wyatt's Dawn Model F LLSI for January 1987-July 1990.

Trends.--Trends in transaction prices of complete instrument packages cannot be developed because of the variation in prices resulting from the different options included with the basic instruments. However, list prices, * * * suggest some upward movement in prices. During 1987 the list price for the basic Wyatt Dawn Model F increased from $24,500 in April to $27,500 in September. The list price did not change during 1988, but increased to $31,350 in May 1989 and to $35,000 in March 1990. The prices of many of the computer software and hardware options also increased from 1987 through 1989, and then remained the same through the first half of 1990.

Brookhaven's list price for what it considers a typical purchase of its LLSI was almost constant at $26,675 in 1987 and $26,830 during 1990. LDC did not provide a price list. Prices from January 1987 through July 1990 to unrelated customers of the KMX-6 instrument, its leading model, ranged widely, from *** to *** (table 13 and figure 5).

Information on Polymer's list prices was incomplete, and changes in equipment offered in the base price made the assessment of trends impossible.

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[67] Static capability is synonymous with classical or molecular weight measurement, dynamic with molecular size. Wyatt's price list does not list the autocorrelator for dynamic or particle size measurement as an option, although it does list the autocorrelator interface needed to link its LLSIs with an autocorrelator. However, Wyatt will provide an autocorrelator for $12,500; the autocorrelator interface is available for $6,500. * * * stated that Wyatt Technology does not offer the autocorrelator in their price list because their LLSIs are compatible with any autocorrelator. Wyatt does not want to give the impression that the autocorrelator they offer is the only one compatible with their LLSIs and therefore must be purchased from Wyatt. * * * also stated that their LLSIs are set up to use an autocorrelator, stating that * * *. Dr. Philip Wyatt stated that they will continue to support and upgrade their LLSIs to carry out any additional uses. Respondent argues that Wyatt's LLSIs are less versatile than the Otsuka LLSI because the Otsuka LLSI has built-in dynamic capabilities and the Wyatt LLSIs do not. See conference transcript, p. 127.

Table 12
Classical LLSIs: Wyatt Technology's sales, January 1987-August 1990

Purchaser	Purchase date	Instrument		Software			Options					
		Model F	Model B	Astra	Easi	Aurora	Data board	Amplifi/ Multiplex	High temperature	Peltier heat/cool	Other	Total
*	*	*	*	*	*	*	*	*	*	*	*	*

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

Figure 3
Wyatt Technology's Model Dawn F LLSI: Average percentage share of Wyatt Technology's sale price accounted for by the LLSI, related software, and options, 1989

* * * * * * *

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

Figure 4
Wyatt Technology's Dawn Model F LLSI: Average monthly prices, January 1987-July 1990

* * * * * * *

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

Table 13
Classical LLSIs: LDC Analytical's sales, January 1987-July 1990

Purchaser	Purchase date	KMX-6	GPC	High Temp GPC	Digital Corr.	Polarizer	Software	Total
		*	*	*	*	*	*	*

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

Figure 5
LDC's Model KMX-6 LLSI: Average monthly prices, January 1987-July 1990

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

For example, the DLS-700 was listed at $48,750 in March 1989, including a computer. In February 1990 it was $42,000 without the computer, as shown below.

* * * * * * *

Distribution of sales.--Wyatt listed *** sales to purchasers in the United States during 1987, *** during 1988, *** during 1989, and *** during January-August 1990. During January 1989-August 1990, Wyatt sold only *** Dawn Model B LLSIs. In 1989, *** percent of Wyatt's LLSIs were sold to universities and *** percent were sold to industrial research laboratories. In January-August 1990, universities purchased *** percent of Wyatt's LLSIs; pharmaceutical companies also purchased *** percent; and industrial research laboratories purchased *** percent.

* * * for dynamic measurement were sold but *** LLSIs were equipped with the * * *. Most of Wyatt's LLSIs were equipped with * * *, and, since 1989, most were equipped with * * *.[68] During the period, *** were equipped with the * * * and *** with the * * *.

Brookhaven did not provide individual sales data but did estimate the distribution of its sales to different users. In 1989 and 1990 *** percent of Brookhaven's LLSIs were sold to universities; *** percent were sold to pharmaceutical companies; and *** percent were sold to industrial research laboratories.

In addition to the KMX-6, LDC Analytical sells a less expensive model, the CMX-100. LDC listed *** sales of its KMX-6 LLSI and *** of its CMX-100 to purchasers in the United States during 1987; *** KMX-6's and *** CMX-100's during 1988; *** KMX-6's and *** CMX-100's during 1989; and *** KMX-6's and *** CMX-100's during January-July 1990. In 1989, *** percent of LDC's LLSIs were sold to universities; *** percent were sold to industrial research laboratories; and *** percent were sold to other companies. In January-July 1990, industrial research laboratories purchased *** percent of LDC's LLSIs and *** percent went to other companies.

