Vector Supercomputers from Japan

Investigation No. 731-TA-750 (Preliminary)

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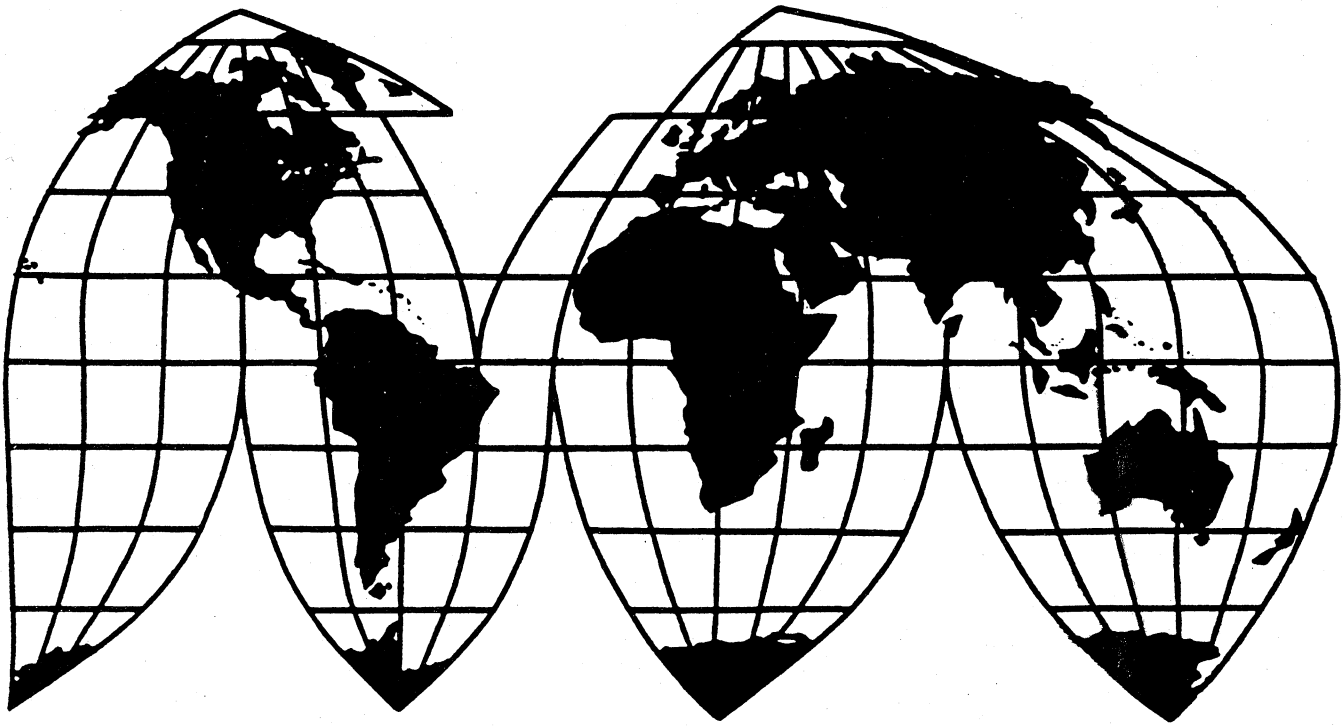
U.S. International Trade Commission



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GLOSSARY OF ABBREVIATIONS

Alliant	Alliant Computer Systems
American	American Supercomputers
ASCI	DOE's Accelerated Strategic Computing Initiative
BAFO	Best and final offer
Celerity	Celerity Computing
Chopp	Chopp Computer
CCC	Cray Computer Corporation
Commerce	U.S. Department of Commerce
Commission	U.S. International Trade Commission
CMOS	Complimentary metal oxide semiconductor
Convex	Convex Technology Center of Hewlett Packard
CPU	Central processing unit
CRI	Cray Research, Inc.
Culler	Culler Scientific Systems
Digital	Digital Equipment Corporation (DEC)
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DRAM	Dynamic random access memory
ECD	Emitter-collector-dotted
ECL	Emitter coupled logic
ETA	ETA Systems
FCC	Federal Computer Corporation
Floating Point	Floating Point Systems
Fujitsu	Fujitsu Limited or Fujitsu America
Gflops	Gigaflops (billions of floating point operations per second)
HNSX	HNSX Supercomputer, Inc.
HP	Hewlett-Packard
HTS	Harmonized Tariff Schedules of the United States
IDC	International Data Corporation
I/O	Input/output
KSR	Kendall Square Research
Key	Key Computer
LAN	Local area network
LLNL	Lawrence Livermore National Laboratory
LTD	Live test demonstration
LTFV	Less than fair value
Mflops	Megaflops (millions of floating point operations per second)
MPP	Massively parallel processor system
Multi-Flow	Multi-Flow Computer
NCAR	National Center for Atmospheric Research
NEC	NEC Corporation and NEC Systems Lab
NSF	National Science Foundation
NTT	Nippon Telephone and Telegraph
PVP	Parallel vector processing
RFP	Request for proposal
RISC	Reduced instruction set computer

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RISC	Reduced instruction set computer
Sandia	Sandia National Laboratories
Saxpy	Saxpy Computer
Scientific Computer	Scientific Computer Systems
SGI	Silicon Graphics, Inc.
SMP	Symmetric multiprocessor
SPP	Scalable parallel processing
SRAM	Static random access memory
SSD	Scalable Systems Division
Sun	Sun Microsystems
Tera	Tera Computer Company
TMC	Thinking Machines Corporation
UCAR	University Corporation for Atmospheric Research
WAN	Wide area network

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UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-750 (Preliminary)

VECTOR SUPERCOMPUTERS FROM JAPAN

Determination

On the basis of the record[3] developed in the subject investigation, the Commission determines, pursuant to section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(a)), that there is a reasonable indication that an industry in the United States is threatened with material injury[4] by reason of imports from Japan of vector supercomputers, provided for in heading 8471of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value (LTFV).

Commencement of Final Phase Investigation

Pursuant to section 207.18 of the Commission's rules, as amended in 61 FR 37818 (July 22, 1996), the Commission also gives notice of the commencement of the final phase of its investigation. The Commission will issue a final phase notice of scheduling which will be published in the *Federal Register* as provided in section 207.21 of the Commission's rules upon notice from the Department of Commerce (Commerce) of an affirmative preliminary determination in the investigation under section 703(b) of the Act, or, if the preliminary determination is negative, upon notice of an affirmative final determination in that investigation under section 705(a) of the Act. Parties that filed entries of appearance in the preliminary phase of the investigation need not enter a separate appearance for the final phase of the investigation. Industrial users, and, if the merchandise under investigation is sold at the retail level, representative consumer organizations have the right to appear as parties in Commission antidumping and countervailing duty investigations. The Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to the investigation.

Background

On July 29, 1996, a petition was filed with the Commission and the Department of Commerce by Cray Research, Inc., Eagan, MN, alleging that an industry in the United States is materially injured or threatened with material injury by reason of LTFV imports of vector supercomputers from Japan. Accordingly, effective July 29, 1996, the Commission instituted antidumping investigation No. 731-TA-750 (Preliminary).

Notice of the institution of the Commission's investigation and of a public conference to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of August 7, 1996 (61 F.R. 41181). The conference was held in Washington, DC, on August 20, 1996, and all persons who requested the opportunity were permitted to appear in person or by counsel.

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

[4] Commissioner Nuzum dissenting and Commissioners Watson and Crawford not participating.

VIEWS OF THE COMMISSION

Based on the record in this investigation,[1] we find that there is a reasonable indication that an industry in the United States is threatened with material injury by reason of imports of vector supercomputers from Japan that are allegedly sold in the United States at less than fair value ("LTFV").[2]

I. THE LEGAL STANDARD FOR PRELIMINARY DETERMINATIONS

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

II. DOMESTIC LIKE PRODUCT AND INDUSTRY

A. In General

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

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[1] Under the Commission's amended regulations that became effective August 21, 1996, the Commission will now conduct a single, continuous investigation in contrast to the discrete preliminary and final investigations it conducted under its prior regulations. *See* Amendments to Rules of Practice and Procedure, 61 Fed. Reg. 37,818, 37,819 (July 22, 1996). Under these new rules, the preliminary portion of the Commission's injury investigation will now be referred to as the Commission's "preliminary phase of the investigation." Id. at 37,832. Because we commenced this investigation prior to the effective date of the rules, we refer to this investigation as this "preliminary investigation." We have, however, published notice of the commencement of a final phase investigation in the notice announcing our preliminary affirmative determination.

[2] Commissioner Nuzum dissents from this determination. She joins the discussion of Applicable Legal Standard, Domestic Like Product and Industry. See Dissenting Views of Commissioner Janet A. Nuzum. Commissioner Crawford and Commissioner Watson did not participate in this investigation.

[3] 19 U.S.C. § 1673b(a); *see also* American Lamb Co. v. United States, 785 F.2d 994 (Fed. Cir. 1996); Calabrian Corp. v. United States, 794 F. Supp. 377, 381 (Ct. Int'l Trade 1992).

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

[5] 19 U.S.C. § 1677(4)(A).

[6] 19 U.S.C. §1677(4)(A).

[7] 19 U.S.C. §1677(10).

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

B. Analysis of Domestic Like Product

> In its notice of initiation, Commerce defined the articles subject to this investigation as follows: [a]ll vector supercomputers, whether new or used, and whether in assembled or unassembled form, as well as vector supercomputer spare parts, repair parts, upgrades, and system software shipped to fulfill the requirements of a contract for the sale and, if included, maintenance of a vector supercomputer. A vector supercomputer is any computer with a vector hardware unit as an integral part of its central processing unit boards.[12]

Generally, supercomputers are differentiated from other computers by two factors--high processing speeds and the ability to handle numerically intensive problems too large for conventional computers. Technological innovations have enabled some computer systems to challenge the superiority of traditional supercomputers in terms of processing speed. However, not all of these systems have the capability of the most advanced scientific and commercial applications at the speed of a true supercomputer.[13]

Supercomputers can be divided into two main categories: vector supercomputers and various types of parallel processor systems (non-vector systems). Vector computers use a particular computer architecture which is designed to perform operations on large arrays of numbers called vectors.[14]

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[8] *See, e.g.,* Nippon Steel Corp. v. United States, Slip Op. 95-57, at 11 (Ct. Int'l Trade Apr. 3, 1995). The Commission generally considers a number of factors including: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) customer and producer perceptions of the products; (5) common manufacturing facilities, production processes and production employees; and, where appropriate, (6) price. *See* id. at n.4, 18; Timken Co. v. United States, Slip Op. 96-8, at 9 (Ct. Int'l Trade Jan. 3, 1996).

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

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

[11] Hosiden Corp. v. Advanced Display Manufacturers, __ F.3d __, No. 94-1380, slip op. at 11-13 (Fed. Cir. May 31, 1996) (Commission may find single like product corresponding to several different classes or kinds defined by Commerce); Torrington, 747 F. Supp. at 748-752 (affirming Commission determination of six like products in investigations where Commerce found five classes or kinds).

[12] 61 Fed. Reg. 43527-28 (August 23, 1996).

[13] Confidential Report ("CR") at I-2, Public Report ("PR") at I-2.

[14] CR at I-2, PR at I-1. For purposes of this opinion and analysis, non-vector supercomputers refer to any supercomputer which performs parallel processing without vector processing capability. These include clustered

(continued...)

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Petitioner CRI, Inc. ("Cray" or "petitioner") argues that the domestic like product includes only vector supercomputers, which is commensurate with the scope of the investigation.[15] Respondents NEC Corporation and HNSX Supercomputers, Inc. ("NEC") accept petitioner's contention that the correct like product is vector supercomputers for purposes of this preliminary investigation.[16] Respondents Fujitsu Limited and Fujitsu America, Inc. ("Fujitsu") argue that the like product should be defined to include both vector processors and massively parallel processors, which are non-vector supercomputers.[17]

Non-vector supercomputers utilize parallel processors to process data. These systems are characterized by the ability to process data using more than one processor (i.e., in parallel). Separate parts of the program and the data are assigned to each processor and all processors carry out the required calculations simultaneously.[18] Communications among parallel processors are handled by a routing network, which transfers messages within the computer system.[19] The number of processors can range from a few to many (a characteristic known as "scalability").[20]

Although parallel processing has many forms, and supercomputers which process in parallel can be highly parallel or moderately parallel, they have in common multiple processing elements. The distinguishing characteristics among different types of parallel processors are the internal communications systems, memory structure, and the number of instruction units that communicate with the processing elements.[21]

For the reasons discussed below, we find, for purposes of this preliminary investigation, the like product consists of only vector supercomputers, as defined by Commerce.

1. Physical Characteristics and End Uses

Physical differences between vector and non-vector systems supercomputers result in the two systems processing data differently. Vector supercomputers use particular hardware specially designed to process data in groups called vectors, which is particularly well suited to simulating complex problems over time. The processor treats each vector as a single entity; adding two vectors together

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[14] (...continued)
workstations, massively parallel processors (MPPs), scalable parallel processors, (SPPs), and symmetric multiprocessors (SMPs). See CR at I-2-3; 8-9, PR at I-2, 5.

[15] Petitioner's Postconference Brief at 5.

[16] NEC's Postconference Brief at 1. NEC states, however, that should this matter proceed to a final investigation, it reserves its right to argue for a broader definition of the like product. Id.

[17] Fujitsu's Postconference Brief at 4. Fujitsu does not appear to address whether clustered workstations, which are also considered parallel processing supercomputers, should be included in the domestic like product. We note that Fujitsu considers symmetric multiprocessors (SMPs) to be grouped along with its definition of MPPs. CR at I-4, n.11, PR at I-3, n.11. SMPs contain multiple processing units that share a common memory, and are considered to be the most fully developed parallel processor to date. CR at I-9, PR at I-5.

[18] CR at I-3, PR at I-2.

[19] CR at I-3, PR at I-2.

[20] CR at I-3, PR at I-2.

[21] CR at I-6-7, PR at I-4.

takes only as long as it takes to add two numbers.[22] In parallel processing, however, separate parts of the program and the data are assigned to each processor, and all processors carry out the required calculations simultaneously.[23] Most vector supercomputers have one large shared memory [24] and programming is specially designed to minimize the time required to bring needed data from memory to processors and to the appropriate output device. Vector supercomputers generally use custom logic chips, whereas most other supercomputers use commodity chips.[25]

Non-vector systems, which process in parallel, vary widely among themselves in architecture, performance, and applications and encompass a broad array of products.[26] The range of products includes clustered workstations at the low end, (which would probably not be used in the same applications as a vector supercomputer) to SMPs at the high end (which compete for some applications with vector computers).[27] All non-vector supercomputers have in common, however, multiple processing elements.[28] The distinguishing characteristics between vector and non-vector supercomputers are the internal communications system, memory structure, and the number of instruction units that communicate with the processing elements.[29] Non-vector supercomputers are of a distinctly different design, process data differently, and require different software from that of vector supercomputers.[30]

Based on the foregoing, we find for purposes of this preliminary determination that vector and non-vector supercomputers have significantly differentiated physical characteristics.

2. Interchangeability

For some applications, parallel supercomputers are interchangeable with vector supercomputers, and have increasingly been used to solve at least some of the same problems. Numerous factors, however, limit the interchangeability between various architectures and sizes of supercomputers. These factors include the time sensitivity and complexity of the problem, the size of the data set, software, price, cost of maintenance, the presence of parallelism in the application, and the ability to expand the system.[31] In many cases, vector supercomputers and some types of parallel processing machines perform similar analyses, and therefore appear to be interchangeable to a certain degree. However, several types of systems or features of systems in parallel computing may make them less desirable for some applications, thereby limiting the interchangeability with vector computers.[32] For example, parallel computers with only one instruction unit and processors that work in lock-step are not preferred for most intricate applications. Additionally, clustered workstations, which are at the low end of the range of

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[22] CR at I-3, PR at I-2.

[23] CR at I-3, PR at I-2.

[24] Fujitsu vector supercomputers do not have a shared memory, but do use vector processing. CR at I-6, PR at I-4.

[25] CR at I-9, PR at I-6.

[26] CR at I-6, PR at I-4.

[27] CR at I-8, 11, PR at I-4, 7.

[28] CR at I-6, PR at I-4.

[29] CR at I-7, PR at I-4.

[30] CR at I-2, PR at I-1.

[31] CR at I-11, PR at I-7.

[32] CR at I-11, PR at I-7.

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parallel processing systems, are not likely to perform well on very large simulations, especially if the problem is time-sensitive.[33] Applications that consist of many independent calculations, and can be parallelized, may run more efficiently on a parallel processing computer. Conversely, applications that are highly scalar, those that require serial processing, usually run faster on vector supercomputers.[34]

On balance, vector and non-vector supercomputers appear to be interchangeable for at least some applications. However, there appear to be some applications at the higher end of the computing spectrum for which vector processors are uniquely suited. We intend to examine further in any final phase investigation the extent to which vector and non-vector supercomputers are interchangeable.

3. Channels of Distribution

The majority of vector and non-vector supercomputers are sold in similar channels of distribution. Both are sold either by the manufacturer's direct sales force or on a competitive-bid basis for contracts announced by purchasers. The contracts are generally for entire systems, which almost always require extensive software and installation support and on-site engineering by the manufacturer for the system's operational life. Included with the system are certain spare parts to facilitate repairs, upgrades, and maintenance.[35] Clustered workstations that are connected with a local area network ("LAN") or wide area network ("WAN") may, however, be set up from "off the shelf" components. These types of systems are sold at the retail level, and, therefore, do not share the same channels of distribution with higher end non-vector and vector supercomputers.[36]

4. Manufacturing Processes and Production Employees

Petitioner, the only domestic manufacturer of both vector and non-vector systems, reported that it did not produce other products on the same equipment and machinery used in the production of vector supercomputers.[37] It did, ***.[38] Convex, a domestic manufacturer that ceased production of vector supercomputers in favor of non-vector systems after its acquisition by Hewlett Packard, reported that ***.[39] It appears from Convex's limited questionnaire response that ***.[40] ***. In any final phase investigation, we will seek to clarify the extent to which modifications are necessary in order to shift from the production of vector supercomputers to non-vector supercomputers.

5. Customer and Producer Perceptions

There is limited information in the record specifically addressing customer perceptions of the different types of systems. However, some of the trade literature suggests that vector and non-vector supercomputers are perceived to be different types of machines by some customers. While non-vector

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[33] CR at I-11, PR at I-7.

[34] CR at I-12, PR at I-7.

[35] CR at I-12, PR at I-8.

[36] CR at I-12, PR at I-8.

[37] Petitioner's Postconference Brief at 19-20.

[38] CR at II-5, PR at II-2.

[39] CR at II-5, PR at II-2.

[40] Questionnaire Response of Convex.

systems are being used in a greater number of applications which used solely vector supercomputers in the past, this trade literature appears to indicate that vector and non-vector machines are perceived as distinct products in the marketplace.[41]

Additionally, petitioner, the only current domestic producer of vector supercomputers, considers vector and non-vector supercomputers to be separate products. This is evidenced by the fact that petitioner maintains separate manufacturing lines for the two types of supercomputers.[42] Finally, at least one industry analyst tracks vector and non-vector systems separately, and perceives them to be different products in the marketplace.[43]

6. Price

It is uncontroverted that there is some overlap in prices between vector and non-vector systems. At the low end of non-vector supercomputers, clustered workstations and small MPPs are less expensive than the least expensive vector supercomputer.[44] It is unclear from the present record whether the "high-end" non-vector systems ever approach the price point of the "high-end" vector supercomputers. In any final phase investigation, we will seek to clarify the extent to which prices between vector and non-vector supercomputers overlap.