Polymer Laboratories reported selling *** DLS-700 LLSIs, * * *. * * * were sold for research. Another DLS-700 was imported into the United States * * *, and sold to Dr. Frank Karasz of the University of Massachusetts in 1988.[69] Dr. Karasz also uses his LLSI for research.

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[68] The * * *.

[69] Munhall was the importer of the Otsuka DLS-700 prior to Polymer. For more details see the U.S. importers section of the staff report. In late 1986, Munhall * * *.

Price comparisons of instruments, software, and options.--Because of the inherent differences in types of LLSIs and the variety of configurations of optional equipment, price comparisons of domestic and imported equipment are extremely difficult. The small number of import sales and the questions concerning the use of machines in different applications make price comparisons of equivalent machines problematic. For example, the three Otsuka DLS-700s sold during the investigatory period perform both classical and dynamic measurement. None of the *** Wyatt machines sold during January 1987 to August 1990 were equipped to make dynamic measurement and only *** were purchased with the potential capability of doing so with additional optional equipment.[70] Another fundamental difference between the Wyatt and Otsuka LLSIs is their application in gel permeation chromatography (GPC). Although disputed by both sides, the Wyatt Dawn F appears to lend itself to this application because of its cylinder flow cell. A user survey confirmed that purchasers of the Dawn F were interested in GPC applications.[71] The suitability of the DLS-700 in GPC is open to question,[72] but the DLS-700 sales to date do not appear to be for this purpose.[73]

LLSIs, whether constructed with a fixed array of detectors or with a goniometer, come with a variety of software and options. Each company determines which equipment and software to include in the base price and which to sell separately. List prices of LLSIs and available options for Wyatt, Brookhaven, and Otsuka are provided in table 14. As noted, the base machines are not necessarily equivalent and vary widely in price accordingly, as do several of the options, e.g., the various temperature controls. There are also questions of discounts from list prices, which are discussed in detail in the lost sales and lost revenues section.

Wyatt sells two fixed-array LLSI models with the light detectors spread around the sample cell, the Dawn F and the Dawn B. The 1990 base price of Wyatt's more sophisticated LLSI, the Dawn F, is $35,000, and the price of its Dawn B is $25,000.[74] Wyatt includes its "Dawn" software, which computes the root mean square radius and the second virial coefficient and works interactively

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[70] The *** were sold with * * *. The Brookhaven LLSI, which is most similar to the Otsuka DLS-700, can make dynamic measurements, however, no sales data were provided by Brookhaven. Neither the LDC KMX-6 or CMX-100 is equipped to perform dynamic measurements.

[71] See "Purchaser responses," p.44.

[72] See exhibit 5 of petitioner's prehearing brief.

[73] The Brookhaven LLSI also cannot be used in GPC applications, but LDC's LLSIs are used in GPC applications.

[74] In addition to the standard method of examining the macromolecule in a vial, the Dawn F has a flow cell that allows for on-line, near real-time determinations of molecular weights and sizes of both known and unknown samples. This flow cell allows for use with gel permeation chromatography. GPC is a method of separating an unknown sample into different molecules and identifying the molecules by the separation of wavelengths emitted.

Table 14
LLSIs: List prices for Wyatt Technology, Brookhaven, and Otsuka and their features, whether included in the base machine or available as extra-cost options, 1990[1]

Item	Wyatt Technology		Brookhaven	Otsuka
	Dawn F	Dawn B		DLS-700
Light-scattering instrument[2]	$35,000	$25,000	$26,830[3]	$42,000
Zimm Plot software	2,000	2,000	1,250	included
Debye Plot software	4,500[4]	(5)	(6)	included
Berry Plot software	(4)	(5)	(6)	included
Data translation	1,500	1,500	included	included
Autocorrelator interface	6,500	6,500	included	included
Autocorrelator	12,500	12,500	18,975	included
Temperature control	10,500	10,500	2,500[7]	5,280[7]
AT type computer and printer	3,000	3,000	3,725	4,995
Refractometer	16,500	16,500	na	18,000
Argon-ion laser option	12,600	12,600	15,900	15,500

[1] LDC did not provide a price list.

[2] Each producer's LLSI is inherently different or marketed differently. The Wyatt and Brookhaven machines are not capable of dynamic measurement without extra-cost options. The price of Otsuka's basic machine includes the capability of dynamic measurement.

[3] The Brookhaven price list has many different configurations. The light-scattering instrument and autocorrelator are considered typical purchases for Brookhaven.

[4] The Berry Plot and Debye Plot are both included in Wyatt's "Astra" software.

[5] Not available.

[6] In an April 12, 1990, letter to the Commission, Dr. Walther Tscharnuter, president of Brookhaven Instruments, stated that since 1988 Brookhaven has supplied both the Debye and Berry plots. However, Brookhaven's list prices do not include either item.

[7] External temperature control bath.

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

with other software that has been developed in-house. This configuration does not by itself allow for classical or dynamic measurement.

Both the Brookhaven and Otsuka LLSIs use a goniometer equipped with a single detector. The typical price for a Brookhaven LLSI, which includes a data translation card and an autocorrelator interface, is currently $26,830. The Brookhaven price list is set up differently than Wyatt's and Otsuka's. Its price list has many different configurations. The light-scattering instrument and the autocorrelator listed are considered typical purchases by Brookhaven.

The list price of Otsuka's DLS-700 is $42,000, and includes software to measure molecular weight, a data collection card, and an autocorrelator with interface so that dynamic measurements can also be performed.

Zimm Plot software is required to measure molecular weights. Zimm Plot is an algorithm used to extrapolate to zero angle and zero concentration of the molecule being studied from the data gathered from the different angles. The molecular weight is then calculated from the zero angle. Wyatt provides Zimm Plot capabilities with its "Aurora" software for $2,000. Brookhaven provides Zimm Plot software for $1,250, while Otsuka includes this software in its base price.

The "Debye Plot" and "Berry Plot" software also measure molecular weight, but provide more information than the Zimm Plot. Wyatt provides these capabilities with its "Astra" software for $4,500;[75] Otsuka includes these in its base price; and Brookhaven does not provide them.[76]

A data translation board is used to convert signals from analog form into digital form. Wyatt charges $1,500 for the data translation board. The Brookhaven and Otsuka DLS-700 include this board.

In order to measure particle size, an autocorrelator interface and an autocorrelator must be added to the basic LLSI. Wyatt provides the autocorrelator interface for $6,500 and will provide a Nicomp Autocorrelator for $12,500. Brookhaven charges $18,975 for an autocorrelator, including the autocorrelator interface. Otsuka includes both the autocorrelator interface and the autocorrelator in the basic instrument.

Temperature control options, necessary for particle sizing and for use with a refractometer, are offered by all suppliers. Temperature control is important because the light-scattering properties of the molecules are temperature dependent. Wyatt sells two internal temperature control options, the Peltier heater/cooler option for $10,500 that is used to keep the sample below or at ambient temperatures, and a high temperature option that lists for $9,750 for the Dawn F LLSI and $8,500 for the Dawn B LLSI. Both Brookhaven and Otsuka offer an external temperature control bath that functions much like the internal Peltier heater/cooler. Brookhaven provides the bath for $2,500, while Otsuka charges $5,280.

Other options that are occasionally purchased include computers to run the software packages, printers, refractometers, and argon-ion lasers. Wyatt, Brookhaven, and Otsuka all provide IBM AT type computers and printers to their customers. Wyatt charges $3,000, Brookhaven charges $3,725, and Otsuka charges $4,995 for this option.

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[75] The "Astra" software is only available for the Dawn F.

[76] In an Apr. 12, 1990 letter to the Commission, Dr. Walther Tscharnuter, president of Brookhaven Instruments, stated that since 1988 Brookhaven has supplied both the Debye and Berry plots. However, Brookhaven has yet to include either of these items in its price list.

A refractometer is available from both Wyatt and Otsuka, but not from Brookhaven. Refractometers are used for determining the refractive index increment, a measure of the relationship between a polymer's response in a solvent and the type of solvent.[77] Wyatt sells a refractometer for $16,500, while Otsuka sells one for $18,000. Brookhaven does not offer a refractometer.

An argon-ion laser light option is also available. If the polymer being tested is overly opaque for the standard helium-neon (HeNe) laser, an argon-ion laser is useful. Because the configuration of the LLSI is different for the argon-ion laser, this laser is purchased in place of the standard HeNe laser. Wyatt offers an argon-ion laser for $12,600; Brookhaven offers three different argon-ion lasers for $15,900, $16,950, and $18,950, respectively; and Otsuka offers two different argon-ion lasers, one for $15,500 and the other for $34,500.

Purchaser responses.--Twenty-one questionnaires were received from purchasers.[78] All twenty-one of these purchasers had either bought or leased a LLSI. Reported purchases of LLSIs from domestic purchasers accounted for 33 percent of total reported U.S. shipments of LLSIs during 1989-July 1990. Purchasers of the Otuska DLS-700 accounted for 100 percent of imports during the period of investigation.