7. Conclusion

On balance, based on the differing physical characteristics, apparent lack of interchangeability for some applications, and differences in domestic manufacturing facilities, and producer perceptions, we find, for purposes of this preliminary investigation, that the domestic like product is vector supercomputers. We intend to examine closely in any final phase investigation whether the like product should include any or all types of non-vector supercomputers.

C. Domestic Industry

In making its determination, the Commission is directed to consider the effect of the subject imports on the industry, defined as "the producers as a [w]hole of a domestic like product."[45] Based on the definition of the domestic like product, the domestic industry consists of all domestic producers of vector supercomputers. Petitioner CRI, Inc. is the only remaining domestic producer of vector

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[41] See, e.g., Petitioner's Postconference Brief at 17-18, and articles cited therein. We note, however, that respondent Fujitsu presented evidence which it contends showed that customers and producers perceive vector and non-vector supercomputers to be highly substitutable. Fujitsu's Postconference Brief at 24-30.

[42] See, e.g., Petitioner's Postconference Brief at 19-20.

[43] Tr. at 57. (Testimony of Deborah Goldfarb, Vice President of Workstations and High Performance Systems at International Data Corporation, stating: "In terms of definitions, we have historically segmented the vector portion of the market out from other classes of technologies. [T]here are certain unique aspects of applications which lend themselves to vector class machines.") Id.

[44] CR at I-13, PR at I-8.

[45] 19 U.S.C. §1677(4)(A). In doing so, the Commission generally includes all domestic production, including tolling operations and captively consumed product, within the domestic industry. *See* United States Steel Group v. United States, 873 F. Supp. 673, 682-83 (Ct. Int'l Trade 1994), *aff'd*, Slip Op. No. 95-1245 (Fed. Cir. August, 1995).

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supercomputers. During part of the period of investigation, Convex also produced vector supercomputers. Convex ***.[46]

III. CONDITION OF THE DOMESTIC INDUSTRY

In assessing whether there is a reasonable indication that the domestic industry is materially injured or threatened with material injury by reason of allegedly LTFV imports, we consider all relevant economic factors that bear on the state of the industry in the United States.[47] These factors include output, sales, inventories, capacity utilization, market share, employment, wages, productivity, profits, cash flow, return on investment, ability to raise capital, and research and development. No single factor is dispositive and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[48]

A. Conditions of Competition

We note certain conditions of competition pertinent to our analysis of the domestic vector supercomputer industry. As noted above, the industry that produces vector supercomputers comprises a small number of large firms. At present, CRI is the only domestic manufacturer of vector supercomputers.[49]

The vector supercomputer market is characterized by a small number of purchases in any given year.[50] Vector supercomputers are high-value goods, ranging in price from $250,000 to $40 million or more for a single system.[51] The purchase of a vector supercomputer also includes software, auxiliary equipment, and services. At a minimum, the purchase includes operating system software. Such software is developed by the vector supercomputer manufacturer, and is based on the widely used Unix operating system. Some purchases may also include application software developed by the hardware manufacturer. Auxiliary equipment, such as the cooling system, may also be designed and assembled by the computer manufacturer. Construction design and services, on-site maintenance and repair services, and user assistance are usually included in the contract price.[52]

The largest market for supercomputers, especially the most powerful large scale vector supercomputers, is the scientific and engineering market, much of which is funded by the federal government. This market accounts for one-third of the total vector supercomputer market, but is

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[46] CR at III-3, PR at III-2. Convex was ***.

[47] 19 U.S.C. § 1677(7)(C)(iii).

[48] 19 U.S.C. §1677(7)(C)(iii).

[49] As noted above, during part of the period of investigation, Convex also produced vector supercomputers. During 1995, however, Convex reduced its participation in the vector supercomputer market and it ***. Additionally, Tera, in Seattle, Washington has been designing a shared-memory vector multiprocessor. The systems are expected to be available in the second half of 1996. CR at III-2-3, PR at III-2.

[50] See, e.g., Table IV-2; CR at IV-4, PR at IV-2. The Commission has recently investigated another industry characterized by a small number of large purchases. See e.g., Large Newspaper Printing Presses and Components Thereof, Whether Assembled or Unassembled, from Germany and Japan, Inv. Nos. 731-TA-736 and 737 (Final) USITC Pub._ at 18-19 (September 1996).

[51] CR at IV-1, PR at IV-1.

[52] CR at I-5, PR at I-3-4.

projected to decline in size.[53] Because of the actual decline and further projected declines in government purchases, vector supercomputer manufacturers have sought to increase their sales to private industry, including automotive, aerospace and energy-related firms. Industrial users account for 20 to 25 percent of the U.S. vector supercomputer market. The remainder of the market (i.e., not government or industrial users) consists largely of sales to academic institutions.[54]

Another condition of competition in the vector supercomputer industry is the shift in customer demand from large scale to mid-range vector supercomputer systems,[55] which have smaller profit margins for the domestic manufacturer.[56] This shift corresponds to a decline in purchases by the U.S. government and commercial customers primarily serving the U.S. government.[57] CRI's revenue from U.S. government customers or commercial customers primarily serving the U.S. government declined from $386 million in 1993 to $110 million in 1995.[58]

Another condition of competition in the vector supercomputer industry is the fact that certain domestic contracts are subject to "Buy American" restrictions and preferences. Sales to the U.S. government subject to "Buy American" restrictions primarily consist of sales that are funded by the Department of Defense and/or classified government sales.[59] The number of purchases subject to these restrictions and preferences, however, has declined *** during the period of investigation.[60]

Vector supercomputers are either sold through a competitive closed-bid procedure or on a non-competitive bid basis.[61] The closed bid procedure typically includes a formal request for proposal (RFP), which contains detailed specifications for the systems to be delivered. The purchaser reviews the initial bids of participating suppliers and rejects unacceptable bids or asks certain suppliers to submit new bids. Competitive procurements that involve several million dollars almost always include some sort of testing of the equipment being offered, or prototypes thereof. The testing generally involves the execution of a benchmark suite of programs provided by the purchaser that test the performance capabilities and capacities of the systems being offered.[62] After the initial bid submissions and testing, the purchasers begin negotiations with those suppliers whose bids and initial testing performance have been sufficiently responsive to the RFP and benchmark testing. Negotiations conclude with the award of a sales contract, lease, or lease-to-purchase agreement, but delivery and installation may take at least several months to

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[53] CR at II-1, PR at II-1.

[54] CR at II-1, PR at II-1.

[55] Table IV-2; CR at IV-4, PR at IV-2. Mid-range vector supercomputers are those with a theoretical peak performance of 7 gigaflops (millions of floating point operations per second) (Gflops) or less. High-range vector supercomputers are those with a theoretical peak performance of greater than 7 Gflops. CR at III-1, n.1, PR at III-1.

[56] CR at VI-1, PR at VI-1.

[57] CR at III-2, n.8, PR at III-1, n.8.

[58] CR at VI-3, PR at VI-1.

[59] CR at II-4, PR at II-1-2.

[60] CR at II-4, PR at II-1-2. The share of CRI's vector supercomputer sales that were subject to "Buy American" restrictions declined from *** percent in 1993 to *** percent in 1995. Id.

[61] CR at V-2-3, PR at V-2.

[62] CR at V-2, PR at V-2.

begin, and there may be requirements for additional systems to be installed during the contract period.[63] Although the bid procedure is closed, bidding firms usually know the identity of competing bidders.[64]

Slightly more than *** of the vector supercomputers for which bid information was received were purchased on a non-competitive bid basis.[65] Purchasers may, however, negotiate with the supplying manufacturer to reduce the price of their purchase or increase the amount of equipment being offered. Purchasers buying on a non-competitive basis, however, can ask other producers for estimates, even if they are not interested in purchasing from those particular producers, to determine if the bid they receive is reasonable.[66]

B. **Condition of the Industry**

U.S. capacity to produce vector supercomputers increased from 1993 to 1995. Capacity did not change from interim (January-June) 1996 compared with interim 1995.[67] The domestic industry's vector supercomputer production increased from 1993 to 1995, but was *** lower in interim 1996 compared with interim 1995.[68] Capacity utilization followed the same trends as production, increasing from 1993 to 1995, but declining in interim 1996 compared with interim 1995.[69]

Domestic consumption of vector supercomputers increased by volume from 1993 to 1995. The volume of domestic consumption was lower in interim 1996 compared with interim 1995.[70] The value of domestic consumption followed opposite trends, reflecting the shift in demand from large scale to mid-range vector supercomputers. The domestic industry's share of domestic consumption as a percentage of both quantity and value increased during 1993-1995. However, the domestic industry's share of domestic consumption was *** lower in interim 1996 compared with interim 1995.[71]

The volume of shipments increased between 1993 and 1995. The volume of shipments in interim 1996, however, were lower than the corresponding period in 1995. Conversely, the value of

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[63] CR at V-3, PR at V-2; CR at App. D, PR at App. D.

[64] CR at V-2, PR at V-2.

[65] CR at V-3, n.2, PR at V-2, n.2.

[66] CR at V-3, PR at V-2.

[67] The domestic industry's capacity to produce vector supercomputers increased from *** systems in 1993 to *** systems in 1994, and increased further to *** systems in 1995. The domestic industry's capacity was *** systems in interim 1995 and interim 1996. Table III-1, CR at III-6, PR at III-4.

[68] Domestic production of vector supercomputer systems increased from *** systems in 1993 to *** systems in 1994, and increased further to *** systems in 1995. Domestic production of vector supercomputer systems was *** systems in interim 1996 compared with ***
systems in interim 1995. Domestic production of large scale vector supercomputers declined from *** systems in 1993 to *** systems in 1994, and further declined to *** systems in 1995. Domestic production of large scale supercomputers was *** systems in interim 1996 compared with *** systems in interim 1995. Conversely, domestic production of mid-range vector supercomputers increased from *** systems in 1993 to *** systems in 1994, and further increased to *** systems in 1995. Domestic production of vector supercomputer systems was *** systems in interim 1996 compared with *** systems in interim 1995. Table III-1, CR at III-6, PR at III-4.

[69] Capacity utilization increased from *** percent in 1993 to *** percent in 1994, and further increased to *** percent in 1995. Capacity utilization was *** percent in interim 1996 compared with *** percent in interim 1995. Table III-1; CR at III-6, PR at III-4.

[70] CR at IV-2, PR at IV-2.

[71] Table IV-3; CR at IV-5, PR at IV-2.

shipments declined from 1993 to 1995, reflecting the shift in demand from high-end vector supercomputers to mid-range vector supercomputers, and continued to decline in interim 1996 compared with interim 1995.[72]

Inventories increased *** throughout the period of investigation reflecting at least in part the fact that CRI restructured its product line in 1995 to tap demand for new applications. The ratio of inventories to production, and the ratio of inventories to U.S. shipments followed the same trend.[73]

The number of production and related workers producing vector supercomputers, the number of hours worked and wages paid increased throughout the period of investigation.[74] [75]

The domestic industry's financial performance was poor during the period of investigation. Total revenue from vector supercomputers (including sales, leases and service fees) declined from 1993 to 1995. Total revenue in interim 1996 was higher than the corresponding period in 1995.[76] Commensurate with this trend, gross profit declined from 1993 to 1995. However, gross profit was lower in interim 1996 compared with interim 1995. Selling, general and administrative expenses (SG&A) declined somewhat from 1993 to 1994, increased between 1994 and 1995, and were lower in interim 1996 as compared with interim 1995.[77] Operating income declined from 1993 to 1994, and became *** in 1995. Operating *** were also experienced during the interim period. The *** was ***, however, in interim 1996 compared with interim 1995.[78] Operating income as a percentage of value followed the same trends.[79]

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[72] CR at III-7, PR at III-4. The volume of total domestic shipments (commercial and internal) increased from *** systems in 1993 to *** systems in 1994, and further increased to *** systems in 1995. There were *** systems shipped in interim 1996 compared with *** systems in interim 1995. The value of total shipments (commercial and internal) declined from *** in 1993 to *** in 1994, and declined further to *** in 1995. The total value of shipments was *** in interim 1996 compared with *** in the corresponding period of 1995. Table III-2; CR at III-8, PR at III-4.

[73] Inventories increased from *** in 1994 to *** systems in 1995. There were *** systems in inventory in interim 1996 compared with *** in the same period of 1995. There were *** inventories in 1993. The ratio of inventories to production increased from *** percent in 1994 to *** percent in 1995. The ratio of inventories to production was *** percent in interim 1996 compared with *** percent in 1995. The ratio of inventories to U.S. shipments increased from *** percent in 1994 to *** percent in 1995. The ratio of inventories to U.S. shipments was *** percent in interim 1996 compared with *** percent in 1995. Table III-3, CR at III-9, PR at III-5.

[74] We note, however, that ***.

[75] The number of production and related workers increased from *** in 1993 to *** in 1994, and further increased to *** in 1995. The number of production and related workers was *** in interim 1996 compared with *** in 1995. Hours worked increased from *** in 1993 to *** in 1994, and further increased to *** in 1995. The number of hours worked was *** in interim 1996 compared with *** in interim 1995. The hourly wages paid to production and related workers declined from *** in 1993 to *** in 1994, and then increased to *** in 1995. Hourly wages were *** in interim 1996 compared with *** in 1995. Table III-4; CR at III-10, PR at III-5.

[76] Total revenue declined from *** in 1993 to *** in 1994, and further declined to *** in 1995. Total revenue was *** in interim 1996 compared with *** for the corresponding period in 1995. Table VI-1, CR at VI-2, PR at VI-1.

[77] SG&A expenses declined from *** in 1993 to *** in 1994, and increased to *** in 1995. SG&A expenses were *** in interim 1996 compared with *** in interim 1995. Table VI-1, CR at VI-2, PR at VI-1.

[78] Table VI-1; CR at VI-2, PR at VI-1.

[79] Table VI-1; CR at VI-1, PR at VI-1.

Capital expenditures fluctuated throughout the period. Research and development expenditures declined throughout the period of investigation.[80] [81]

IV. NO REASONABLE INDICATION OF MATERIAL INJURY BY REASON OF ALLEGEDLY LTFV IMPORTS OF VECTOR SUPERCOMPUTERS[82]

In preliminary antidumping investigations, the Commission determines whether there is a reasonable indication that an industry in the United States is materially injured by reason of the imports under investigation.[83] In making this determination, the Commission must consider the volume of imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product, but only in the context of U.S. production operations.[84] Although the Commission may consider causes of injury to the industry other than the allegedly LTFV and subsidized imports,[85] it is not to weigh causes.[86] [87]

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[80] Capital expenditures for vector supercomputers increased from *** in 1993 to *** in 1994, and then declined to *** in 1995. Capital expenditures were *** in interim 1996 compared with *** in interim 1995. Research and development expenses declined from *** in 1993 to *** in 1994, and further declined to *** in 1995. Research and development expenses were *** in interim 1996 compared with *** in interim 1995. Table VI-3; CR at VI-8, PR at VI-3.

[81] Based on the foregoing, Commissioner Newquist finds a reasonable indication that the domestic industry is vulnerable to the continuing adverse effects of allegedly unfair imports of vector supercomputers from Japan. He does not join the discussion of whether or not there is a reasonable indication of material injury by reason of allegedly LTFV imports of vector supercomputers. He proceeds directly to the discussion of whether or not there is a reasonable indication of threat of material injury by reason allegedly LTFV imports.

[82] Commissioner Newquist does not join in this section of the opinion.

[83] 19 U.S.C. § 1673b(a). The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant." 19 U.S.C. § 1677(7)(A).

[84] 19 U.S.C. § 1677(7)(B)(I). The Commission "may consider such other economic factors as are relevant to the determination," but shall "identify each [such] factor . . . and explain in full its relevance to the determination." 19 U.S.C. § 1677(7)(B).

[85] Alternative causes may include the following:

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

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

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

[87] As part of its consideration of the impact of imports, the statute as amended by the Uruguay Round Agreements Act (URAA) specifies that the Commission is to consider "the magnitude of the margin of dumping." 19 U.S.C. § 1677(7)(C)(iii)(V). The URAA Statement of Administrative Action (SAA) indicates that the amendment "does not alter the requirement in current law that none of the factors which the Commission considers is necessarily dispositive in the Commission's material injury analysis." SAA at 850. New section 771(35)(C), 19 U.S.C. § 1677(35)(C), defines the "margin of dumping" to be used by the Commission in a preliminary determination as the

(continued...)

A. Volume

We find that the increase in the volume of imports from Japan to be *** during the period of investigation. Although there *** vector computer system imported from Japan in each of 1993 and 1994, and there were *** shipments in 1995, the number of shipments of imports increased to *** subject vector supercomputers in interim 1996. The value of subject import shipments declined from *** in 1993 to *** in 1994, and *** to *** in 1995. The value of subject import shipments was *** in interim 1996.[88] Subject import shipments, by quantity, as a share of apparent consumption in the United States declined from *** percent in 1993, to *** percent in 1994 and further declined to *** in 1995. The market share *** increased from *** in interim 1995 to *** percent in interim 1996.[89] The market share by value followed a similar trend over the investigation period. Import market share by value declined from *** percent in 1993 to *** percent in 1994, and further declined to *** percent in 1995. Import market share by value increased from *** percent interim 1995 to *** percent in interim 1996.[90] We find the *** increase in volume and market share during the first half of 1996 to be ***.

B. Price

Based on the available information in this preliminary investigation, we cannot conclude that the subject imports significantly affected domestic prices during the period of investigation.

Price/performance ratios ($million/Gflop) for domestic vector supercomputers not subject to "Buy American" restrictions declined by *** percent during February 1993-September 1994, increased by *** percent during October 1994-March 1995, then fell by *** percent in May 1995, and then fluctuated throughout the rest of the period. Price/performance ratios were *** percent lower in June 1996 than they were in February 1993.[91]

Price/performance ratios for subject imports[92] fell *** from February 1993 to April 1994, and then continued to fall *** percent in May 1996. Price/performance ratios were *** percent lower in May 1996 than they were in April 1993.[93]

The evidence thus suggests that while prices declined for the domestic product over the period of investigation, prices for the subject imports appeared to have declined ***. However, we note that the *** decline in domestic prices occurred in ***, a period during which there were *** imports.

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[87] (...continued)
margin or margins published by Commerce in its notice of initiation. The estimated dumping margin identified by Commerce in its notice of initiation of this investigation is 454 percent.. 61 Fed. Reg. 43527, 43529 (Aug. 23, 1996).

[88] Table IV-2; PR at IV-4, PR at IV-2.

[89] Table IV-3; CR at IV-5, PR at IV-2.

[90] Table IV-3; CR at IV-5, PR at IV-2.

[91] CR at V-4, PR at V-4. Domestic prices which were subject to "Buy American" restrictions followed similar trends. Id.

[92] HNSX/FCC ***. CR at V-21, PR at V-4.

[93] CR at V-4, PR at V-4.

The Commission also received domestic and subject import bid information that shows direct competition on ***.[94] We note that the parties' arguments focused primarily on one transaction--the possible sale by NEC of four supercomputer systems to Federal Computer Corporation ("FCC"), an independent party that will lease the supercomputers, together with U.S. sourced peripheral equipment and services, to the University Corporation for Atmospheric Research ("UCAR") for use by the National Center for Atmospheric Research ("NCAR"). In late 1994, UCAR began preparing a request for proposal (RFP) to install and periodically upgrade high performance computing equipment. Four vendors submitted proposals, and three were considered to be in the competitive range. The three firms were Cray, Fujitsu, and FCC, a U.S. firm offering vector supercomputers manufactured by NEC of Japan. On May 20, 1996, UCAR announced its intention to enter into final contract negotiations with FCC for the NEC machines. However, the UCAR transaction has not been formally completed, and we do not find that the pending bid has had a current adverse impact on the domestic prices of vector supercomputers. The Commission also received competing CRI and Japanese bid information concerning ***. We intend to examine the nature and circumstances surrounding all of these competing bids in any final investigation, and the extent to which the apparently *** affect domestic prices.

C. Impact

In this preliminary investigation, we do not find any significant adverse impact that can be attributed to the subject imports. As stated above, subject import volume and market share have remained at extremely low levels until ***. While the financial condition of the domestic industry has ***, this decline does not appear to have occurred as a result of the subject imports. For example, vector supercomputer revenues are greatly affected by the number of large scale systems installed and whether these systems are sold or leased. During the period of investigation, there was a *** decline in U.S. shipments of large-scale vector supercomputers.[95] CRI itself explained that lower gross margins in 1995 compared to 1994 are the result of several factors: (1) a shift in the product mix to small, lower-margin systems, (2) a decrease in sales on its high-end products, resulting primarily from this product transition, and (3) increased service revenues, which have lower gross margins than product revenues.[96] Additionally, CRI restructured its operations during the period of investigation. CRI's restructuring expenses *** as well.[97]

V. REASONABLE INDICATION OF THREAT OF MATERIAL INJURY BY REASON OF ALLEGEDLY LTFV IMPORTS [98]

Section 771(7)(F) of the Act directs the Commission to consider whether the U.S. industry is threatened with material injury by reason of the subject imports by taking into account whether "further dumped or subsidized imports are imminent and whether material injury by reason of imports would

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[94] CR at V-21, PR at V-4.

[95] Table III-2; CR at III-8, PR at III-4.

[96] CR at VI-4, PR at VI-2.

[97] CR at VI-4, PR at VI-2.

[98] Commissioner Newquist notes that, in his analytical framework, "evaluation of the magnitude of the margin of dumping" is not generally helpful in answering the questions posed by the statute: whether the domestic industry is threatened with material injury; and, if so, whether such threat of injury is by reason of the subject imports.

occur unless an order is issued or a suspension agreement is accepted."[99] The Commission may not make such a determination "on the basis of mere conjecture or supposition,"[100] and considers the threat factors "as a whole."[101] In making our determination, we have considered all statutory factors[102] that are relevant to this investigation.[103]

For the reasons discussed below, we find there is a reasonable indication that the domestic industry producing vector supercomputers is threatened with material injury by reason of the allegedly LTFV imports from Japan.

Japanese producers' capacity increased overall throughout the period of investigation.[104] Capacity utilization fluctuated throughout the period, and increased *** in interim 1996 as compared with interim 1995.[105] Additionally, capacity utilization is projected to decline from *** percent for full year 1996 to *** percent in 1997.[106] We note, however, that in an industry characterized by a limited number of high-value, custom-configured sales (or leases), that capacity appears to be determined primarily by sales volumes rather than production constraints or ceilings.[107] We find, therefore, that there is available capacity in the exporting country to increase exports to the United States.

We also find that there has been a *** rate of increase of the volume or market penetration of imports of the subject merchandise, indicating the likelihood of *** increased imports. Fujitsu and NEC

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[99] 19 U.S.C. § 1673b(a) and 1677(7)(F)(ii).

[100] 19 U.S.C. §1677(7)(F)(ii). An affirmative threat determination must be based upon "positive evidence tending to show an intention to increase the levels of importation." Metallverken Nederland B.V. v. United States, 744 F. Supp. 281, 287 (Ct. Int'l Trade 1990), *citing* American Spring Wire Corp. v. United States, 590 F. Supp. 1273, 1280 (Ct. Int'l Trade 1984). *See also* Calabrian Corp. v. United States, 794 F. Supp. 377, 387 & 388 (Ct. Int'l Trade 1992), *citing* H.R. Rep. No. 1156, 98th Cong., 2d Sess. 174 (1984).

[101] While the language referring to imports being imminent (instead of "actual injury" being imminent and the threat being "real") is a change from the prior provision, the SAA indicates the "new language is fully consistent with the Commission's practice, the existing statutory language, and judicial precedent interpreting the statute." SAA at 184.

[102] The statutory factors have been amended to track more closely the language concerning threat of material injury determinations in the Antidumping and Subsidies Agreements, although "[n]o substantive change in Commission threat analysis is required." SAA at 185.

[103] 19 U.S.C. § 1677(7)(F)(I). Factor I regarding consideration of the nature of the subsidies alleged is inapplicable because there have not been any subsidies alleged. Factor VII regarding raw and processed agriculture products is also inapplicable to the products at issue. *See* 19 U.S.C. § 1677(7)(F)(iii)(I).

[104] Because there are only two Japanese producers who responded to the Commission questionnaires, the data pertaining to their operations are confidential. Japanese producers' capacity to produce vector supercomputers declined from *** systems in 1993 to *** systems in 1994, and then increased to *** systems in 1995. Capacity in interim 1996 was *** systems compared with *** systems in 1995. Table VII-1, CR at VII-2, PR at VII-1.

[105] Capacity utilization increased from *** percent in 1993 to *** percent in 1994, and then declined to *** percent in 1995. Capacity utilization was *** percent in interim 1996 compared with *** percent in interim 1995. Table VII-1, CR at VII-2, PR at VII-1. We intend to investigate further in any final phase investigation the apparent anomalous capacity utilization reported for interim 1996. We note also that, unlike the domestic producer, ***. CR at VII-1-2, PR at VII-2. We intend to explore in any final phase investigation the extent to which there is production shifting from other types of computers to vector supercomputers, and the extent to which any reported capacity takes this into account. See also, Discussion of product shifting, infra.

[106] Table VII-1; CR at VII-2, PR at VII-1.

[107] CR at VII-4, PR at VII-2.

were quoted in the Japanese press in July 1996 as hoping to expand sales volumes by 100 percent and 63 percent (by number of orders), respectively, in fiscal year 1996 compared to fiscal year 1995.[108] Other Japanese press reports have cited Fujitsu and NEC as hoping to increase imports to the United States and Europe of less expensive complimentary metal oxide semiconductor ("CMOS")[109] processor-based vector supercomputers.[110] The record suggests that this effort is succeeding. Although the quantity and value of subject imports declined between 1993 and 1995, subject imports, both in terms of quantity and value were *** higher in interim 1996 compared with interim 1995.[111] In terms of both quantity and value, subject import market share followed the same trend.[112] Additionally, aside from the potential UCAR transaction, a *** of orders for vector supercomputers from Japan have been placed for which delivery is scheduled after June 30, 1996. Specifically, ***. ***.[113] We find that the *** increases in subject import volume and market share in the interim period, coupled with the fact that there are *** projected deliveries in the second half of 1996 indicate the imminent likelihood of *** increased imports.

We find that there is evidence in the record that the increased subject imports will enter at prices likely to depress or suppress domestic prices to a significant degree. As discussed above, a central issue in this investigation has focused on CRI's prospective loss to Japanese imports by CRI of a $35 million sale to UCAR, a U.S. government funded consortium of universities engaging in weather forecasting. UCAR has entered into final negotiations to purchase a system which will be imported from Japan. The Commission received competing domestic and imported bid information concerning *** projects ***, including bid information relating to the proposed UCAR transaction. In *** instances, the imported product *** the domestic product. In a bid to ***. Similarly, ***. Finally, HNSX's bid on the UCAR project, for which it is the only company still under consideration, was *** than the competing domestic bid, based on $million/Gflop.[114] Although the domestic industry won the sale in *** of those instances,[115] HNSX'S success in the UCAR transaction suggests that the apparent strategy of *** has been successful, enabling the producers of the subject imports to make inroads into the domestic market at a *** when measured in terms of $million/Gflop. Moreover, subject foreign producers appear to be offering higher specifications at the same price as the domestic producer. We have considered the

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[108] We note that the entry of the Japanese product in the United States may be in part due to Japanese conversion to the Unix operating system, the most universally accepted operating system used in vector supercomputers. Japanese systems switched from proprietary operating systems to Unix based systems within the last four years. Japanese Involvement with Unix, World Wide Web, top 500@rz.uni-mannheim.de, June 3, 1994.

[109] CMOS is one of two types of logic chips used in vector supercomputers. The other type of logic chip is emitter coupled logic (ECL). CR at I-9, PR at I-6.

[110] CR at VII-4-5, PR at VII-2.

[111] *** Japanese import of vector supercomputers was reported for both 1993 and 1994. There were *** subject imports in 1995. Subject imports, however, were *** units in interim 1996 compared with *** units in interim 1995. Table IV-2; CR at IV-4. PR at IV-2.

[112] In terms of quantity, subject import market share declined from *** percent in 1993 to *** percent in 1994, and then further declined to *** percent in 1995. Import market share was *** percent in interim 1996 compared with *** percent in interim 1995. In terms of value, subject import market share declined from *** percent in 1993 to *** percent in 1994, and then to *** percent in 1995. Subject import market share, as measured by value, was *** percent in interim 1996 as compared with *** percent in interim 1995. Table IV-3, CR at IV-5, PR at IV-2.

[113] CR at VII-5-6, PR at VII-3.

[114] CR at V-21, PR at V-4.

[115] CR at V-21, PR at V-4.

arguments made regarding the failure on the part of petitioner to meet certain of UCAR's requirements, but note that the domestic producer was considered qualified enough to be invited to the final negotiations in the UCAR bidding process. We intend to examine the nature and circumstances surrounding all of these competing bids in any final phase investigation, and the extent to which the seemingly *** affect future domestic prices. The industry's current weakened financial condition due to the shift in demand from large scale to lower margin mid-range systems, declining government sales, and overall declining profitability makes it particularly vulnerable to such future adverse price effects of the lower priced imports.

Inventories of the subject merchandise are ***.[116]

We find that the evidence regarding the potential for product shifting to be conflicting. The Japanese producers reported that they ***. Specifically, ***.[117] Similarly, ***.[118] However, NEC argued that based on the historical pattern of supercomputer and mainframe production, as well as the physical, logistical, and human bottlenecks in the production process, product shifting is unlikely. NEC states that its production capability for vector supercomputers is ***.[119] We intend to explore this issue further in any final phase investigation.

Finally, the data collected during the investigation indicate that the domestic vector supercomputer industry has not been performing well during the period of investigation, and its ability to generate funds to continue future research and development is impaired. This is consistent with the reported decline in research and development expenditures.[120] CRI reports that ***.[121] This is problematic in an industry such as the computer industry where technical innovation is a prerequisite to remaining competitive.

Based on the combination of the rise of subject import volumes and market share, the Japanese producers' stated plans to increase exports to the United States, apparent excess foreign capacity, and the evidence of underbidding, we find that the subject imports are likely to have a significant adverse impact on the condition of the domestic industry, and that these factors provide a reasonable indication that the imminent LTFV imports pose a threat of material injury.[122]

CONCLUSION

For the foregoing reasons, we determine that there is a reasonable indication that the domestic industry producing vector supercomputers is threatened with material injury by reason of allegedly LTFV imports from Japan.

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[116] CR at VII-5, PR at VII-3.

[117] CR at VII-1, PR at VII-1.

[118] CR at VII-2, PR at VII-1.

[119] NEC's Postconference Brief at 49.

[120] Table VI-3; CR at VI-8, PR at VI-3.

[121] CR at App. H, PR at App. H.

[122] We have considered the present condition of the domestic industry as among the "relevant economic factors" in our threat analysis.

DISSENTING VIEWS OF COMMISSIONER JANET A. NUZUM

Vector Supercomputers from Japan
Inv. No. 731-TA-750 (Preliminary)

Based on the information available, I make a negative determination in this preliminary investigation. I find no reasonable indication that a domestic industry is either materially injured, or threatened with material injury, by reason of allegedly less-than-fair-value (LTFV) imports of vector supercomputers from Japan. The market for vector supercomputers is changing as a consequence of advances by competing technologies and products. At the same time, fiscal constraints on government spending are reducing the number, size, and composition of supercomputer purchases supported by government funds. The portion of the U.S. market sheltered from foreign competition through Buy American requirements or preferences is still significant, but provides a smaller stream of revenue for the domestic industry than in earlier years.

Notwithstanding these developments, petitioner Cray Research, Inc. ("CRI") still dominates the U.S. market. Imports of Japanese vector supercomputers have been negligible in volume until this year. The crux of petitioner's case is that the success of NEC, earlier this year, in winning a large, multi-year bid from the University Corporation for Atmospheric Research ("UCAR") is so damaging to CRI's current and future position in the market, that it constitutes a threat of material injury within the meaning of U.S. antidumping law. It is true that the fulfillment of this sales contract between UCAR and NEC would lead to an increase in the volume of imports from Japan. Nevertheless, the resulting loss of revenue to CRI from this sales opportunity, when viewed in the context of CRI's overall performance, is insufficient, in my view, to constitute a threat of material injury. Based on the information now before us, I find no reasonable indication of either present material injury or threat of material injury by reason of the subject imports. A more detailed discussion of my analysis follows.

I. DOMESTIC LIKE PRODUCT AND DOMESTIC INDUSTRY

For purposes of this preliminary determination, I have analyzed the impact of the imports of Japanese vector supercomputers on the domestic industry producing vector supercomputers. As discussed in the majority views, there are differences between vector and non-vector supercomputers which, when analyzed in the context of our traditional six "like product" factors, reasonably support a domestic like product determination of simply vector supercomputers. There is also, however, considerable evidence in the record suggesting that a *better* like product definition would include a larger universe of high performance computers, not just vector supercomputers.

Vector supercomputers and non-vector supercomputers, such as massively parallel processors ("MPPs") and symmetric multiprocessors ("SMPs"), are increasingly interchangeable.[1] Petitioner CRI acknowledges that several applications previously served only by vector supercomputers are now also served by MPPs, but argues that interchangeability is still extremely limited.[2] A weakness in petitioner's argument, however, is that it overlooks the *pace of change* in the marketplace. Non-vector systems are increasingly able to compete with vector systems in a broadening range of applications.[3] Although end

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[1] See CR at I-11, II6; PR at I-7, II-3; Questionnaire Responses of *** and *** in response to Question IV.A.

[2] See, e.g., CRI's Postconference Brief at 11.

[3] See, e.g., Fujitsu's Postconference Brief at 21 ("[Cray] predicted in 1992 that [vector products] and MPPs would by 1995 compete in the following applications: seismic and signals, electromagnetic, chemistry, fluid dynamics,

use is often useful in evaluating interchangeability, in a high technology industry characterized by continuous and rapid changes in technological capability, it becomes a moving target. Hence, "[w]hat may have been a possible dividing line between different . . . technologies yesterday. . . may no longer exist today, and what may be a possible dividing line today may disappear tomorrow."[4]

This is not the first time changes in technology have presented unusual considerations in the like product context. In Flat Panel Displays from Japan, the Commission examined an industry which utilized four separate technologies, each having different characteristics unique to that technology. I (and two other Commissioners), however, observed that these differences were relatively minor when viewed in the context of the development of flat panel display technology generally.[5] Similarly with respect to supercomputers, physical differences are less important in light of the evidence of increasing convergence in end uses. As one questionnaire respondent stated,

> There is NO SUCH market as vector supercomputers. The market is high-end servers, and there are two architectures that are used. One is a vector architecture, and it is decreasing in importance; the other is a RISC [Reduced Instruction Set Computer] based MPP and it is increasing in its importance.[6]

The advances in technology also make it difficult, however, to discern a clear dividing line between supercomputers (both vector and non-vector) and other high performance computers containing microprocessors and commodity chips similar to those in MPPs, but not sharing the same performance capacity and capabilities as supercomputers. Parallel processors exist along a continuum from desktop workstations to large, high-performance systems. On the high end are systems that are suitable alternatives for vector supercomputers. On the low end of the spectrum, however, are desktop computers not yet interchangeable with high-end MPPs or vector supercomputers.[7]

Having said this, I did not feel compelled, for purposes of this preliminary determination, to make a broader like product decision. For one, the information currently available does not clearly establish where to draw the line so that the like product definition makes sense from both a legal and a commercial perspective.[8] Second, in preliminary investigations where the evidence tends not to support the petitioner, I prefer to give petitioner the benefit of the doubt on threshold issues, such as domestic like product.

Finally, identifying vector supercomputers as the domestic like product does not, as a matter of law, preclude us from taking into account the changing nature of competition with other types of high performance computers. In fact, the statute directs us to evaluate the impact of subject imports on the domestic industry "in the context of . . . conditions of competition that are distinctive to the affected

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weather, structural analysis, combustion. . . . Cray was right. . . .").

[4] Certain High-Information Content Flat Panel Displays and Display Glass Therefor from Japan, Inv. No. 731-TA-469 (Final) Views on Remand, USITC Pub. No. 2610 (March 1993) at I-10 (Views of Chairman Newquist, Commissioner Rohr and Commissioner Nuzum).

[5] Id. at I-9.

[6] *** Questionnaire Response at IV.A.10 (capitalization in original).

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

[8] Although respondent Fujitsu argues extensively that the like product should extend beyond simply vector supercomputers, it fails to articulate precisely how to define this broader like product.

industry."[9] One of the conditions of competition facing vector supercomputer producers clearly is the increasing role of other technologies and systems in competing for sales. Not including MPPs or other high performance computers in the domestic like product does not require us to put on blinders and ignore their role in the real world.

For the foregoing reasons, therefore, I have based my analysis on a "domestic like product" that consists of vector supercomputers. Consequently, the "domestic industry" effectively consists of one producer -- petitioner, CRI.[10]

II. CONDITIONS OF COMPETITION

As already mentioned, the statute directs the Commission to "evaluate all relevant economic factors . . . within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[11] In this particular investigation, several pertinent conditions of competition are worth noting.

First, as discussed above, vector supercomputers are facing increasing competition from non-vector supercomputers such as MPPs and SMPs. One reason for this increasing competition is that non-vector supercomputers offer significant cost advantages as compared to vector systems. Vector supercomputers, such as CRI's new large scale T90, utilize small numbers of processors that use customized logic chips. These customized chips have few other uses and therefore are produced in relatively small numbers.[12] MPPs, by contrast, use large numbers of so-called "commodity logic chips." Producers of MPPs are thus able to take advantage of the large economies of scale associated with the production of commodity microprocessors that are also used in other computer products.[13] The cost advantage is so significant that some customers are willing to revise codes and software originally designed for vector processing in order to utilize parallel processors.[14] Moreover, there is a growing library of software designed for parallel processors.[15]

Rapid improvements in the power and performance of these non-vector products have made them an increasingly attractive alternative to vector supercomputers in a wide variety of applications. Weather forecasting and climate modeling, which previously relied on vector technology, also are turning to MPPs.[16] The TOP500 Supercomputing Sites report, a detailed annual report compiled at the University of Tennessee and the Oak Ridge National Laboratory on the state of worldwide supercomputer installations, indicates that of the 500 largest supercomputer installations worldwide in November 1995, CRI's vector supercomputers accounted for only 104 sites, or 21 percent. MPPs, by

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[9] 19 U.S.C. §1677(7)(C)(iii).