Knowledge of available LLSIs.--Purchasers were generally aware of the types of LLSIs available, the method of detection used, and the applications of each LLSI. When asked to list domestic and foreign LLSI producers that were contacted when they decided to buy a LLSI, purchasers listed Wyatt *** times, Brookhaven *** times, LDC *** times, and Otsuka *** times. When asked to list the LLSI producers by method of laser light scattering, Wyatt was listed by 16 purchasers as a multi-angle instrument, and Brookhaven and Otsuka were each listed by 7 purchasers as multi-angle instruments. LDC was listed by 8 purchasers as a low-angle instrument.

Purchasers were generally aware of who manufactured the LLSI they purchased. Seven purchasers were aware of two relatively new suppliers of LLSIs to the United States--Otsuka and Oros.[79] They became aware of these suppliers from colleagues, magazine advertisements, trade shows, conferences, and direct contacts.

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[77] The refractive index increment is the percentage change of the refractive index relative to the concentration of the solvent. Since the refractive indexes of all known polymers relative to the most popular solvents are widely available in books, few refractometers are sold. Companies creating new polymers or companies that use unusual solvents would need refractometers.

[78] Thirty-six purchaser questionnaires were sent. All of Wyatt's customers during January 1989-July 1990 were sent questionnaires. * * * was also sent a questionnaire because it made multiple purchases. All purchasers of the Otsuka DLS-700 during the period of investigation were sent questionnaires.

[79] Oros produces an LLSI that makes dynamic measurements. It is imported from the United Kingdom.

Purchasers were asked to list the three major factors generally considered when selecting suppliers. The reasons given most often were quality, specific features, price, availability, and support service. Most purchasers stated that they know the country of origin of the LLSI(s) they purchased. Only five purchasers stated that there were quality differences between domestic and Japanese LLSIs. Three purchasers stated that the domestic LLSIs were better, and two stated that the Japanese LLSIs were better. Four purchasers stated that these quality differences affected their purchase decision.

Gel permeation chromatography.--Twenty-two purchasers,[80] accounting for *** percent of Wyatt's Dawn Model F LLSI sales from January 1989 to July 1990, were asked if they purchased the Model F specifically for use in gel permeation chromatography. Eighteen, or *** percent of the purchasers said that they bought the Wyatt machine primarily to be used as a detector in GPC. Five purchasers stated that they have no other uses for the machine, while nine said they had current uses for the machine other than GPC detection (uses that could be performed by the imported product). The remaining four said that they anticipated additional uses of the Wyatt machine--uses that could be performed by the DLS-700. See figure 6.

Many of those questioned said that they were not interested in a product that was not capable of performing GPC detection. * * * said his evaluation of the Otsuka DLS-700 LLSI showed that it could not perform GPC detection.

Lost sales and lost revenues

Two lost sales and no lost revenues were alleged in the questionnaire responses. Another sale was lost by * * * to Otsuka. One Japanese instrument was sold in both 1988 and 1989 and another was leased in April 1990 before being purchased 3 months later. In each case there was competition from a domestic instrument.

Munhall sold one machine to Dr. Karasz of the University of Massachusetts in 1988 for ***. Dr. Karasz stated: "I understood that the price was discounted to reflect my efforts in getting the DLS-700 into working order."[81] Although aware of both the Wyatt and Brookhaven instruments, Dr. Karasz did not consider either one because he thought that the Wyatt was designed specifically for GPC, and he thought that the Brookhaven was designed for dynamic measurement.[82]

Polymer Laboratories sold one machine to * * * of the University of Oklahoma in 1989 for ***. Polymer Laboratories states that * * *, so that they can be

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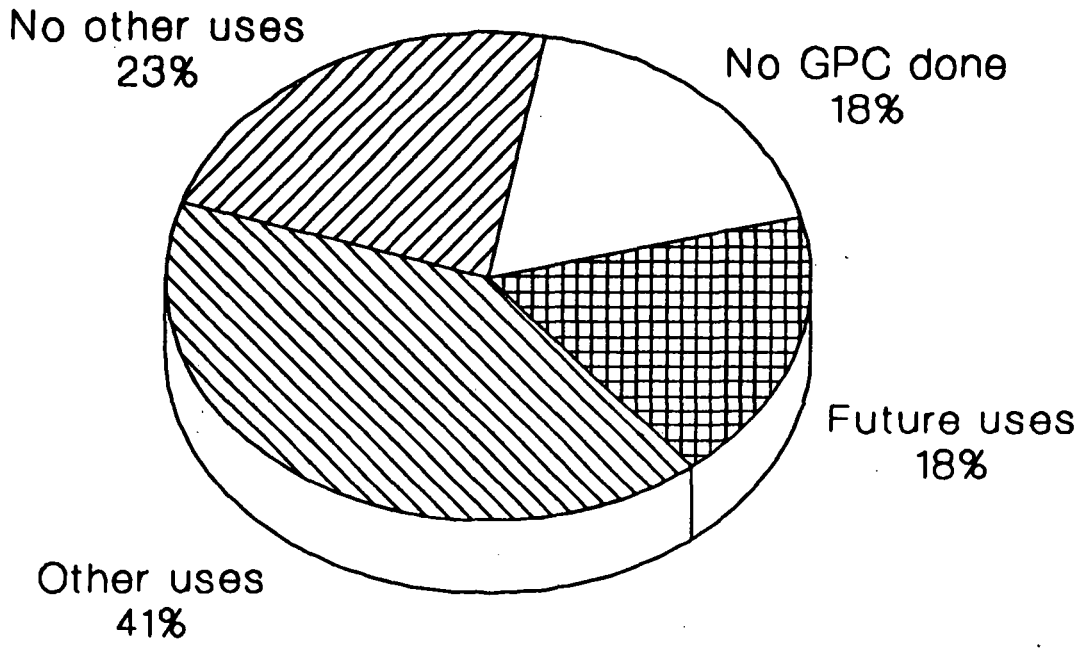
[80] These responses were gathered in a telephone survey. All those contacted had purchased the Wyatt Dawn Model F during either 1989 or January-July 1990.

[81] See respondent's prehearing brief, appendix 2, p. 5.

[82] Ibid.

Figure 6
Uses of the Wyatt Dawn Model F by purchasers who purchased the Wyatt LLSI in 1989 and 1990



No GPC done: Purchasers that presently do not preform GPC detection.
No other users: Purchasers that only do GPC detection and will only preform GPC detection in the future.
Future uses: Purchasers that only do GPC detection but anticipate other uses in the future.
Other uses: Purchasers that purchased the Wyatt LLSI for GPC detection but currently have other uses for their machine.

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

used as a reference site. In this case a * * * was made."[83] The price to * * * was *** below the 1989 list price of $48,750 for Otsuka's basic LLSI. Polymer's March 1989 price list included a computer in the base price of $48,750. Polymer offered the DLS-700 with the computer to * * * for ***. * * * purchased the DLS-700 without the computer.

* * * said that he had originally * * * a Brookhaven LLSI for ***. When * * * called Brookhaven and was told that * * *. When Brookhaven personnel indicated that * * *. He then called a friend * * *, who owns an Otsuka DLS-700 and a * * * LLSI. * * *, who purchased his Otsuka in 1986, recommended the Otsuka and stated that the * * *. * * * never considered * * * LLSIs.[84]

Polymer Laboratories also * * *. Operating under a severe time constraint to * * * a LLSI, * * * tested Otsuka's DLS-700 and Wyatt's Dawn F LLSIs. * * * said that both machines are excellent and that he wishes he could have both. He said that each machine has certain capabilities that are superior to the other and that both machines are well suited for research. * * * believes that for general research either machine could be used, but if very specialized research is performed, then the LLSI most suitable for that type of research should be used. * * * stated that his selection of the DLS-700 was made partially because it included more equipment in its basic package than the Dawn F and was, therefore, better able to perform some of his tests. He did not have time to obtain optional equipment from * * *.

Two additional criteria contributed to his choice of the DLS-700. First, it was delivered with a florescence blocking filter while the Dawn F was not. Second, * * * stated that although a fixed array, multiple detector system, such as the Dawn F, is capable of depolarization, he was worried that the filters used on the detectors would not be completely uniform. Since the DLS-700 has only a single detector, it would not have the problem of uniformity between filters. * * * added that another advantage the DLS-700 has over the Dawn F is that the DLS-700 comes with the autocorrelator.

* * * pointed out that a number of the options available on the Dawn F made it a better machine for other types of research. He stated that the Dawn F had a vastly superior temperature control system that makes it better suited for thermodynamic research. He also stated that the Dawn F's internal bath system (the Peltier heater/cooler) was superior to the DLS-700's external bath because it provided a better regulation of ambient or cooler temperatures. The Dawn F flow cell was also viewed by * * * as very advantageous for most types of research.

Both Otsuka and Wyatt offered lease agreements with an option to buy. Otsuka charged * * *. Wyatt listed in its lease agreement for its Dawn F a charge of * * *.

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[83] Polymer Laboratories said the list price for this LLSI was $43,755, which differs from the $48,750 listed in its sales brochure by $4,995, or the price of the computer.

[84] Telephone conversation with * * *.

* * * has * * * the DLS-700 for ***. The purchase price was *** for the DLS-700, *** for a helium-neon laser, *** for a high-speed correlator module, *** for an interference filter to eliminate fluorescence, and *** for polarizer prisms.