[10] Another domestic company, Convex, recently ceased production of vector supercomputers in favor of non-vector supercomputers. CR at III-3; PR at III-2. A third company, Tera, has been designing a shared-memory vector multiprocessor which is expected to be available in the second half of 1996. Id.

[11] 19 U.S.C. §1677(7)(C)(iii).

[12] CR at I-6; PR at I-4. See also Staff Notes of Field Trip to CRI, August 6, 1996.

[13] CR at I-6; PR at I-4.

[14] CR at I-11; PR at I-7; see also Fujitsu's Postconference Brief at 26 (several energy companies that previously used Cray vector supercomputers "migrated the workload of these Cray vector machines to MPPs which perform identical or similar functions.").

[15] CR at I-11; PR at I-7.

[16] See Fujitsu's Postconference Brief at 20.

contrast, accounted for 53 percent of the supercomputing sites.[17] Academic institutions are a large segment of the vector supercomputer market. Yet, over 90 percent of the supercomputers in the United States that are used in academic institutions are parallel processors, not vector supercomputers.[18] Indeed, during the period examined, the share of domestic shipments of supercomputers held by vector systems was significantly less in 1995 than it had been in 1993.[19]

Another condition of competition is the limited life cycle of the product. A supercomputer has an operational life of approximately five years.[20] Thus, producers are under pressure to introduce a new generation of products every few years. This can be an expensive undertaking, as was the case with CRI's recent introduction of its T-90 vector supercomputer.[21]

Yet another condition of competition is the role of purchases by the government sector. The defense establishment in particular was an important customer for vector supercomputers during the Cold War. Defense-related budget cutbacks, and reductions in government spending in general, have resulted in a substantial decline in government purchases of vector supercomputers.[22] In addition, as budgets tighten and technology advances, some customers are shifting from large vector systems to less expensive systems.[23]

Notwithstanding reductions in government expenditures, however, there remains a sizeable portion of the domestic vector supercomputer market that is restricted to domestic producers.[24] As a result of Buy American requirements or Buy American preferences, a significant portion of the domestic vector supercomputer market is insulated from import competition and is therefore served entirely by CRI.[25]

The fact that the overall market for vector supercomputers is shrinking is reflected in the data collected. The value of domestic consumption of vector supercomputers declined sharply during the period examined.[26] A significant portion of this decline is accounted for by a decline in sales of vector supercomputers to U.S. Government agencies and commercial customers primarily serving the U.S.

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[17] Id. at 15, App. 2.

[18] CR at II-1, n. 4; PR at II-1.

[19] Compare Tables C-1 and C-5, CR at C-2, C-7; PR at C-3.

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

[21] See CRI's Postconference Brief at 40.

[22] CRI reported that the share of its vector supercomputer sales that were subject to "Buy American" restrictions declined sharply from *** percent and *** percent in 1993 and 1994, respectively, to *** percent in 1995. CR at II-4; PR at II-2.

[23] See Fujitsu's Postconference Brief at 19 ("'[A] large segment of [Department of Defense] high-performance computing is migrating to small computers through the process of code conversion and 'parallelizing' to take advantage of clustered and networked computers.'").

[24] CR at II-4; PR at II-1 - II-2.

[25] Id.

[26] See Tables IV-2, VI-1, CR at IV-4, VI-2; PR at IV-2, VI-1. It is not clear whether all questionnaire respondents used the same basis for reporting the value of their shipments (e.g., whether they included or excluded the value of leases or service). Therefore, the precision of our data on domestic consumption is uncertain. Nevertheless, all the data unmistakably show a significant decline in the value of domestic consumption of vector supercomputer systems in general or vector supercomputers specifically during 1993 through 1995.

Government.[27] It also appears that part of the decline in consumption from 1994 to 1995 was attributable to customers awaiting the introduction of CRI's new T-90 model vector supercomputer.[28]

III. NO REASONABLE INDICATION OF MATERIAL INJURY

In determining whether there is a reasonable indication that subject imports are causing material injury to the domestic industry, the Commission is directed to consider the significance of the volume of subject imports, their effect on domestic prices, and the impact of the subject imports on the domestic industry. The Commission may consider alternative causes of injury, but must not weigh causes.[29] Where there are alternative causes of injury to the industry, the Commission must not attribute the injury from those other causes to the subject imports.[30]

The volume of subject imports from 1993 through 1995 was extremely small.[31] Import market share, as measured by value of shipments, declined throughout the three full years and consistently accounted for under three percent in each year.[32]

The Commission received information on bids that accounted for the vast majority of vector supercomputer sales during the period examined, including both sales subject to Buy American restrictions and sales not subject to Buy American restrictions. The actual number of sales captured by subject imports was very small. By value, apart from the UCAR sale, the subject imports captured less than 5 percent of the total value of sales not subject to Buy American restrictions. When the Buy American sales are also included, the percentage of sales value won by subject imports -- 3 percent -- is very small indeed.

The volume of subject imports increased in the first half of 1996, reaching its highest level during the period examined. In assessing the significance of this increase, I observed that less than half of those imports were for sales for which CRI also had bid. The balance of the subject imports were sales for which CRI did not compete, or were not intended for sale or lease to a customer.[33] Consequently, the volume of subject imports in the first half of 1996 that actually competed with CRI was still very small. The rest of domestic consumption was served entirely by the domestic industry (i.e., CRI) since there were no imports from third countries. Based on the foregoing, I conclude that subject imports are not significant, whether assessed in absolute terms or relative to domestic production or consumption.

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[27] CR at II-1, II-4, PR at II-1 - II-2.

[28] Tr. at 69 (Goldfarb).

[29] See H.R. Rep. No. 317, 96th Cong. 1st Sess., at 47 (1979).

[30] See The Uruguay Round Agreements Act, Statement of Administrative Action, H. R. Doc. 316, 103rd Cong., 2nd Sess., at 811 ("The Agreement . . . requires that national authorities examine factors other than unfairly traded imports which may be injuring the domestic industry. . . . [and] cautions authorities not to attribute injury from such other factors to the dumped imports.").

[31] Table IV-1, CR at IV-3, PR at IV-1.

[32] Table IV-3, CR at IV-5; PR at IV-2.

[33] See CR at IV-1, n. 7, IV-2, n. 9, and Table V-1, CR at V-7; PR at IV-1, V-3. NEC ***. Fujitsu ***. CRI ***. The balance of the subject imports, worth approximately ***, accounted for approximately *** of apparent domestic consumption in January-June 1996.

In analyzing the price effects of subject imports,[34] I took into account several important factors. First, vector supercomputers are high-value, customized products, manufactured to particular specifications that differ significantly from one sale to the next. A sale usually consists of an entire system, which includes not only the supercomputer itself but also software, peripherals and service.[35] Thus, it is difficult to compare the price of one product with that of another for purposes of determining whether there is significant underselling or price depression or suppression.

I also note that prices for supercomputer performance are expected to decline as a matter of course. A rule-of-thumb in the industry, known as "Moore's law," estimates that the amount of computer performance received per dollar spent should double every 18 months because of technical innovations.[36] Competition from less-costly MPPs and other non-vector products is putting additional pressure on vector supercomputer prices.[37] Thus, assessing whether *subject imports* are causing vector supercomputer prices to decline more rapidly than they otherwise would is very difficult.

Prices are affected by numerous factors. Many customers have budget constraints that all suppliers must be able to meet in order for their initial bids to be viable.[38] The competing producers' bid prices are further affected by whether the product is at the beginning or the end of its life cycle, and the bid size in terms of volume. Specifications of competing bids can vary significantly in terms of product configurations, processor and memory technology, main memory size, maximum memory bandwidth, cooling systems required, and other essential features. Many sales involve extended delivery and installation periods of up to five years. Bids thus frequently include "forward pricing," which is based on estimates of future performance that should be available for a certain dollar sum based on current prices and performance.[39] All of these factors complicate the pricing analysis.

The record indicates that the lowest bid does not always win the sale. Indeed, the winning bid can be considerably higher than the lowest bid. For example, CRI won two sales against competing Japanese systems even though the subject import bids were more than 30 percent below CRI's bid.[40] Given the significant differences between the competing systems that were bid and the consequent difficulty of attempting to directly compare the prices of competing systems, I did not give much weight to evidence of underselling or overselling.

Assessing price trends and whether subject imports are causing price depression is difficult because of the customized nature of each system. One measure of price that is frequently cited is the price per peak billion floating point operations (Gflops), although this measure does not account for all considerations that are important to a purchaser.[41] Thus, I used this measure with some caution as an indicator of price trends. I observed that the rate of decline in price/Gflop for sales not subject to Buy American restrictions tended to be similar to the rate of decline in price/Gflop for sales that were subject to Buy American restrictions.[42] This suggests that prices were declining at about the same rate both

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[34] 19 U.S.C. §1677(7)(C)(ii).

[35] CR at V-2; PR at V-2.

[36] CR at D-7; PR at D-3.

[37] See Fujitsu's Postconference Brief at 16-17.

[38] CR at V-2; PR at V-2.

[39] Id.

[40] CR at V-21; PR at V-4.

[41] For example, a comparison of one product's price/Gflop to another's may not take into account the fact that one model has substantially higher memory capacity. CR at V-4, n. 4; PR at V-3.

[42] Compare Tables V-1 and V-2, CR at V5-V-11; PR at V-3.

where subject imports were competing with CRI and where they were not competing with CRI. In other words, prices as measured by price/Gflop do not reveal evidence of price depression caused by subject imports. Prior to April 1996, the small portion of sales won by subject imports and the limited degree of competition between subject imports and the domestic industry indicate that subject imports are not having a significant adverse impact on domestic prices.

Petitioner's principal arguments focus on the UCAR sale of April 1996 and the impact on CRI from the loss of that sale to NEC. UCAR issued an RFP in March 1995 that contained two scenarios: (1) a 3-year, $13.5 million scenario; and (2) a 5-year, $35.25 million scenario. UCAR received three offers that were within the competitive range -- from CRI, Fujitsu and Federal Computer Corporation ("FCC"), which offered NEC's products and FCC's service. After meeting with each of the competing producers to conduct Live Test Demonstrations ("LTDs"), UCAR issued guidelines for Best and Final Offers ("BAFOs") in October 1995. The guidelines suggested that the producers focus on the 5-year, $35.25-million funding scenario set out in the RFP.[43] The guidelines contained one "core requirement" of computing capability to support climate simulation programs for delivery in October 1996. There were three additional "expectations" of computing capability and capacity to be delivered in October 1996 and then in October 1998, although these were not core requirements. Following receipt of each producer's BAFO and additional tests, UCAR awarded the sale to FCC in the spring of 1996.[44]

The parties have vigorously disputed the basis for UCAR's decision. In my view, the record makes clear that UCAR was very impressed with the speed of NEC's product, which surpassed not only the core requirement (as did CRI's system), but also the additional expectations. I am persuaded that UCAR selected NEC's system because it offered substantially more *value* in terms of computing power and performance than CRI's system for about the same amount of money. Thus, the reason NEC won this sale was not simply a matter of technical attributes, but very much a matter of price. Given the large dumping margins involved, it seems apparent that the allegedly dumped price contributed to NEC's ability to win the sale.

Petitioner contends that NEC's winning of the UCAR sale will have adverse price effects because the UCAR account is a "lighthouse account" that will affect the prices for vector supercomputers at other key accounts. According to petitioner, NEC's price/Gflop will force down market prices to a level at which CRI cannot operate profitable.[45]

As noted earlier, the UCAR sale was awarded in April 1996. There is too little information on subsequent sales to test whether the UCAR sale is currently having adverse effects on domestic prices based on petitioner's "lighthouse" theory. Therefore, although price was an important factor in the UCAR bid, there is insufficient evidence in this record to conclude that there is domestic price suppression or depression as a result of the UCAR sale. Taken together with the lack of evidence of significant adverse price effects from other bids or sales of subject imports, I find that subject imports are not depressing or suppressing domestic prices to a significant degree. Whether the UCAR sale is likely

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[43] See Letter from E.A. Bogard, UCAR Contracts Manager, to Tim Ward, Cray Research, Inc., dated November 1, 1995, attaching "Guidelines for Preparing the BAFO", appended at Appendix E to the Petition.

[44] Id.; see generally CR at Appendix D; PR at Appendix D.

[45] As evidence of this phenomenon, CRI alleges that the price/performance target of the UCAR procurement was revised upward (i.e., to increase the amount of computer performance per dollar) as the result of a bid by Fujitsu in 1995 that captured a sale to the European Medium Range Weather Forecasting ("EMRWF") account. CRI asserts that a senior official involved in the prepartion of the UCAR procurement had visited Europe to discuss the Fujitsu bid and subsequently changed the UCAR procurement. See Petitioner's Postconference Brief at 30, 44-45.

to have depressing or suppressing effects on domestic prices in the imminent future is addressed below in my threat analysis.

I thus turn to any other evidence of an adverse impact by subject imports on the domestic industry.[46] The miniscule volume of subject imports in the United States throughout most of the period examined suggests that changes in the domestic industry's performance during 1993 through 1995 must be attributable to factors other than subject imports. I note briefly that domestic industry performance was mixed. An overall increase in the number of vector supercomputer systems produced and shipped during the period was offset by a decline in the value of those shipments.[47] This reflects a shift in the product mix; although CRI's sales of its mid-range vector supercomputers increased substantially throughout the period, sales of the large scale vector supercomputers fell off. Since the large scale vector products yield higher revenues, the decline in sales of these products contributed to the decline in CRI's total revenues and operating income from 1993 through 1995, notwithstanding the increase in the sale of mid-range vector supercomputers.[48]

In assessing CRI's financial performance, I gave special note to the fact that CRI incurred substantial restructuring expenses in 1995. Since these restructuring expenses were treated as operating expenses, CRI's financial performance showed a substantial decline from 1994 to 1995. Since the restructuing occurred at a point in time when there was virtually no import competition, I must conclude that the restructuring, and its related costs, had no relationship to LTFV competition. I also note that operating returns improved in the first half of 1996, and total revenues also were higher, as compared to a year earlier.[49]

Subject imports were too small during 1993 through 1995 to have had any measurable impact on the domestic industry. Subject imports in the first half of 1996 that actually competed with CRI for sales were insubstantial in comparison to CRI's shipments and revenues during the same period.

There also is no evidence that the loss of the UCAR sale had a significant adverse impact on CRI during the period examined. It is important to note that although CRI lost the UCAR sale to NEC, CRI did not, in fact, lose a $35.25-million sale. The information submitted by UCAR makes plain that CRI was unable to fully demonstrate that its 5-year BAFO met UCAR's additional expectations.[50] Thus, if the NEC bid had not been available to UCAR, CRI's 5-year BAFO is not what UCAR would have selected as an alternative. Instead, UCAR reports that if the NEC system had not been available, it would have selected CRI's 3-year, $13.5 million proposal, and issued a new RFP for the rest of its computing requirements.[51]

In any event, although the UCAR sale occurred in April 1996, the first revenues from that sale were not going to be paid until after installation of the base system.[52] Thus, even if CRI's 3-year BAFO had been selected by UCAR, no measurable benefits would have accrued during the period examined.

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[46] See 19 U.S.C. §1677(7)(C)(iii).

[47] See Table III-2, CR at III-8; PR at III-1.

[48] CR at VI-3; PR at VI-1 - VI-2.

[49] CR at VI-3-VI-6; PR at VI-1 - VI-2..

[50] For example, although CRI proposed to install a system in 1998 with a compute capacity of 50.3 Gflops, the equipment it had available for testing was able to demonstrate only a sustained capacity of 4.9 Gflops, or about 10 percent of the total compute capacity that was being offered. This represented a significant technical risk to UCAR. CR at D-8; PR at D-3.

[51] CR at V-22; PR at V-4. See also Letter from Frank J. Schuchat to Valerie Newkirk, dated September 18, 1996.

[52] See "Guidelines for Preparing the BAFO" at 3, attached as Appendix E to the Petition.

In sum, subject imports had no significant adverse impact on the domestic industry during the period examined. The record provides no reasonable indication that the domestic industry is materially injured by reason of subject imports.

IV. NO REASONABLE INDICATION OF THREAT OF MATERIAL INJURY

Having found no reasonable indication of material injury, I now turn to the issue of threat. Section 771(7)(F) of the Tariff Act of 1930 directs the Commission to make its decision "on the basis of evidence that the threat of material injury is real and that actual injury is imminent."[53] While an analysis of the statutory threat factors necessarily involves projection of future events, "[s]uch a determination may not be made on the basis of mere conjecture or supposition."[54] These factors are to be considered "as a whole" and no particular factor is dispositive.[55] I further note that the statutory factors are not merely a checklist. Rather, together, they suggest a framework for analyzing whether import penetration and pricing, foreign industry trends, and developments in the domestic industry, taken as a whole, indicate that subject imports pose a realistic threat of actual harm to the domestic industry.

Capacity, production and shipment data for the Japanese vector supercomputer industry were reported in terms of the quantity of systems rather than in terms of value.[56] In a market where products are highly customized and vary greatly in size, capacity reported in terms of the quantity of systems is not very probative as to the constraints on the industry's ability to increase production. Similarly, the production and shipment data do not indicate whether the systems are mid-range or large vector systems. Thus, the conclusions that can reliably be drawn from the foreign industry data are somewhat limited. With these caveats in mind, I observed that although the Japanese producers had excess capacity during 1993 through 1995, exports to the United States remained very small. Japanese production and capacity utilization are projected to increase in 1996 and 1997. Exports to the United States, however, are not projected to increase substantially over current levels. These export projections and the proportion of future Japanese production that is projected to be sold to the home market do not suggest the likelihood that subject imports will increase to injurious levels.[57]

Apart from the UCAR sale, importers reported very few other orders that would be delivered in 1996.[58] CRI points to reports in the Japanese press that NEC and Fujitsu want to significantly increase their sales of vector supercomputers and intend to "target" European and U.S. customers because CRI and other producers "'are not strong in entry level models.'"[59] Statements of plans for increasing

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[53] 19 U.S.C. §1677(7)(F)(ii).

[54] Id.

[55] Id.

[56] Table VII-1, CR at VII-2; PR at VII-1.

[57] Table VII-1, CR at VII-2, PR at VII-1. Japanese capacity utilization was below *** percent throughout full years 1993 to 1995, but is projected to increase to more than *** percent in 1996 and *** percent in 1997. Annual production of vector supercomputer systems fluctuated between *** systems during 1993 through 1995, and is projected to increase to *** in 1996 and *** in 1997. Home market shipments, which fluctuated between *** systems annually during 1993 through 1995, are projected to increase to *** in 1996 and *** in 1997. By contrast, exports to the United States, which were already *** systems in the first half of 1996, are projected to reach *** in full-year 1996 and *** in 1997.

[58] CR at VII-5; PR at VII-3. Importers reported a total of *** systems to be delivered during the second half of 1996, not counting the UCAR sale.