Exchange rates

Quarterly data reported by the International Monetary Fund indicate that during the period January 1987-June 1990 the nominal value of the Japanese yen fluctuated, depreciating by 1.3 percent relative to the U.S. dollar (table 15).[85] Adjusted for movements in producer price indexes in the United States and Japan, the real value of the Japanese currency depreciated by 9.6 percent in the period covered.

[85] International Financial Statistics, August 1990.

Table 15
Exchange rates:[1] Nominal and real exchange rates of the Japanese yen, and producer price indexes in the United States and Japan,[2] by quarters, January 1987-June 1990

Period	U.S. producer price index	Japanese producer price index	Nominal exchange-rate index	Real exchange-rate index[3]
1987:				
January-March.....	100.0	100.0	100.0	100.0
April-June.....	101.6	99.2	107.4	104.8
July-September.....	102.8	100.5	104.3	101.9
October-December....	103.2	100.1	112.8	109.5
1988:				
January-March.....	103.8	99.0	119.7	114.1
April-June.....	105.6	98.6	121.9	113.9
July-September.....	107.1	99.5	114.6	106.5
October-December....	107.6	98.7	122.3	112.2
1989:				
January-March.....	109.9	99.2	119.2	107.6
April-June.....	111.8	101.8	110.9	101.1
July-September.....	111.3	102.6	107.6	99.2
October-December....	111.8	102.4	107.1	98.1
1990:				
January-March.....	113.5	102.9	103.6	93.9
April-June.....	113.2	103.6	98.7	90.4

[1] Exchange rates expressed in U.S. dollars per Japanese yen.

[2] Producer price indexes--intended to measure final product prices--are based on 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. Producer prices in the United States increased 13.2 percent between January 1987 and June 1990 compared with a 3.6-percent increase in Japanese prices during the same period.

Note.--January-March 1987=100.

Source: International Monetary Fund, International Financial Statistics, August 1990.

APPENDIX A

COMMISSION'S FEDERAL REGISTER NOTICE AND LIST OF WITNESSES APPEARING AT THE HEARING

[Investigation No. 731-TA-455 (Final)]

Institution; Certain Laser Light-Scattering Instruments and Parts Thereof From Japan

AGENCY: United States International Trade Commission.

ACTION: Institution of a final antidumping investigation and scheduling of a hearing to be held in connection with the investigation.

SUMMARY: The Commission hereby gives notice of the institution of final antidumping investigation No. 731-TA-455 (Final) under section 735(b) of the Tariff Act of 1930 (19 U.S.C. 1673(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 certain laser light-scattering instruments and parts thereof,[1] provided for in subheadings 9027.30.40 and 9027.90.40 of the Harmonized Tariff Schedule of the United States (previously under item 712.49 of the former Tariff Schedules of the United States), 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 (LTFV). Unless the investigation is extended, Commerce will make its final LTFV determination on or before September 12, 1990 and the Commission will make its final injury determination by November 2, 1990 (see sections 735(a) and 735(b) of the act (19 U.S.C. 1673d(a) and 1673d(b))).

For further information concerning the conduct of this investigation, hearing procedures, and rules of general application, consult the Commission's Rules of Practice and Procedure, part 207, subparts A and C (19 CFR part 207), and part 201, subparts A through E (19 CFR part 201).

EFFECTIVE DATE: July 6, 1990.

FOR FURTHER INFORMATION CONTACT: Elizabeth Haines (202-252-1200), 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 certain laser light-scattering instruments and parts 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 March 19, 1990 by Wyatt Technology Corp., Santa Barbara, CA. 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 a reasonable indication that an industry in the United States was threatened with material injury by reason of imports of the subject merchandise (55 FR 20315, May 16, 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 CFR 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 section 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 §§ 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 not 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 September 7, 1990, 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 September 25, 1990 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 September 17, 1990. 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 September 18, 1990, 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 September 19, 1990. If prehearing briefs contain business proprietary information, a nonbusiness proprietary version is due September 20, 1990.

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 materials 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

[1] The products covered by this investigation are laser light-scattering instruments and parts thereof from Japan that have classical measurement capabilities, whether or not also capable of dynamic measurements. The following parts are included in the scope of the investigation when they are manufactured for use only in a LLSI: Scanning photomultiplier assemblies, immersion baths, sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discriminator circuitry, and optical benches.

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 October 2, 1990. If posthearing briefs contain business proprietary information, a nonbusiness proprietary version is due October 3, 1990. In addition, any person who has not entered an appearance as a party to the investigation may submit a written statement of information pertinent to the subject of the investigation on or before October 2, 1990.

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 October 5, 1990. 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 October 9, 1990.

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).

By order of the Commission.