[59] CRI's Postconference Br. at 47-48.

production, however, are consistent with the evidence of the proportion of the projected increase in production that is intended for the Japanese market. Furthermore, the reference to "entry level models" suggests that Japanese producers are focusing their efforts on the U.S. (and European) markets for mid-range vector supercomputers, in which CRI is already very strong, and not the higher-value large scale models. It also bears noting that future subject imports will be excluded (just as current imports are) from the Buy American-segment of the market, which CRI has to itself. In light of (1) CRI's predominance in the domestic market throughout the period; (2) the large (albeit declining) portion of the market subject to Buy American restrictions; and (3) the very small presence of subject imports in the U.S. market, notwithstanding the significant amount of underutilized capacity among Japanese producers throughout much of the period examined, I do not believe that market penetration by subject imports is likely to increase substantially in the future.

I also do not believe the loss of the UCAR sale itself poses a threat of material injury. As previously discussed, UCAR reported that if the NEC system had been excluded from the bidding, UCAR would have selected CRI's 3-year, $13.5 million BAFO, and not the 5-year, $35.25 million offer.

In order to determine whether the loss of the UCAR sale poses a threat of material injury, I compared the revenues that CRI would have received in October 1996 for its 3-year BAFO to what CRI's 1996 revenues would otherwise likely be. Given the evidence that CRI's first half 1996 revenues were higher than first half 1995, I conservatively estimated that CRI's annual revenues in 1996 would be at least the same as in 1995. On that basis, had CRI's 3-year offer been accepted by UCAR, CRI's revenues in 1996 would increase a miniscule amount.[60] Conversely, the loss of the UCAR sale means that CRI's revenues were only a tiny bit less than they would have been had UCAR selected CRI's 3-year BAFO. I do not find a loss of this magnitude to be sufficiently threatening to CRI's overall condition to warrant an affirmative determination. Furthermore, there is no evidence of an impending downturn in CRI's revenues in the remainder of 1996 that would make the additional revenue stream from the UCAR sale critical. Indeed, CRI's President and Chief Operating Officer, Robert Ewald, announced in a memorandum to CRI's employees dated May 20, 1996 that the UCAR transaction "doesn't make or break our revenue goals for the year, and it doesn't really make a difference in our employment. . . ."[61]

CRI contends that the UCAR sale to NEC will have future adverse effects on domestic prices because the UCAR account is a "lighthouse account." CRI asserts that other prospective purchasers will look to the UCAR sale to set new market standards for price/performance expectations.[62] I do not find there is sufficient evidence in the record to indicate that such adverse effects are likely to occur. First, the record indicates that in international markets, a sale to one vector supercomputer producer did not guarantee subsequent sales to that same producer. For example, a Fujitsu vector supercomputer won the EMRWF weather forecasting procurement in September 1995. Later that same year, however, an NEC vector supercomputer won another sale for European weather forecasting and, in the spring of 1996, a

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[60] UCAR's November 1995 guidelines for the three-year BAFO indicated that $8.25 million would be paid by October 1996, with the balance to be paid in October 1997. See Petition, Appendix E, "Guidelines for Preparing the BAFO" at 3. This sum amounts to a little over *** percent of CRI's total revenues in 1995, which were ***. Table VI-1, CR at VI-2; PR at VI-1.

[61] Ewald Statement, Internal Cray Memorandum, May 20, 1996 (Attachment A to NEC's Postconference Brief). This statement was made a little more than two months before the antidumping petition was filed.

[62] CRI's Postconference Brief at 44-47.

CRI vector processor and an MPP won a Swedish purchase over Fujitsu and NEC vector supercomputers.[63]

Secondly, several of the accounts that CRI contends are at risk because of the NEC sale to UCAR are for different applications than those in the UCAR procurement. One of these prospective purchasers reported that the UCAR sale was less important for purposes of establishing price expectations than if the sale had been to a company for use with the same applications as it seeks.[64]

Finally, the amount of prospective sales for weather forecasting applications in the United States in the next 12-18 months is projected by one party to be $5 million, out of a total market of $228 million.[65] Thus, the portion of the market that would most likely be influenced by the UCAR sale appears to be very small. In sum, there is insufficient evidence in the record to support the petitioner's lighthouse theory.

I also do not find evidence of other adverse trends that support an affirmative threat determination. To the contrary, I believe that CRI's future performance is likely to improve. CRI already has a substantial installed base both in the United States and around the world and a reputation for quality that virtually makes its name synonymous with "supercomputer." It has successfully introduced its new T-90 large vector supercomputer and has completed the restructuring that took such a toll on CRI's operating returns in 1995. CRI's backlog for vector products at the end of 1995 was very high -- over $190 million.[66]

A number of developments, including increasing competition from MPPs and significant declines in government spending, have put substantial pressure on CRI throughout the period. Based on the record in this investigation, however, I conclude that subject imports, although increasing from a very small base, do not pose a threat of material injury.[67]

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[63] Fujitsu Br. at 41-42.

[64] Telephone Notes of Conversation with ***.

[65] NEC Br. at 17-18.

[66] See "Cray Research, Inc., Fourth Quarter FY 1995 Teleconference Remarks", downloaded from http://www.cray.com/PUBLIC/COMPANY/II/other/4Q95teleconf.html (January 25, 1996) at 5 ("Backlog was $437M, an increase of $200M from year-end 1994. . . . The backlog is comprised of about 45% T90 and 40% T3E systems. Ninety-seven percent of the backlog is for 1996 acceptances.").

[67] There have been a number of attempts to draw analogies between this investigation and our recently-concluded investigation in Large Newspaper Printing Presses from Germany and Japan, Invs. Nos. 731-TA-736 and 737 (Final), USITC Pub. 2988 (August 1996). Although there are parallels between the Printing Presses record and the record in this investigation, there also are important differences. First, subject imports had a more significant presence in the domestic market in Printing Presses and there was a greater degree of head-to-head competition is the case here. See id. at 28. Second, the market for large newspaper printing presses had experienced a boom in the late 1980s because of the introduction of new technology to print in color. After the boom subsided, the industry experienced a significant downturn. Id. at 18. Here, by contrast, CRI has just recently introduced a new generation of vector supercomputers; it is at the beginning of a new product cycle during which time its sales will likely increase. Third, in Printing Presses, the domestic industry was about to experience a "hole" in its production schedule, which would have been substantially filled by the large sale lost to subject imports. Id. at 35. There is no similar evidence of a production hole in this investigation. Indeed, as previously noted, the president and chief operating officer of CRI himself stated that the loss of the UCAR sale would not significantly affect CRI's revenue goals. There also was evidence in Presses of head-to-head competition between subject imports and the domestic industry for a large number of pending sales. Id. The record in this investigation shows more limited competition between subject imports and the domestic indusry, and no specific evidence of competition for pending sales.

Finally, I have considered carefully what additional evidence the Commission would likely obtain in any final investigation, and whether it is likely that such evidence would support a contrary result. Apart from certain questions surrounding the definition of like product, we have a more complete record in this preliminary determination than in many others. This is a small industry with a handful of producers and importers, all of whom responded to our questionnaires. The information collected on bids accounts for the large majority of domestic consumption of vector supercomputers during the period. Although a final phase investigation would produce *more* information, it does not appear likely that the record would look very different from how it now appears. Even with regard to the question of like product, new information that would support a broader definition would only further dilute the impact of subject imports on the domestic industry. Accordingly, I see no basis for continuing this investigation.

V. CONCLUSION

On the basis of the record in this investigation, I determine that there is no reasonable indication that the domestic industry producing vector supercomputers is materially injured or threatened with material injury by reason of subject imports. Subject imports were almost nil for most of the period examined and were still very small as recently as the first six months of 1996. Although the domestic industry's condition worsened during 1993 to 1995, this was due to a variety of other factors, not subject imports. Subject imports are likely to remain a small, albeit increasing, presence in the domestic market in the imminent future, while CRI appears to be strengthening its market position with the introduction of its new generation of vector supercomputers. The future is not without its challenges for CRI. Nevertheless, petitioner overstates the challenge posed, at least at this time, by subject imports. Accordingly, I respectfully dissent.

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PART I: INTRODUCTION

BACKGROUND

This investigation results from a petition filed by Cray Research, Inc., Eagan, MN, on July 29, 1996, alleging that an industry in the United States is materially injured and threatened with material injury by reason of LTFV imports of vector supercomputers[1] from Japan. Information relating to the background of the investigation is provided below.[2]

Date	*Action*
July 29, 1996	Petition filed with Commerce and the Commission;[3] institution of Commission investigation (61 F.R. 41181, August 7, 1996)
August 20, 1996	Commission's conference[4]
August 23, 1996	Commerce's notice of initiation (61 F.R. 43527)
September 11, 1996 .	Commission's vote
September 12, 1996 .	Commission's determination to Commerce

SUMMARY DATA

A summary of data collected in this investigation is presented in appendix C. Except as noted, U.S. industry data are based on CRI's questionnaire response that accounted for *** percent of total U.S. supercomputer factory revenue in 1995. U.S. import data are based on information supplied by U.S. importers that are believed to account for 100 percent of the subject systems from Japan.

THE PRODUCT

Commerce has defined the product that is the subject of this investigation as vector supercomputers--computers "with a vector hardware unit as an integral part of any of its CPU boards." This definition describes a particular computer architecture that consists of hardware designed to process data in a specific way and the software that enables the computer to function in this specific way. The other types of high-performance computers that the petitioner believes are not part of the vector market are MPPs and networked workstations. These other two types of computer systems are of a distinctly different design, process data differently, and require different software from that of vector supercomputers. Despite these differences, the markets for vector, MPP, and networked workstation systems may overlap to some extent. Also, parallel processing architecture has many forms, of which MPP is only one. Parallel processors can be highly parallel, moderately parallel, or have a number of other configurations that are not mentioned by the petitioner. This section presents information on both

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[1] For purposes of this investigation, "vector supercomputers" are all vector supercomputers, whether new or used, and whether in assembled or unassembled form, as well as vector supercomputer spare parts, repair parts, upgrades, and system software shipped to fulfill the requirements of a contract for the sale and, if included in the contract, maintenance of a vector supercomputer. A vector supercomputer is any computer with a vector hardware unit as an integral part of its CPU boards. Vector supercomputers are provided for in heading 8471 of the HTS, with most-favored-nation tariff rates ranging from 3.0 to 3.9 percent *ad valorem* applicable to imports from Japan.

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

[3] The petition alleged an LTFV margin of 454 percent, based on a comparison of the export price to the normal value. ***; NEC's postconference brief, attachment 1.

[4] A list of witnesses appearing at the conference is presented in app. B.

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imported and domestically produced vector supercomputers, as well as information related to the Commission's "like product" determination.[5]

It is difficult to define the term "supercomputer" in concrete, measurable terms because the product has changed over time. Generally, supercomputer systems are differentiated from other computers by two factors--high processing speeds and an ability to handle numerically intensive problems too large for conventional computers. Innovations in mainframes, semiconductor technology, and networking have enabled some computers or systems of computers to challenge the superiority of traditional supercomputers in processing speed and/or power. Although these advancements have prompted a number of computer manufacturers to label their products supercomputers, not all of these systems have the capability of running the most advanced scientific and commercial applications at the speed of a true supercomputer.

Supercomputers can be divided into two main categories: vector supercomputers and various types of parallel systems. Vector computers are designed to perform operations on sets of numbers called vectors. The processor treats each vector as a single entity; adding two vectors together takes only as long as it takes to add two numbers. Computers with vector processors are useful in a variety of applications characterized by a large volume of data that can easily be organized into lists when the program is written. The number of processors in parallel systems can range from a few to many, and this characteristic is referred to as scalability. Part of the program and the data are assigned to each processor, and all processors carry out the required calculations simultaneously. Necessary communications between processors, to obtain additional data, for example, are handled by the routing network, which transfers messages within the computer system. Because message passing can slow the machine's overall speed, parallel processing is best suited to problems with many small parts that can be computed independently. The greater the number of processors, the more important it is to limit the connections to the pattern best tailored to the jobs the computer will run.[6]

The petition provides examples of both imported MPPs with vector hardware, that are included within its like product definition of vector supercomputers, and domestically produced mainframe computers with a vector facility that is not an integral part of the mainframe CPU boards and, therefore, is not included in its definition.[7] Vector supercomputers are different from MPPs without vector processor hardware and networked workstations in terms of their architecture, physical characteristics, and availability of third-party application codes.[8] CRI discussed in further detail its like product arguments in its postconference brief.[9]

None of the parties argues that the domestic and Japanese vector supercomputers are not like products, but Fujitsu argues that other types of supercomputers should be included in the like product and thus included in the U.S. industry.[10] Specifically, Fujitsu argues that MPPs[11] should be included in

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

[6] Petition, annex B, pp. 60-61 and 63.

[7] Petition, pp. 8, 10-11. A key to petitioner's definition of like product is that the vector facility be an integral part of any of the computer's CPU boards.

[8] Ibid, pp. 14-18, and annex B. See also testimony of Steve Oberlin, CRI, conference transcript, pp. 21-41.

[9] Petitioner's postconference brief, pp. 4-24.

[10] However, Fujitsu did argue at the conference that since CRI's systems use shared memory and Fujitsu's systems use distributed memory, Fujitsu's vector systems should not be included in the "scope" of the investigation; conference transcript, pp. 142-143. See also Fujitsu's postconference brief, p. 9. For a more detailed discussion of

(continued...) I-2

the like product.[12] U.S. imports of supercomputers from Japan to date have been vector supercomputers or vector-parallel supercomputers. They have been relatively small computers, both in number of processors and peak performance measured in Gflops, compared with the universe of vector supercomputers and compared with the full product line of supercomputers manufactured by NEC, Fujitsu, and CRI. Technologically, they are similar to some, but not all, supercomputers manufactured in the United States. No imports of parallel processing supercomputers from Japan and no imports of clustered workstations large and fast enough to be regarded as supercomputers by industry experts have been identified.

Physical Characteristics and Uses

The manufacture of supercomputer hardware in both Japan and the United States begins with a significant amount of research, development, and design, because these computers are configured differently for each order and include significant proprietary technology to enable them to process large volumes of data at high rates of speed. The actual manufacturing process consists mainly of assembly of various parts, including semiconductors, printed circuit boards, internal wiring, power supplies, I/O devices, and any other parts that a system requires to meet the user's specifications. In addition to these basic operations, many supercomputer manufacturers design and/or manufacture specialty high-performance semiconductors or other components for their computers.

There are differences in the technologies employed in the manufacture of supercomputers; however, these differences are between manufacturers, not between the imported and the domestic products. From the information available at this time, it appears that CRI is the only supercomputer manufacturer using ECL for the processors in any of its supercomputers, and CRI's use of ECL is restricted to one current model of supercomputer, the T90. CRI produces ECL processors in Chippewa Falls, WI, and outsources most, if not all, other processors, although they contain a high level of proprietary design.

Both U.S. and foreign companies use CMOS technology for their processors. Japanese producers and most U.S. parallel systems producers, with the exception of CRI, are integrated firms with broad product lines that can take advantage of spill-over benefits of research and development. In the case of the Japanese producers NEC and Fujitsu, the research, development, and plant and equipment costs of advanced CMOS logic chips are shared with costs of mass-market memory chips. The merchant market and internal demand for higher density DRAMs has driven the development of new CMOS technology. Supercomputer logic chips are designed as a follow-on to developments made in DRAMs, and each innovation is amortizable over a broad product base. In these companies, supercomputer logic chips are produced in the same facilities on manufacturing lines parallel to those producing commodity logic chips; designs for supercomputer logic chips take advantage of developments in the next generation of memories.[13]

The purchase of a supercomputer also includes software, auxiliary equipment, and services. At a minimum, the purchase includes operating system software. Such software is developed by the

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[10] (...continued)
the computational differences see testimony of Ken Miura, Fujitsu, conference transcript, pp. 150-153; and Fujitsu's postconference brief, ex. 1.

[11] Fujitsu includes SMPs in its definition of MPPs.

[12] Conference transcript, pp. 142-146 and 156-163, and Fujitsu's postconference brief, pp. 4-32.

[13] High Performance Computing Lab, University of Texas at San Antonio, World Wide Web, http://rabbit.cs.utsa.edu/Welcome.html, Aug. 21, 1996.

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supercomputer manufacturer, and most software is based on the widely used operating system UNIX. Some purchases may also include some applications software developed by the hardware manufacturer. Auxiliary equipment (other than the I/O devices and power supplies) such as the cooling system may also be designed and assembled by the computer hardware manufacturer. Construction design and services, on-site maintenance and repair services, and user assistance are usually included in the contract price.

All supercomputers process large amounts of data at a very high rate of speed. However, there are a number of designs or architectures that use different technologies to achieve this result. Each architecture and technology has advantages and disadvantages. The performance of the system and its suitability for certain applications are determined by the total system and software and not by any particular feature. The following discussion describes the main features of the different architectures and technologies and their advantages and disadvantages.

Architectures

Vector supercomputers are a particular computer architecture that has hardware specially designed to process data in groups called vectors. This is particularly well suited to simulating complex problems over time, for example the operation of a jet engine from take off to landing or climate changes over decades.[14] Most vector supercomputers have one large shared memory (Fujitsu vector supercomputers do not), and programming is specially designed to minimize the time required to bring needed data from memory to processors and to the appropriate output device. Another characteristic that differentiates vector supercomputers from other supercomputers is the general use in the former of custom processing elements or processing elements with a very high degree of customization that number only in the 10s. Vector processors are designed to employ a concept called pipelining, which speeds up processing by allowing the processor to operate on more than one instruction (step in the program) at a time. The vector features of processing many data items as a group rather than individual items and of working on more than one instruction at the same time increase the efficiency and the speed of the processor.[15] The ability to process data using more than one processor (parallel processing), and thus decrease the time to solution, is a characteristic that has been incorporated in vector computers for at least a decade.

Parallel processing systems vary widely in architecture, performance, and applications. The one thing they have in common is multiple processing elements, and these processing elements are often commodity logic chips with little or no customization. The distinguishing characteristics are their internal communications systems, memory structure, and the number of instruction units that communicate with the processing elements. These differences prevent programming for one type of parallel processing computer from being compatible with other configurations.[16]

The first parallel processing computers consisted of many processing elements, each with its own memory (distributed memory), and one instructional unit, which delivered the same instruction to all the processing elements. Each processing element then executed the instruction on the data in its memory. There are major drawbacks to this type of system. First, a new instruction could not be given until all the processors had finished the current instruction. If one processor's data were complex and took longer to process, all the other processors would be idle while waiting for the last processor to finish. As a result, processing speed could decrease dramatically. Second, programming was difficult because it had to be structured to distribute all of the processing assignments equally and continuously.

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[14] "The World's Fastest Computers," *Byte*, vol. 21, No. 1, Jan. 1996, p. 45.

[15] Ibid.

[16] National Academy Press, World Wide Web, http://www.nap.edu, Aug. 21, 1996.

All processors had to be given assignments continuously and those assignments would have to be designed to take exactly the same amount of time for each processor and its data set. Few of these parallel processing computers are still in use today. They were very difficult to program efficiently and were not compatible with any standard software. In addition, applications that could be structured to run fast on a lock-step architecture such as this were rare.[17]

The next type of parallel processor is one that consisted of many memory/processor/instruction units tied together with a message-passing network. Because each of these units is essentially a computer on its own, it could operate on instructions independently from the other units and coordinate activities by message passing. This structure avoided the problem of one processor holding up the work of all the others, but it also had problems. The main drawback of this system was that the speed with which a message traveled through the network often was slower than the speed of the processors. If communication between processing units was frequent, the overall speed of the computer would fall significantly and as the number of processing units increased, the message-passing delays increased. In order to minimize these problems, processors had to have access to the data they needed in their own memories or in only a few nearby locations, programs had to be written to minimize the need for message-passing, and message-passing networks had to be made faster and more efficient. This parallel processing computer design ranges from MPPs with hundreds of processing units located in one cabinet and connected by a high-performance network to a cluster of workstations connected by LANs or WANs.[18] The MPP configuration, with the appropriate programming, can be a very powerful high-performance computer. The cluster of workstations may perform well if message passing is minimized, but the network connections are likely to severely restrict the overall speed of the system. This type of parallel system, exemplified by TMC's CM5, is able to run more applications with greater efficiency, but software tools are still far behind those for vector computers, mainframes, and workstations. These computers were the first to use off-the-shelf microprocessors and represented a significant cost advantage over traditional vector supercomputers.[19]

A third type of parallel processing computer is one that has multiple processing units sharing a common memory and is sometimes referred to as an SMP. Each processing unit contains a processing element, an instruction unit, and cache memory.[20] Cache is a small, very fast memory between a processor and main memory and is used because the main memory is not capable of transferring data to the processor as fast as it can be processed.[21] There is a limit on the number of processing units in this configuration because communication with shared memory impinges on speed as the number of processors increases. To avoid this bottleneck when adding more processors, nodes, each consisting of an SMP system, are joined together with a second tier of memory. This two-tier memory structure behaves much like shared memory, and as a result this type of supercomputer, SPP, can include very large numbers of processors and still be a high-speed computer. This is the most fully developed parallel processing architecture. Generally, it is easier to program because of its shared memory and independent processors and it can solve a wider rage of problems more efficiently than other types of parallel computers. Examples of this technology are the CRI CS6400 and the Convex Exemplar, which is an SPP computer.[22]

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[17] Ibid.

[18] Ibid.

[19] "The World's Fastest Computers," *Byte*, vol. 21, No. 1, Jan. 1996, pp. 46, 52, 54, and 58.

[20] National Academy Press, World Wide Web, http://www.nap.edu, Aug. 21, 1996.

[21] SGI, World Wide Web, http://www.sgi.com, Aug. 23, 1996.

[22] "The World's Fastest Computers," *Byte*, vol. 21, No. 1, Jan. 1996, pp. 52 and 58.

Processors

There are several classes of processors used in supercomputers. Custom logic chips are used in vector computers, but commodity chips are used in most other supercomputers. The CRI T90, CRI's largest vector computer, uses ECL technology; nearly all other supercomputer producers use CMOS technology in their processors. With the introduction of powerful new CMOS microprocessors such as the IBM Power2, the MIPS R8000, and the DEC Alpha processors, supercomputing increasingly has moved to CMOS microprocessor-based systems.[23] Logic technologies to be preferred are those with both low gate delays and low power dissipation per gate. Unfortunately, neither ECL nor CMOS embodies both of these characteristics. The traditional logic technology used for high-performance computers, ECL, is the fastest of the silicon technologies. ECL is expensive to manufacture and use and requires a more expensive (liquid) cooling system. CMOS has lower power dissipation than ECL and requires a less costly (air) cooling system. The lower power dissipation makes it possible to achieve high densities of gates per chip; the higher gate density makes it possible to incorporate more functions per chip and therefore avoid transmission delays from chip to chip. Offsetting this advantage, CMOS has a major disadvantage as a logic technology for supercomputers--its gate delay is higher than ECL.[24]

However, the speed of the processor is not the only factor in supercomputer speed. The type of memory and the speed of the network connecting the memory, processing elements, and the I/O devices, together with the software and type of application, all contribute to the ultimate speed and processing power of the computer.

Supercomputers are used for data-processing applications that involve massive amounts of data and when that analysis requires a huge number of calculations. They are also used to process large numbers of smaller problems virtually simultaneously. Traditionally, government and university research centers have been the largest users of supercomputers. Supercomputers have also been used for industrial applications for many years. The automotive, aerospace, and petroleum exploration industries are among the largest industrial markets for supercomputers. These industries have used supercomputers to simulate automobile prototype crash tests to speed time to market, in fluid dynamics to create more efficient airplanes, and in reservoir flows to more accurately predict oil and gas reserves. Other industrial applications have included designing Americas Cup yachts and cardiac pacemakers, processing bank and stock market transactions, and analyzing demographic and inventory flow data.

Use of Common Manufacturing Facilities and Production Employees

For a discussion of common manufacturing facilities and employees, see the section in part II entitled "Production Alternatives."

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[23] Benchmark Programs and Reports, World Wide Web, http://www.netlib.org/benchmark, July 26, 1996.

[24] Academy Industry Program, Supercomputers, National Academy Press, Washington, DC, 1989, pp. 39-40.

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Interchangeability

In general, both U.S. and Japanese vector supercomputers are viewed by purchasers as being interchangeable if they meet the purchaser's specifications and computational needs.[25] Theoretically, any of the systems that are called supercomputers could be used for any application. In practice, this is not the case. The factors that play a role in determining how interchangeable the various architectures and sizes of supercomputers are include the following:

- the time sensitivity of the application
- the complexity of the problem
- the size of the data set
- the applications software that has already been developed
- the resources that can be devoted to software development/modification
- the system's price
- the cost to maintain the system
- the presence of parallelism in the application
- the ability to expand the system (scalability)

In many cases, vector supercomputers and some types of parallel processing machines are performing similar analyses and, therefore, appear to be interchangeable. However, this assumes that comparable software has been developed for each computing platform. There is already a considerable library of vector computer programs and the library of parallel computing programs is growing.

There are other trade-offs that can be made that could convince users to consider different types of supercomputers to be interchangeable. Cost is an important consideration. Purchasers may be willing to spend resources to convert vector programs for use on parallel computers because the cost of the parallel system is so much less. Scalability is an important feature that allows for future expansion, and it is available to a greater degree in parallel systems. Communications with other computers and proprietary languages are less important concerns, because UNIX is the principal operating system for both supercomputers and workstations.

There are several factors indicating that not all supercomputers are interchangeable. In parallel computing there are several types of systems or features of systems that may make them a poor choice for some applications. For example, parallel computers with only one instruction unit and processors that work in lock-step are not good choices for most applications. Clustered workstations, at the low end of the distributed memory parallel processing systems, are not likely to perform well on very large simulations, especially if the problem is time-sensitive. The structure of the application can have a significant effect on the performance of different supercomputers. Applications that consist of many independent calculations, those that can be parallelized, may run more efficiently on a parallel processing computer. Applications that are highly scalar, those that require serial processing, usually run faster on vector supercomputers. However, innovative memory or other design and software can mitigate the differences.

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[25] For large projects, such as the UCAR project, which test many benchmarks, competing systems might perform better on some benchmarks and worse on others. In addition, there is the question of performance of core requirements vs. performance on expectations. A system could meet the core requirements but still be vastly outperformed by the competing system on expectations. I-7

Channels of Distribution

Both U.S. and Japanese vector supercomputers are sold either by the manufacturer's direct sales force or on a competitive-bid basis for contracts announced by purchasers. The contracts are generally for entire systems, which almost always require extensive software and installation support and on-site engineering by the manufacturer for the system's operational life (usually 5 years). Included with the system (and generally provided for in the contract) are certain spare parts to facilitate the speed of repairs, upgrades, and maintenance. Vector supercomputers are sold to end users that tend to be research laboratories and other scientific institutions; government agencies involved in defense, intelligence, and aerospace; climate modeling and weather forecasting institutions; and large corporations with demanding modeling and/or simulation requirements (e.g., automobile producers, petroleum companies, and aerospace companies).[26] [27] Other supercomputers are sold in much the same way. The exception to these channels of distribution would be clustered workstations that are connected with a LAN or WAN. These computers could be purchased from high-end retailers and connected by a systems integrator or knowledgeable user. After-sales service and support would be minimal.

Price

The movement toward scalable systems, mainframes, and networked workstations has eliminated most of the potential growth in traditional supercomputing. However, a large base of core customers with critical applications continues to see traditional systems as the only feasible solution to their computing needs, and has bolstered sales of these computers. Because of increased sales of low-end, air-cooled vector systems, which range in price from $350,000 to $1 million, the number of supercomputers in use has risen at a faster rate than revenues.

At the high end, supercomputers remain very expensive and even increased somewhat in price. At the low end, vector-system prices are beginning to reflect the heavy competition with scalable systems, mainframes, and even mid-range systems. The result is larger volumes at lower margins. Although that shift is not likely to drive the remaining vector firms out of the market, it signals a new era where supercomputer makers cannot necessarily rely on their products' elite status to ensure high prices.

Scalable parallel systems, which emerged at the low end of the supercomputer market, recently have gained market share at the expense of traditional vector supercomputers. To attract more high-end business, scalable-systems vendors have focused on selling systems with larger numbers of processors, which carry bigger price tags as well. Prices for these systems range from $100,000 to well over $50 million. In addition, as scalable systems have evolved from their status as experimental computers and moved firmly into the marketplace, vendors are in a better position to demand higher margins.[28]

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[26] Petition, p. 12.

[27] Parallel computers are used extensively in scientific (such as weather modeling) and industrial (such as the automotive industry and the oil and gas industry) applications; SGI, World Wide Web, http://www.sgi.com, Aug. 23, 1996.

[28] Department of Commerce, *U.S. Industrial Outlook, 1994*, pp. 26-29

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

MARKET SEGMENTS

The industry that produces vector supercomputers is global in scope and comprised of a small number of large firms, such as CRI, Fujitsu, and NEC. The supercomputer market today is quite different from that of 10 years ago. The lack of growth in government contracts has led supercomputer manufacturers to seek new markets and adopt new technologies to attract customers.[1]

The largest market for all supercomputers, especially the most powerful, is still the scientific and engineering market, much of which is funded by the government.[2] This market accounts for one-third to one-half of the total, but it is not growing. In fact, this market segment is projected to slowly decline in size. Because of this, supercomputer manufacturers have sought to increase their sales to private industry. Traditionally, automotive, aerospace, and energy-related firms have been a steady customer base.[3] As business has become more data intensive, a greater number of companies have turned to high-performance computing to track their costs and enhance their products. Currently, industrial customers account for 20 to 25 percent of the supercomputer market. The remainder of the market is largely academic institutions.[4] Figures II-1 and II-2 present CRI's customer base for its large and mid-range vector supercomputers.

Figure II-1: Installed large Cray vector supercomputer systems, by industry

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Figure II-2: Installed medium (J90/EL) Cray vector supercomputer systems, by industry

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The U.S. market for vector supercomputers is segmented by "Buy American" restrictions and preferences. The tabulation below shows the contract value (in $millions) of CRI's U.S. sales and/or leases of vector supercomputer systems that were subject to "Buy American" restrictions and preferences during January 1993-June 1996:[5]

	1993	1994	1995	Jan.-June 1996
Subject to "Buy American" restrictions	***	***	***	***
Subject to "Buy American" preferences	***	***	***	***

[1] NEC argues that CRI enjoys substantial sales of vector supercomputers to the U.S. Federal Government or government-related customers that are legally precluded (or effectively precluded) from considering purchase of an imported supercomputer; postconference brief, pp. 22-24.

[2] The largest market for mid-range vector supercomputers is universities.

[3] ***.

[4] Benchmark Programs and Reports, World Wide Web, http://www.net.lib.org/benchmark, July 26, 1996, and SGI, World Wide Web, http://www.sgi.com, Aug. 23, 1996. In the United States, over 90 percent of the supercomputers on the current top 500 list that are used in academic institutions are parallel processors.

[5] The information in this tabulation was compiled from data submitted in response to supplemental questionnaires of the U.S. International Trade Commission.

U.S. vector supercomputer sales that are subject to "Buy American" restrictions primarily consist of sales that are funded by the DOD[6] and/or classified government sales. On the average, sales that were subject to "Buy American" restrictions and preferences accounted for *** percent and *** percent, respectively, of CRI's total U.S. sales of vector supercomputers during the period January 1993-June 1996. However, the share of CRI's vector supercomputer sales that were subject to "Buy American" restrictions *** from *** percent and *** percent in 1993 and 1994, respectively, to *** percent in 1995.

SUPPLY AND DEMAND CONSIDERATIONS

U.S. Supply

The responsiveness of the supply of vector supercomputers to changes in price is influenced by such factors as the level of excess production capacity in the industry, the availability of export markets, the ease of shifting employees, facilities, and equipment to the production of other products, and the existence of significant inventories.

Domestic Production

***. With the recent acquisition by SGI, CRI could likely respond to changes in demand by increasing sales of vector supercomputers to the U.S. market, although CRI noted in its postconference brief that ***.[7]

Capacity in the U.S. industry

***. For a more detailed discussion of capacity in the U.S. industry, see the section in part III entitled "U.S. Capacity, Production, and Capacity Utilization."

Production alternatives

***. CRI reported that it ***.

Inventory levels

For a discussion of inventories maintained by CRI, see the section in part III entitled "U.S. Producers' Inventories."

Export markets

CRI is a major supplier of vector supercomputers to export markets worldwide. CRI has traditionally supplied many supercomputers used by researchers around the world.[8] Exports have consistently accounted for ***.

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[6] The Sabo Amendment requires that any DOD-funded purchases of vector supercomputers be subject to "Buy American" restrictions. See P.L. 104-61 § 8103 (1995); 48 CFR § 225.7023-1 (1996).

[7] Petitioner's postconference brief, pp. 32-33.

[8] Approximately 80 percent of the world's supercomputer-based environmental research sites use CRI systems (WorldWideWeb, http://www.cray.com).

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U.S. Demand

U.S. vector supercomputer producers and importers were asked if demand in the United States had changed since 1993 and, if so, what the principal factors were that affected changes in demand. Questionnaire responses indicate that demand for vector supercomputers has decreased since 1993. Convex responded that ***. Convex continued that ***. CRI responded that since 1993 worldwide demand for vector supercomputers has ***.[9]

HNSX responded that demand for vector supercomputers has declined since 1993 because of ***. Fujitsu characterized demand in the United States as ***.

At the conference, Deborah Goldfarb, IDC, testified that there is a global market for vector supercomputers, that it is relatively small, and that it will grow by only 1 percent in nominal terms (actually decline in inflation-adjusted terms) over the next several years.[10] The U.S. vector supercomputer market has been characterized as having experienced a "triple witching hour," with all major market forces turning negative at once. Product cycle transitions, shifts in federal spending, and the ongoing applications drain into the mid-range converged to significantly depress sales by the traditional vector supercomputer segment.[11]

Substitute Products

Counsel for Fujitsu argued at the conference and in its postconference brief that other high-performance platforms, including MPPs, SMPs, and networked workstations, compete directly with vector supercomputers in many applications. Petitioner argues that vector supercomputers and other high-performance platforms compete in only a relatively small set of applications and are not highly substitutable. For a more detailed discussion of the characteristics of vector supercomputers and other high-performance platforms, see the earlier section of this report entitled "The Product."

Comparison of Domestic Products and Subject Imports

Vector supercomputer systems are often highly differentiated products. Specifications of competing U.S.-produced and imported Japanese vector supercomputer bids can differ substantially with respect to important characteristics such as sustained performance of the most important benchmarks; processor and memory technology (e.g., CMOS or ECL); main memory size; maximum main memory bandwidth; maximum I/O bandwidth; cooling systems required; and other important features. For example, ***.[12] [13] [14]

The substitutability of U.S.-produced and imported Japanese vector supercomputers is further limited by the fact that *** of the U.S. market are closed to the Japanese suppliers because of "Buy American" restrictions. Competition between U.S.-produced and imported Japanese vector supercomputers

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[9] Although 1995 was not a good year for the vector supercomputer market, demand for and sales of supercomputers are expected to improve in 1996; conference transcript, pp. 69-70, testimony of D. Goldfarb, IDC, and NEC's postconference brief, p. 31.

[10] Conference transcript, pp. 58-59, and petitioner's postconference brief, pp. 36-37.

[11] "High-Performance Technical Computing Market, Review and Forecast: 1995-2000," IDC, p. 21.

[12] Competing vector supercomputer equipment is typically tested on a benchmark suite of programs to determine its performance capability and capacity. Often, one supplier's equipment will outperform the other supplier's equipment on some of the benchmark tests, but will underperform on the other benchmark tests. In these cases, the purchaser must decide which benchmarks are the most important, and weigh the differing performance results. For this reason, a purchaser's performance evaluation generally involves more than a simple comparison of overall peak performance rates.

[13] For a more detailed discussion of the UCAR project, see appendix D.

[14] See table V-3.

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is also limited by the existence of "Buy American" preferences for *** of the U.S. market. For a detailed discussion of "Buy American" restrictions and preferences in the U.S. vector supercomputer market, see the earlier part of this section entitled "Market Segments."

Substitutability between U.S.-produced and imported Japanese supercomputers also depends on factors such as compatibility of replacement or additional vector supercomputer systems with existing supercomputer systems;[15] the financial strength and stability of the competing suppliers; and the technical risk involved with offers of new generation computer architectures that are unavailable for actual LTDs.

Comparison of Domestic Products and Subject Imports to Nonsubject Imports

Available evidence indicates that there have been no U.S. imports of nonsubject vector supercomputers during January 1993-June 1996.

[15] The fact that *** percent of the value of the bids reported by CRI for the period January 1993-June 1996 were single sourced, suggests that compatibility of new equipment with existing equipment often is a significant factor.

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PART III: CONDITION OF THE U.S. INDUSTRY

The Commission analyzes a number of factors in making injury determinations (see 19 U.S.C. §§ 1677(7)(B) and 1677(7)(C)). Information on the alleged margin of dumping was presented earlier in this report and information on the volume and pricing of imports of the subject merchandise is presented in parts IV and V. Information on the other factors specified is presented in this section and/or part VI and (except as noted) is based on the questionnaire response of CRI.[1]

U.S. PRODUCERS

There were two producers of vector supercomputers in the United States during January 1993-June 1996: the petitioner, CRI, Inc., Eagan, MN,[2] and Convex, Richardson, TX. CRI, founded in 1972 by Seymour Cray, has been the dominant U.S. producer of vector supercomputers,[3] accounting for an estimated *** percent of total U.S. supercomputer factory revenue in 1995,[4] and is currently essentially the only remaining U.S. producer of such supercomputers. In 1985, Seymour Cray and his team started work on the Cray-3, which suffered delays due in part to the use of advanced technology. In November 1989, CRI's management decided it could no longer pursue both the C90 and the Cray-3 projects. To prevent closing down Seymour Cray's project, the development of the Cray-3 was spun off into a new company called Cray Computer Corp. However, CCC was unable to overcome technological[5] and packaging problems, and in 1995 CCC sought protection under Chapter 11 and closed the business.[6]

CRI has the largest share of the world market for large-scale vector supercomputer systems[7] used in government,[8] industry, and academia.[9] As of July 1, 1996, CRI became a wholly owned subsidiary of

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[1] The data in this section are presented for large-scale and mid-range vector supercomputers. CRI's large-scale vector supercomputers are the T90, C90, and the YMP series; the mid-range vector supercomputers are the ELs and the J90 series. Mid-range vector supercomputers are those with a theoretical peak performance of 7 Gflops or less. Convex could not provide the data as requested by the Commission.

The quantities presented in this section are based on systems. Quantities measured by processors and by Gflops are presented in app. C. *** provided data on MPPs; such data are also presented in app. C. ***.