Issued: July 18, 1990.

Kenneth R. Mason,

Secretary.

[FR Doc. 90-17340 Filed 7-24-90; 8:45 am]

BILLING CODE 7020-02-M

CALENDAR OF PUBLIC HEARING

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

Subject	:	CERTAIN LASER LIGHT-SCATTERING INSTRUMENTS AND PARTS THEREOF FROM JAPAN
Inv. No.	:	731-TA-455 (Final)
Date and Time	:	September 25, 1990 - 9:30 a.m.

Sessions were held in connection with the investigation in the Main Hearing Room 101 of the United States International Trade Commission, 500 E Street, S.W., Washington, D.C.

In Support of Imposition of Antidumping Duties:

Wyatt Technology Corporation
Santa Barbara, California

Geofrey K. Wyatt, Executive Vice President

Philip J. Wyatt, President

In Opposition to the Imposition of
Antidumping Duties:

Irell & Manella
Washington, D.C.
On behalf of

Otsuka Electronics Co., Ltd

Kenji Nakayama

John MacKay

Dr. Andrew Blow

Dr. Frank Karasz

Dr. Guy Berry, Laser Light Scattering Expert

Andrew Wechsler, Sr. Vice President, Economists, Inc.

Peter Von Luewen, Economists, Inc.

Arthur S. Lowry)
Susan Liebler)--OF COUNSEL
Harold Kruth)

- end -

APPENDIX B

COMMERCE'S FEDERAL REGISTER NOTICE

[A-588-813]

Final Determination of Sales at Less Than Fair Value; Certain Light Scattering Instruments and Parts Thereof From Japan

AGENCY: Import Administration, International Trade Administration, Commerce.

ACTION: Notice.

SUMMARY: We determine that imports of certain light scattering instruments and parts thereof (LSIs) from Japan are being, or are likely to be, sold in the United States at less than fair value. We have notified the U.S. International Trade Commission (ITC) of our determination and have directed the U.S. Customs Service to continue to suspend liquidation of all entries of LSIs from Japan. The ITC will determine by November 7, 1990, whether these imports injure, or threaten material injury to, the U.S. industry.

EFFECTIVE DATE: August 27, 1990.

FOR FURTHER INFORMATION CONTACT: Erik Warga or Louis Apple, 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) 377-8922 or (202) 377-1769, respectively.

SUPPLEMENTARY INFORMATION:

Final Determination

We determine that imports of LSIs 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) (the Act). The estimated weighted-average margins are shown in the "Continuation of Suspension of Liquidation" section of this notice.

Case History

The Department published its preliminary determination in the Federal Register on July 10, 1990 (55 FR 28271). Petitioner submitted comments on July 9, 1990. The foreign manufacturer, Otsuka Electronics Company, submitted comments on July 11, 1990.

Scope of Investigation

The products covered by this investigation are light scattering instruments, and the parts thereof specified below, from Japan that have classical measurement capabilities, whether or not also capable of dynamic measurements. Classical measurement (also known as static measurement) capability usually means the ability to measure absolutely (*i.e.*, without reference to molecular standards) the weight and size of macromolecules and submicron particles in solution, as well as certain molecular interaction parameters, such as the so-called second virial coefficient. (An instrument that uses single-angle instead of multi-angle measurement can only measure molecular weight and the second virial coefficient.) Dynamic measurement (also knows as quasi-elastic measurement) capability refers to the ability to measure the diffusion coefficient of molecules or particles in suspension and deduce therefrom features of their size and size distribution. LSIs subject to this investigation employ laser light and may use either the single-angle or multi-angle measurement technique.

The following parts are included in the scope of the investigation when they are manufactured according to specifications and operational requirements for use only in an LSI as defined in the preceding paragraph: scanning photomultiplier assemblies, immersion baths (to provide temperature stability and/or refractive index matching), sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discriminator circuitry, and optical benches. LSIs subject to this investigation may be sold inclusive or exclusive of such accessories as personal computers, cathode ray tube displays, software, or printers. LSIs are currently classifiable under Harmonized Tariff Schedule (HTS) subheading 9027.30.40. LSI parts are currently classifiable under HTS subheading 9027.90.40. HTS subheadings are provided for convenience and U.S. Customs Service purposes. The written description remains dispositive.

Different items with the same name as subject parts may enter under subheading 9027.90.40. To avoid the unintended suspension of liquidation of non-subject parts, those items entered under subheading 9027.90.40 and generally known as scanning photomultiplier assemblies, immersion baths, sample-containing structures, electronic signal-processing boards, molecular characterization software, preamplifier/discriminator circuitry, and optical benches must be accompanied by an importer's declaration to the Customs Service to the effect that they are not manufactured for use in a subject LSI.