[2] CRI maintains three business units: Software Development and Applications for Supercomputing Systems, Eagan, MN; Software Engineering and Technical Marketing for Business Systems, San Diego, CA, and Beaverton, OR, respectively; and Research Engineering, Development, and Manufacturing, Chippewa Falls, WI, Beaverton, and San Diego.

[3] CRI also produces MPPs (T3D and T3E series).

[4] Total U.S. factory revenue for supercomputers was obtained from Commerce, 1996 Dataquest Inc.

[5] CCC decided that in order to produce fast chips they would be based on gallium arsenide, a material with faster switching times than silicon. This decision led, in part, to exceptionally high manufacturing overhead to be spread over a dozen or so units.

[6] CCC did make a tentative sale to LLNL in 1991, but when it was unable to meet delivery and performance goals, the order was canceled.

[7] In April 1996, CRI was awarded a contract by the United Kingdom Meteorological Office to provide a T3E MPP supercomputer for numerical weather prediction and global climate modeling.

[8] Sales to U.S. Government agencies and commercial customers primarily serving the U.S. Government constitute a significant, but declining, portion of CRI's business.

[9] In 1991, CRI entered the growing market for mid-range scientific and technical supercomputers. With the introduction of the Cray Superserver 6400 series in 1993 (which it no longer produces), CRI entered the commercial market, with customers in financial services, telecommunications, transportation, and manufacturing industries

SGI,[10] together becoming perhaps the world's leading high-performance computer company.[11] CRI was the first U.S. company to offer parallel UNIX processing in the supercomputing environment.[12] CRI's vector pipelining provides a way to perform the same operation on a large array of numbers very quickly.[13]

On December 20, 1995, Hewlett-Packard announced its acquisition of Convex, which is now a wholly owned subsidiary of HP, known as the Convex Technology Center of HP.[14] As a result of the acquisition, HP now provides support for the Convex C series and Exemplar[15] scalable parallel processor product lines.[16] The Convex C Series of vector parallel supercomputers had offered innovative supercomputing solutions to customers since the 1980s.[17] Convex markets its products primarily to manufacturing (automotive, aerospace, and construction), government/defense, chemistry, petroleum, university/research, environmental, and financial and commercial users for a wide range of applications including data management. During 1995, Convex reduced its participation in the vector supercomputer market and it ***.[18] A third company, Tera, Seattle, WA, has been designing a shared-memory vector multiprocessor.[19] The system will be able to accommodate up to 256 processors and a limited number of systems are expected to be available in the second half of 1996.

In addition, there are several firms in the United States that produce and sell MPP and SMP supercomputers and networked workstations.[20] IBM is one of the main competitors to CRI in the

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[10] SGI, Mountain View, CA, which started production a number of years after CRI and concentrated on specialized graphics workstations, is now a leading manufacturer of high-performance and commercial computing systems. It sells interactive three-dimensional graphics, digital media, and SMP technologies to technical and commercial environments. Its subsidiary, MIPS, designs and licenses the RISC processor technology for the computer systems. Since its acquisition of CRI it is likely that SGI will want to have the two companies produce a compatible line of computers; Fujitsu's postconference brief, p. 28, and ex. 22. According to CRI, the business plan is to move to ***; petitioner's postconference brief, p. 17. ***.

[11] The Top500 Supercomputer Sites, Jack Dongarra, June 7, 1996, shows that CRI and SGI have a combined total of 218 systems installed (114 for SGI and 104 for CRI), by far the largest number of the companies listed except for IBM, which has 106; Fujitsu's postconference brief, ex. 2, and World Wide Web, http://www.netlib.org/benchmark/top500.html..

[12] CRI's UNICOS is considered the most mature UNIX-based supercomputer operating system.

[13] CRI is moving into new high-performance architectures with the T3E supercomputer, which just had its first customer acceptance.

[14] HP produces high-performance, UNIX-based computer systems, such as SPPs, supercomputer-class systems, etc.

[15] The Exemplar product line was introduced in March 1994.

[16] ***.

[17] Convex recently introduced its Exemplar series, scalable parallel (SPP) architecture that groups HP's PA-RISC 7200 processors into powerful computing nodes. ***.

[18] Since Convex no longer actively produces or sells vector supercomputers, ***.

[19] The architecture is scalable and general purpose, meaning that users can easily add processing power without reprogramming.

[20] The Commission sent producers' questionnaires to *** firms not identified in the petition which were believed to produce supercomputers other than vector supercomputers. These firms were ***. *** of these firms responded to the questionnaire; *** provided data, *** responded that it did not produce vector, MPP, or networked workstation supercomputers, and *** provided a late response with some data for its SMP systems.

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production and sale of these other supercomputer systems.[21] IBM was recently selected by the LLNL, Livermore, CA, for a $93 million contract to build the world's fastest supercomputer. The IBM RS/6000 SP systems will be installed as part of the ASCI programs[22] designed to deliver tera-scale computing capability.[23] ***. Intel's SSD was formed in 1984 to commercialize large-scale parallel computer systems based on standard Intel microprocessors. Intel designs, develops, manufactures, and markets microprocessor components and related products at various levels of integration. Intel is a leading supplier of scalable high-performance computer systems, such as the high-performance Paragon supercomputer.[24] Digital produces and sells ***, which compete in the high-performance computer market.[25] Digital's software development tools for parallel applications include high-performance Fortran, parallel software environment, and Digital PVM. Digital ***. TMC produced MPP supercomputers during 1993-95, but filed for protection under Chapter 11 in 1994 and is now effectively out of the hardware business.[26] Sun is a supplier of network computing products, including workstations, servers, software, microprocessors, and a full range of services and support. Sun's products have a growing share of the networked workstations supercomputer market.

During the past few years the vector supercomputer industry has confronted a double-edged challenge--decreasing government spending in the post-cold war era and enormous improvements in commodity microprocessors. Traditional markets have stopped growing and comparatively low-cost, mass-produced computers have entered the high-performance computing arena. As a result of these forces, several supercomputer companies have closed; others have merged with larger, broader based computer firms; and new entrants as well as old-line companies have developed more cost effective solutions to penetrate new markets. The following tabulation presents the changing dynamics of U.S. producers of supercomputers from 1969 to 1996:

Company	Dates of operation
Alliant	1982-1992
American	1985-1986
CCC	1989-1995
Celerity	1983-1988
Chopp	1975-1988
Convex	1982-1995 company merged
CRI	1972-1996 company merged

[21] IBM has several supercomputing platforms, including the S/390 ES/9000 with vector facilities, the POWER visualization system, the RISC system/6000, and the recently introduced scalable POWER parallel systems. The IBM Power2 is a new microprocessor with CMOS technology.

[22] The ASCI program involves three major DOE facilities (Livermore, Los Alamos, and Sandia National Laboratories) over the next 5 years to study a variety of complex problems, among them ensuring the safety of the nation's nuclear stockpile. Intel was selected in Sept. 1995 to build a teraflop supercomputer at Sandia. The Los Alamos facility will be supplied with *** supercomputers. The ***. The ASCI program ***; petitioner's postconference brief, part II.

[23] The IBM RS/6000 SP is a general-purpose SMP system based on MPP architecture; it can grow to accommodate as many as 512 processors to perform numeric-intensive and data-intensive tasks.

[24] Some of the major installations of Intel supercomputing systems are at Sandia National Laboratories, Oak Ridge National Laboratory, the San Diego Supercomputer Center, etc. A cooperative agreement with Sandia will result in the installation of a machine with more than 9000 processors in 1996.

[25] Telephone conversation with ***. The DEC Alpha processors are microprocessors with CMOS technology.

[26] ***.

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Culler	1969-1987
Cydrome	1984-1988
ETA	1983-1989
Evans & Sutherland	1989-1989 exited hardware business
Floating Point	1970-1991 company merged
Intel	1984-1996
Kendall Square	1986-1995
Key	1987-1989
Multi-Flow	1984-1991
Saxpy	1983-1988
Scientific Computer	1983-1989
TMC	1984-1995 exited hardware business

New entrants into the high-performance computing market are not new to computing--they are some of the largest and best known companies in the computer industry. These firms, such as IBM and DEC, have broad production, research and development, and marketing bases in computer systems and components and have succeeded in blurring the line that divided supercomputers from the rest of the computer industry. In 1995 SGI, CRI, IBM, and DEC accounted for over two-thirds of the world market and an even higher percentage of the U.S. scientific/engineering/technical market.

U.S. CAPACITY, PRODUCTION, AND CAPACITY UTILIZATION

Table III-1 presents data on CRI's capacity and production of vector supercomputers during January 1993-June 1996. Capacity to produce large-scale vector supercomputers *** throughout the period, while the capacity to produce mid-range vector supercomputers ***. Production of vector supercomputers *** from 1993 to 1995, but then *** in January-June 1996.

Table III-1
Vector supercomputers: CRI's capacity, production, and capacity utilization, by size, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

U.S. SHIPMENTS

CRI's shipments are presented in table III-2. The volume *** between 1993 and 1995, while the value ***. Such shipments *** in both volume and value in interim 1996 compared to the corresponding period in 1995. The volume of exports *** during 1993-95 and then *** in January-June 1996. The value of exports *** between 1993 and 1994 and then *** in 1995, although to *** that in 1993. The value of exports continued to *** in 1996.

Table III-2
Vector supercomputers: CRI's shipments, by size and type, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

U.S. PRODUCERS' INVENTORIES

CRI noted in its questionnaire response that its vector supercomputer systems ***. CRI restructured its product line in 1995 to tap demand for new and innovative applications. This led to *** even though CRI had a large backlog of orders, the highest year-end backlog in its history.[27] The ratio of inventories to shipments was *** percent in 1995 and *** percent in January-June 1996 (table III-3).

Table III-3
Vector supercomputers: CRI's end-of-period inventories, by size, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

U.S. EMPLOYMENT, COMPENSATION, AND PRODUCTIVITY

CRI's employment and productivity data are presented in table III-4. Employment, hours worked, and wages paid to PRWs *** during January 1993-June 1996.

Table III-4
Average number of CRI's production and related workers producing vector supercomputers, hours worked, wages paid to such employees, and hourly wages, productivity, and unit production costs, by size, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

[27] The increase in the backlog resulted from the high level of orders in 1995, the product transition to the T3E, and production constraints on the T90. The backlog is almost all for 1996 acceptances. The delivery schedule for the T90 systems and the T3E systems will begin in the second quarter of 1996. The orders for the T90 are worldwide, with automotive manufacturers such as Ford, Chrysler, Electronic Data Systems, Kia Motors, and many Japanese auto firms; NTT; and national research centers and climate/weather organizations; Fujitsu's postconference brief, p. 36. III-5

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

U.S. IMPORTERS

Importers' questionnaires were sent to four firms that the Commission believed could be importing vector supercomputers from Japan. Three firms, believed to account for all imports of vector supercomputers from Japan,[1] reported imports during January 1994-June 1996: Fujitsu, San Jose, CA; HNSX, Boxborough, MA;[2] and NEC, Woodlands, TX.[3] Fujitsu is a wholly owned subsidiary of Fujitsu Limited, Japan, and HNSX and NEC are wholly owned subsidiaries of NEC Corporation, Japan. Fujitsu began its supercomputer marketing efforts in the United States in 1992 and currently offers three basic systems, all of which are vector parallel processors that are scalable.[4] ***.[5] Fujitsu won an order for a vector supercomputer from Western Geophysical, a U.S. oil drilling research company in 1995, ***.[6] ***.[7] ***.[8]

U.S. IMPORTS

U.S. imports of vector supercomputers are presented in table IV-1. Very few vector supercomputers entered the United States during January 1993-June 1996. ***.

Table IV-1
Vector supercomputers: U.S. imports from Japan, by size, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

APPARENT U.S. CONSUMPTION

Data on apparent consumption of vector supercomputers are presented in table IV-2. Apparent U.S. consumption is calculated from U.S. producers' and importers' shipment data provided in response

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[1] Fujitsu testified at the conference that to the best of its knowledge there have been no imports of MPPs from Japan or other countries. NEC reported that it had imported MPPs from Japan for internal use applications only, such as benchmarking; conference transcript, pp. 139-140 and 164. However, Meiko, a British manufacturer, sold two MPP computers to Lawrence Livermore National Laboratories which were installed in 1994. The larger of the two was upgraded in July 1996.

[2] ***.

[3] FCC, Falls Church, VA, was the fourth firm to receive a questionnaire; however, FCC ***.

[4] Conference transcript, p. 142.

[5] Fujitsu employs more than 3,500 people in the United States in manufacturing, laboratories, software development, and sales.

[6] ***.

[7] ***. HNSX supports SX-3 systems located at the Houston Advanced Research Center and at the Atmospheric Environmental Service in Dorval, Quebec. HARC's current research focuses on energy, biotechnology, and the environment. The AES systems are used for daily weather forecasting, severe weather and environmental disaster prediction, and climate modeling and research.

[8] ***.

IV-1

Table IV-2
Vector supercomputers: U.S. shipments of domestic product, U.S. shipments of imports from Japan, and apparent U.S. consumption, by size, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

to Commission questionnaires. The volume of U.S. consumption *** during 1993-95, but *** in January-June 1996. The value of such consumption, however, *** during 1993-95 but *** in the first half of 1996. The 1993 shipment of ***.

U.S. MARKET SHARES

The market shares of U.S. producers and imports from Japan, based on apparent U.S. consumption of vector supercomputers, are presented in table IV-3. The import market share did not exceed *** percent, by value, until it reached *** percent in the first half of 1996, which included a shipment of an NEC system for internal benchmarking purposes.

Table IV-3
Vector supercomputers: U.S. producers' and importers' market shares, by size, 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

IV-2

PART V: PRICING AND RELATED DATA

FACTORS AFFECTING PRICING

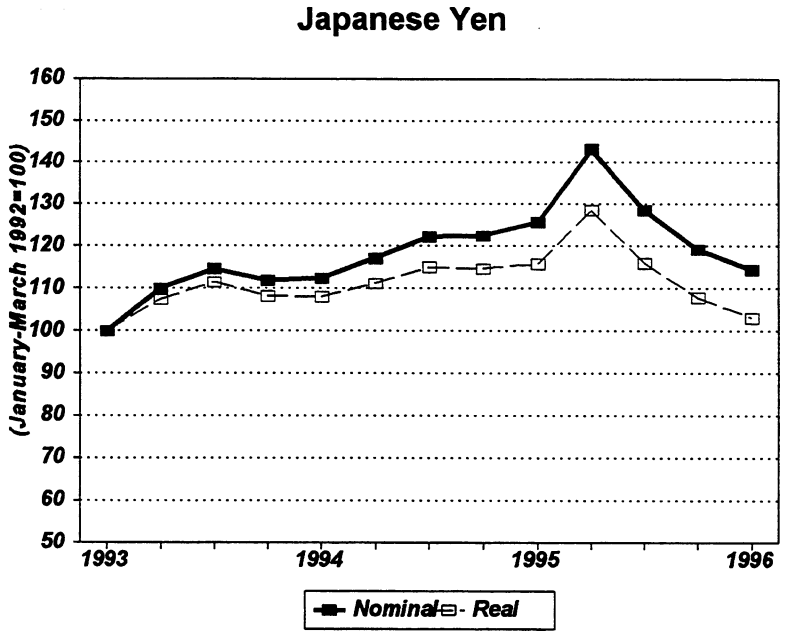
U.S. Inland Transportation Costs

The U.S. inland freight component was not broken out separately by U.S. producers or importers in their reported cost figures. Although specific figures are not available, U.S. transportation costs to the purchaser reportedly average less than 1 percent of the delivered installed price of vector supercomputers.[1]

Exchange Rates

Quarterly exchange rates reported by the International Monetary Fund for Japan during the period January 1993-March 1996 are shown in figure V-1.

Figure V-1
Exchange rates: Indexes of nominal and real exchange rates of the Japanese yen relative to the U.S. dollar, by quarters, Jan. 1993-Mar. 1996



Source: International Monetary Fund, *International Financial Statistics*, July 1996.

[1] ***.

V-1

PRICING PRACTICES

Most vector supercomputers are sold through a closed-bid procedure, although bidding firms usually know who they are competing against. The bid procedure typically includes a formal RFP. The RFP usually contains detailed specifications for the system(s) to be delivered (these specifications may include functional and/or performance requirements for hardware, software, the system as a whole, and support/maintenance); a delivery schedule; proposed terms and conditions; financial requirements or budget constraints; and proposal/bid-evaluation criteria.

The supplier reviews all elements of the RFP and prepares technical and business proposals in response to the requirements of the RFP. The key areas typically covered are technical requirements; hardware and software configuration; benchmark requirements; site conditions and preparation; installation and testing of the systems; user training; service/support; terms and conditions; and pricing.

Bids are typically based on published list prices. List prices are based on market factors, price/performance levels, and comparison to costs. List prices are established at a level above manufacturing costs, at a level intended to cover other expenses such as R&D, SG&A, and profits. Other factors considered in determining the bid include trade-in of existing equipment; timing of deliveries; whether the product is at the beginning or end of its life cycle; gross margin projected for the transaction; current interest rates, expected residual value, and lease duration (when leases are involved); budget constraints of the purchaser; volume of purchases by the customer; and size of volume in the subject bid opportunity. Some of these factors can result in discounts from list price.

The purchaser reviews the initial bids of participating suppliers and rejects unacceptable bids or asks certain suppliers to submit new bids. Competitive procurements that involve several million dollars almost always include some sort of LTD on the equipment being offered, or prototypes thereof. The LTDs are mandatory for all competitors, and generally involve the execution of a benchmark suite of programs provided by the purchaser that test the performance capabilities and capacities of the systems being offered. After the initial bid submissions, purchasers begin negotiations with the suppliers that have been deemed to be within the competitive range of offers. This process can take several months as purchasers try to decide which package offers the best value on the basis of performance, price, reputation, and service-related aspects. Negotiations conclude with the award of a sales contract, lease, or lease-to-purchase agreement, but delivery and installation can take from several months to 5 years after the contract is signed.

The process is simpler if a firm is purchasing on a non-competitive bid basis.[2] In this case, purchasers still need to develop specifications, which may be done with the supplying manufacturer. Purchasers may also negotiate with the supplying manufacturer to reduce the price of their purchase or increase the amount of equipment being offered. Purchasers buying on a non-competitive basis can benefit from the appearance of competition by asking other producers for estimates, even if they are not interested in purchasing from those particular producers, to determine if the bid they receive is reasonable.

PRICE DATA

The Commission requested U.S. producers and importers to provide bid information concerning their 10 largest bids for vector supercomputer projects each year during January 1993-June 1996. U.S. producers and importers were asked to provide cost breakouts (i.e., hardware costs, software costs, maintenance/service costs, etc.) as well as specification breakouts (i.e., technology offered, performance, memory size, etc.) for each bid reported. In a supplemental questionnaire, the Commission requested U.S. producers and importers to provide less detailed bid information concerning their 10 largest bids for MPP and networked work station projects each year during January 1993-June 1996. *** reported vector supercomputer bid information. *** reported MPP bid information. Reported bid information accounted for *** percent of U.S. producers' total

[2] Based on winning final-bid prices discussed in the next section, about *** percent of the reported value of vector supercomputer purchases during January 1993-June 1996 were single-sourced.

U.S. sales of vector supercomputers and all U.S. sales of imported Japanese vector supercomputers during January 1993-June 1996. Bid information for sales of vector supercomputers is presented in tables V-1 to V-4[3] [4] and figures V-2 and V-3.[5] Bid information for sales of MPPs is presented in apppendix F.