Period of Investigation

The period of investigation is October 1, 1989, through March 31, 1990.

Fair Value Comparisons

To determine whether sales of LSIs from Japan to the United States were made at less than fair value, we compared the United States price (USP) to the foreign market value (FMV), as specified in the "United States Price" and "Foreign Market Value" sections of this notice. We used best information available as required by section 776(c) of the Act because Otsuka failed to respond to the Department's request for information. We determned that the best information available was information submitted by the petitioner.

United States Price

U.S. price is based on an alleged actual price from Otsuka's unrelated U.S. distributor to a U.S. customer, as reported in the petition. We assume that unrelated distributor must apply a mark-up to cover expenses and profit, but pettioner provided no specific information on the mark-up percentages. Thus, we assumed, as best information available, that the distributor marks up the LSI it buys from Otsuka by 10 percent of the LSI cost (*i.e.*, the alleged actual price) for selling, general, and administrative expenses (SF&A) and 8 percent of the figure representing cost plus SG&A to account for profit and reduced the U.S. price accordingly. This methodology, using the statutory percentages for constructed value calculations under 19 CFR 353.50(a)(2), was chosen as a reasonable estimate in the absence of information on the actual mark-up percentage. We also adjusted for U.S. Customs fees and duty. We made no further adjustments because we had no information on other charges associated with U.S. sales.

Foreign Market Value

We based FMV on a November 1989 price list issued by Otsuka for the Japanese market, as reported in the petition. We applied an estimated discount to the reported home market list price for purposes of calculating the FMV. We based the estimated discount on the difference, as a percentage of U.S. list price, between the U.S. list price and an alleged actual U.S. price for an LSI, both of which were reported in the petition. We made no further adjustments because we had no information on circumstances of sale and charges associated with home market sales.

Interested Party Comments

Comment 1: Petition argued that the imputed home market discount of 28.21 percent of the list price should be lowered because petitioner's experience is that scientific instruments in Japan are discounted only five to ten percent from list prices.

DOC Position: We based discounts in both markets on information in the petition. Since the petition contained information only on Otsuka's U.S. discount policy and petitioner provided no evidence to support a policy of granting smaller discounts in the Japanese market, we assumed that Otsuka's home market and U.S. market discount policies are comparable.

Comment 2: Otsuka submitted a list of certain LSI parts and requested that these parts not be included in the scope of the investigation because they are off-the-shelf and not manufactured for use only in an LSI.

DOC Position: We did not include in the scope of the investigation the parts listed by Otsuka for purposes of our preliminary determination, and will not include them for purposes of our final determination.

Continuation of Suspension of Liquidation: We are directing the U.S. Customs Service to continue to suspend liquidation, under section 733(d) of the Act, of all entries of LSIs from Japan, as defined in the "Scope of Investigation" 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 continue to 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. The suspension of liquidation will remain in effect until further notice.

The weighter-average dumping margins are as follows:

Manufacturer/Producer/Exporter	Margin percentage
Otsuka Electronics Co., Ltd.	129.71
All Others	129.71

ITC Notification

In accordance with section 735(d) of the Act, we have notified the ITC of our determination. In addition, we are making available to the ITC all nonprivileged and nonproprietary information relating to this investigation. We will allow the ITC access to all privileged and business proprietary information in our files, provided the ITC confirms in writing 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, or threat of material injury, does not exist with respect to LSIs, the proceeding will be terminated and all securities posted as a result of the suspension 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 duties on all LSIs from Japan, on or after the effective date of the suspension of liquidation, equal to the amount by which the foreign market value exceeds the U.S. price.

This determination is published pursuant to section 735(d) of the Act (19 U.S.C. 1673d(d)) and 19 CFR 353.20

Dated: August 16,1990.

Eric I. Garfinkel,

Assistant Secretary for Import Administration.

[FR Doc. 90-20054 Filed 8-24-90; 8:45 am]

BILLING CODE 3510-DS-M

APPENDIX C

PERCENTAGE CHANGES IN MARKET DATA

Table C-1
Laser light-scattering instruments: Percentage changes in market data, 1987-88, 1988-89, and January-June 1989-1990

Item	1987-88	1988-89	January-June 1989-90

* * * * * * *

Source: Compiled from data presented in the section of this report entitled "Information Obtained in the Investigation."

APPENDIX D

COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS OF CLASSICAL LLSI ON THEIR GROWTH, INVESTMENT, ABILITY TO RAISE CAPITAL, AND EXISTING 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 laser light scattering instruments from Japan on their firm's growth, investment, and ability to raise capital, or existing development and production efforts. * * *.

Actual negative impact - * * *

Anticipated negative impact - * * *

Effect on scale of capital investment - * * *