Table V-1
Vector supercomputer sales not subject to "Buy American" restrictions: Final bid values for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996, by cost component

* * * * * * *

Table V-2
Vector supercomputer sales subject to "Buy American" restrictions (i.e., DOD-funded or classified sales): Final bid values for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996, by cost component

* * * * * * *

Table V-3
Vector supercomputer sales not subject to "Buy American" restrictions: Final bid specifications for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996, by specification

* * * * * * *

Table V-4
Vector supercomputer sales subject to "Buy American" restrictions (i.e., DOD-funded and/or classified sales): Final bid specifications for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996, by specification

* * * * * * *

Figure V-2
Vector supercomputer sales not subject to "Buy American" restrictions: Final bid values for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996

* * * * * * *

Figure V-3
Vector supercomputer sales subject to "Buy American" restrictions (i.e., DOD-funded and/or classified sales): Final bid values for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996

* * * * * * *

[3] In the bid tables, the firm that won the bid is listed first.

[4] ***.

[5] ***.

Price Trends[6]

Price/performance ratios ($million/Gflop) for CRI vector supercomputer systems not subject to "Buy American" restrictions *** by *** percent during February 1993-September 1994, *** by *** percent during October 1994-March 1995, then *** by *** percent in May 1995 and fluctuated between *** during the rest of the period. Price/performance ratios were *** percent *** in June 1996 than they were in February 1993.

Price/performance ratios for CRI vector supercomputer systems subject to "Buy American" restrictions ***.

Price/performance ratios for Fujitsi vector supercomputer systems ***.

HNSX/FCC ***.

Price Comparisons[7]

The Commission received competing CRI and imported Japanese bid information concerning ***.[8]

LOST SALES AND LOST REVENUES

CRI reported *** vector supercomputer lost sales allegations. The lost sales allegations involved ***. CRI ***.

---

[6] An industry rule-of-thumb known as "Moore's Law" estimates that, due to technical innovation, the price/performance ratios for vector supercomputers should decline by 10 percent every 18 months. ***.

[7] Gflop ratings are based on theoretical peak performance, not actual sustained performance. A system's actual sustained performance, determined by running purchasers' selected benchmark codes on the competing systems, is a better measure of system performance than theoretical peak performance. However, in most cases, bid participants were unable to provide sustained performance information.

[8] ***, see app. E.

V-4

PART VI: FINANCIAL EXPERIENCE OF U.S. PRODUCERS

BACKGROUND

Complete financial information on vector supercomputers was provided by the petitioner, CRI.[1] Convex, the only other firm to have produced vector supercomputers in the United States during January 1993-June 1996, did not provide any questionnaire data.[2] Based on information obtained from Commerce (1996 Dataquest, Inc.), the data submitted represent *** percent of total U.S. supercomputer factory revenue in 1995. Supercomputer producers receive revenue not only from sales, but from leases and service fees as well. For this reason and the fact that vector supercomputer prices can range from $250,000 to over $40 million, quantities sold have little correlation with financial performance on a per-unit basis and thus were not requested in the financial section of the questionnaire.

OPERATIONS ON VECTOR SUPERCOMPUTERS

Income-and-loss data for CRI's vector supercomputer operations are presented in table VI-1.[3] Revenues are significantly affected by the number of high-end systems installed and whether these systems are sold or leased. Also, total profit margins decrease if service fees and leases increase in proportion to total revenues since service fees and leases have smaller profit margins than sales, particularly high-end sales. CRI did not provide a breakout of sales and leases, although it did indicate that leases ***.[4] CRI has a large customer base in government agencies and companies that ***. CRI's revenue from U.S. Government agencies or commercial customers primarily serving the U.S. Government totaled approximately $386 million in 1993, $334 million in 1994, and $110 million in 1995, a decrease of approximately $276 million from 1993 to 1995.[5]

Table VI-1
Income-and-loss experience of CRI on its vector supercomputer operations, calendar years 1993-95, Jan-June 1995, and Jan.-June 1996

* * * * * * *

CRI experienced ***. High-end systems traditionally have generated most of CRI's sales revenue. This decrease in high-end system installation was primarily a result of a product transition at the high-end,

---

[1] The data in this section are only for vector supercomputers. CRI, IBM, and TMC provided financial data on MPPs; these data are presented in app. G. CRI provided data ending Dec. 31 for the annual periods, even though in 1996 it changed its fiscal year end to June 30 to correspond with that of its new parent, Silicon Graphics, Inc.

[2] As noted earlier in this report, Convex ***.

[3] For financial statement purposes, revenue from system sales is recognized at the time the system is accepted by the customer or independent distributor, or in the case of a conversion from lease to purchase, at the time of the customer's election to convert. Revenue from systems under operating lease contracts is recorded as earned over the lease term. Service fees are recognized monthly as earned.

[4] Telephone conversation on Aug. 19, 1996 with Ms. Jill Nussbaum, Director of Financial Planning.

[5] CRI's electronic filing of its 1995 10K Report, p. 25 of the downloaded document.

from the CRAY C90 series to the CRAY T90 series, and it is expected that the CRAY T90 series will ship in greater quantities in 1996 than in 1995. The decrease in revenue derived from high-end system installations was partially offset by an increase in low-end system sales.[6] The vector supercomputer market has been described as a mature market and dramatic growth is not expected in the near future. In fact, one expert has described it as a zero-sum market; i.e., whatever one producer gains in sales is at the expense of another.[7]

Vector supercomputer export revenues are *** of CRI's total vector supercomputer revenues; consequently, these revenues are exposed to elements that can have adverse affects on total revenues and operating profits. Factors such as trade protection measures, export licensing regulations, changes in political conditions, and fluctuations in foreign currency exchange rates could have detrimental effects on the firm's income-and-loss results.[8] CRI's restructuring expenses ***. The effects are presented in the following tabulation (in thousands of dollars):

* * * * * * *

Restructuring expenses for vector supercomputer operations are specifically identified and are not allocated from the total expense.

Although the effects of CRI's restructuring expenses can be accurately measured, the product mix effects cannot and the decisions by the customers to lease or purchase can significantly influence the results. CRI explained that lower gross margins in 1995 compared to 1994 are the result of several factors: (1) sales gross margins were lower due to a shift in the product mix to smaller, lower-margin systems, (2) there was a decrease in sales and gross margins on the high-end products, resulting primarily from the product transitions described above, and (3) service revenues, which have lower gross margins than product revenues, represented a greater percentage of total revenues in 1995.[9]

OPERATIONS ON VECTOR SUPERCOMPUTERS (U.S. MARKET)

Income-and-loss data for CRI's vector supercomputer operations for the U.S. market only are presented in table VI-2. CRI has experienced the ***. The effects of the restructuring expenses in 1995 on the U.S. market are presented in the following tabulation (in thousands of dollars):

* * * * * * *

Restructuring expenses are allocated to the U.S. operations on the basis of respective vector supercomputer revenues.[10]

---

[6] Ibid., p. 12.

[7] Ms. Deborah Goldfarb, VP of Work Stations and High Performance Systems, International Data Corp., Conference Transcript, p. 56.

[8] CRI's electronic filing of its 1995 10K Report, p. 15 of the downloaded document.

[9] Ibid, p. 13.

[10] For example, the 1995 U.S. vector allocation is U.S. revenues divided by total vector revenues times the total vector restructuring amount ***.

Table VI-2
Income-and-loss experience of CRI on its vector supercomputer operations (U.S. market only), calendar years 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

VARIANCE ANALYSIS

A variance analysis could not be presented because of the limited number of systems produced and sold each year and the large variance in product architecture and price from contract to contract, which makes a per-unit and variance analysis of little value in this particular case.

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

CRI's value of property, plant, and equipment, its capital expenditures, and its research and development expenses during the period of investigation are presented in table VI-3.

Table VI-3
Value of fixed assets, capital expenditures, and research and development expenses, calendar years 1993-95, Jan.-June 1995, and Jan.-June 1996

* * * * * * *

CAPITAL AND INVESTMENT

The Commission requested U.S. producers to describe any actual or potential negative effects of imports of vector supercomputers from Japan on their firm's' growth, investment, and ability to raise capital or development and production efforts (including efforts to develop a derivative or more advanced version of the product). Their responses are shown in appendix H.

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PART VII: THREAT CONSIDERATIONS

The Commission analyzes a number of factors in making threat determinations (see 19 U.S.C. § 1677(7)(F)(I)). Information on the nature of the alleged margins of sales at LTFV was presented in part I of this report; information on the volume and pricing of imports of the subject merchandise is presented in parts IV and V; and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts is presented in part VI. Information on inventories of the subject merchandise; foreign producers' operations, including the potential for product-shifting; any other threat indicators, if applicable; and any dumping in third-country markets, follows.

THE INDUSTRY IN JAPAN

There are three known producers of vector supercomputers in Japan: Fujitsu Limited,[1] NEC Corporation, and Hitachi Limited. The Japanese vector supercomputer producers are integrated producers. Fujitsu and NEC have made very few sales of vector supercomputers to the United States and Hitachi has never sold such merchandise in the United States.[2] Data on Fujitsu's and NEC's production and shipments of vector supercomputers were provided by counsel in response to the Commission's foreign producer questionnaires and are presented in table VII-1. ***.

Table VII-1
Summary data for Japanese producers of vector supercomputers, 1993-95, Jan.-June 1995, Jan.-June 1996, and projected 1996-97

* * * * * * *

The Japanese supercomputer market is significantly different from other markets, as Japanese manufacturers and users rely more heavily on vector processing with a very high single processor performance than other countries.[3] Japanese manufacturers are currently integrating vector processing into scalable parallel computer architectures.[4] The move to RISC-based parallel computers is not as strong in Japan as in other parts of the world.[5] The Japanese dominate the domestic market[6] but have not exported a large number of their systems to other countries.[7]

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[1] Fujitsu is believed to be the largest Japanese vector supercomputer producer.

[2] U.S. and Japanese supercomputer vendors dominate their respective home markets, while European supercomputer manufacturers play only a minor role in the world market or in their own region.

[3] As a result of this, Japan's share of the world market is much lower when measured in the number of systems installed than when measured by Rmax in the Linpack benchmark.

[4] Scalable vector parallel computers have been introduced by both Fujitsu and NEC to combine the high single processor performance of vector processors with the high scalability of parallel processing.

[5] The Japanese continue to rely on vector instructions and large SRAM memories for computing power, while at the same time MPP systems are being investigated in manufacturers' and users' research labs.

[6] CRI has operated in Japan since 1980, mainly in commercial organizations such as car manufacturers and universities.

[7] The Japanese have been more successful in the Canadian and European vector supercomputer markets than in

(continued...)

The Japanese decided in the late 1970s to produce their own vector-based supercomputers, ***. Production and sales of vector supercomputers began in 1983. Prior to that, the Japanese Government had allocated no funds for supercomputer procurement, but soon after Japan's integrated electronics firms began to make supercomputers, the Government began funding such procurements. The inability of American manufacturers of vector supercomputers to penetrate the growing Japanese Government procurement market soon became a bilateral trade issue between the United States and Japan.[8] There was an attempt to remedy this problem through the adoption of a bilateral agreement in 1987. The 1987 agreement produced unsatisfactory results and led to the negotiation of the 1990 agreement on supercomputers. Results from that agreement have been mixed.[9] Procurements of U.S. supercomputers increased in 1993 and 1994 but declined in 1995. The U.S. share of the Japanese public sector market remains far lower than the U.S. share of the Japanese private sector market.[10]

Fujitsu introduced its first vector supercomputer in the 1970s and various product lines have been introduced since that time. The VPP300, introduced in 1995, is the most powerful and compact of its vector supercomputers to date.

NEC is one of the world's oldest providers of semiconductor, computer, and communications technology. The SX-4 series, announced in November 1994, combines a scalable parallel vector architecture with CMOS technology.[11] ***. During fiscal 1995, NEC introduced in Japan the parallel ACOS series, a new generation of mainframe computers that employ parallel processing technology.

Hitachi has not introduced a new vector supercomputer in over 3½ years and has announced no plans to bring out the current model's successor.[12] ***.

In an industry characterized by a limited number of high-value, custom-configured sales (or leases), capacity appears to be determined primarily by sales levels rather than production constraints or ceilings. Fujitsu and NEC were quoted in the Japanese press in July 1996 as hoping to expand sales volumes by 100 percent and 63 percent (by number of orders), respectively, in fiscal year 1996 compared to fiscal year 1995. Other Japanese press reports have cited Fujitsu and NEC as hoping to increase exports to the United States and Europe of less expensive CMOS processor-based supercomputers.[13]

Japanese supercomputer exports face no significant tariff barriers or antidumping findings in export markets. Fujitsu and NEC have enjoyed some export success in Europe and Canada, two regions with negligible domestic competition. Information obtained from the U.S. Embassy indicates that Japanese manufacturers tried to establish themselves in Europe and Canada before entering the U.S. market due to the well-established position of U.S. supercomputer makers in their domestic market and also possibly due to recurrent bilateral trade tensions over U.S. access to the Japanese market. Exports to other regions of the world are limited primarily by cost.[14]

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[7] (...continued)
the United States.

[8] Telegram from the American Embassy, Tokyo, Japan, Aug. 23, 1996.

[9] Ibid.

[10] Ibid.

[11] The SX-3 series was based on ECL technology.

[12] Hitachi offers MPP systems based on commodity RISC processors, as well as its older shared memory, proprietary vector processor system S3800.

[13] Telegram from the American Embassy, op. cit.

[14] Ibid.

VII-2

Fujitsu and NEC reported ***. Based on the historical pattern of supercomputer and mainframe production, as well as the physical, logistical, and human bottlenecks in the production process, product shifting is unlikely.[15]

U.S. IMPORTERS' INVENTORIES

U.S. importers of Japanese vector supercomputers do not generally hold inventories because the subject products are produced to specifications for particular contracted projects.

U.S. IMPORTERS' CURRENT ORDERS

Orders for vector supercomputers from Japan that U.S. importers have placed for delivery after June 30, 1996, were reported by ***. The NEC contract with FCC/NCAR/UCAR[16] for the purchase of 4 SX-4/32s with 1 SX-4/32 to be delivered in October 1996 is discussed in detail in part V of this report.[17]

[15] NEC's postconference brief, p. 49.

[16] As indicated earlier in this report, UCAR is a non-profit consortium of 61 North American institutions engaged in climate research. UCAR manages NCAR in Boulder, CO.

[17] See also testimony of Dr. Buzbee, NCAR, conference transcript, pp. 180-190, and NEC/HNSX's postconference brief, pp. 5-15.

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APPENDIX A

FEDERAL REGISTER NOTICES

A-1

[Investigation No. 731–TA–750 (Preliminary)]

Vector Supercomputers From Japan

AGENCY: United States International Trade Commission.

ACTION: Institution and scheduling of a preliminary antidumping investigation.

SUMMARY: The Commission hereby gives notice of the institution of preliminary antidumping Investigation No. 731–TA–750 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(a)) (the Act) to determine whether there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of vector supercomputers that are alleged to be sold in the United States at less than fair value. Unless the Department of Commerce extends the time for initiation pursuant to section 732(c)(1)(B) of the Act (19 U.S.C. § 1673a(c)(1)(B)), the Commission must complete preliminary antidumping investigations in 45 days, or in this case by September 12, 1996. The Commission's views are due at the Department of Commerce within five business days thereafter, or by September 19, 1996.

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

EFFECTIVE DATE: July 29, 1996.

FOR FURTHER INFORMATION CONTACT: Valerie Newkirk (202–205–3190), Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Hearing-impaired persons can obtain information on this matter by contacting the Commission's TDD terminal on 202–205–1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000. General information concerning the Commission may also be obtained by accessing its internet server (http://www.usitc.gov or ftp://ftp.usitc.gov).

SUPPLEMENTARY INFORMATION:

Background.—This investigation is being instituted in response to a petition filed on July 29, 1996, by Cray Research, Inc., Eagan, MN.

Participation in the investigation and public service list.—Persons (other than petitioners) wishing to participate in the investigation as parties must file an entry of appearance with the Secretary to the Commission, as provided in sections 201.11 and 207.10 of the Commission's rules, not later than seven days after publication of this notice in the Federal Register. 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.

Limited disclosure of business proprietary information (BPI) under an administrative protective order (APO) and BPI service list.—Pursuant to section 207.7(a) of the Commission's rules, the Secretary will make BPI gathered in this preliminary investigation available to authorized applicants under the APO issued in the investigation, provided that the

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application is made not later than seven days after the publication of this notice in the Federal Register. A separate service list will be maintained by the Secretary for those parties authorized to receive BPI under the APO.

Conference.—The Commission's Director of Operations has scheduled a conference in connection with this investigation for 9:30 a.m. on August 20, 1996, at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC. Parties wishing to participate in the conference should contact Valerie Newkirk (202–205–3190) not later than August 16, 1996, to arrange for their appearance. Parties in support of the imposition of antidumping duties in this investigation and parties in opposition to the imposition of such duties will each be collectively allocated one hour within which to make an oral presentation at the conference. A nonparty who has testimony that may aid the Commission's deliberations may request permission to present a short statement at the conference.

Written submissions.—As provided in sections 201.8 and 207.15 of the Commission's rules, any person may submit to the Commission on or before August 23, 1996, a written brief containing information and arguments pertinent to the subject matter of the investigation. Parties may file written testimony in connection with their presentation at the conference no later than three days before the conference. If briefs or written testimony contain BPI, they must conform with the requirements of sections 201.6, 207.3, and 207.7 of the Commission's rules.

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

Authority: This investigation is being conducted under authority of title VII of the Tariff Act of 1930; this notice is published pursuant to section 207.12 of the Commission's rules.

Issued: July 30, 1996.

By order of the Commission.

Donna R. Koehnke,

Secretary.

[FR Doc. 96–20128 Filed 8–6–96; 8:45 am]

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International Trade Administration

[A–588–841]

Initiation of Antidumping Duty Investigation: Vector Supercomputers From Japan

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

EFFECTIVE DATE: August 23, 1996.

FOR FURTHER INFORMATION CONTACT: Edward Easton at (202) 482–1777 or Sunkyu Kim at (202) 482–2613, Office of AD/CVD Enforcement II, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, N.W., Washington, DC 20230.

INITIATION OF INVESTIGATION:

The Applicable Statute

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

The Petition

On July 29, 1996, the Department of Commerce ("the Department") received a petition, filed, in proper form, by Cray Research, Inc., of Eagan, Minnesota ("the petitioner"). On August 9, 1996, Cray Research, Inc., provided supplemental information concerning assertions made in its petition.

In accordance with section 732(b) of the Act, the petitioner alleges that vector supercomputers are being, or are likely to be, sold in the United States at less than their fair value within the meaning of section 731 of the Act, and that such imports are materially injuring, or threatening material injury to, an industry in the United States.

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

Scope of the Investigation

The products covered by this investigation are all vector supercomputers, whether new or used, and whether in assembled or unassembled form, as well as vector supercomputer spare parts, repair parts, upgrades, and system software shipped to fulfill the requirements of a contract for the sale and, if included, maintenance of a vector supercomputer. A vector supercomputer is any computer with a vector hardware unit as an integral part of its central processing unit boards.

The vector supercomputers imported from Japan, whether assembled or unassembled, covered by this investigation are classified under heading 8471 of the Harmonized Tariff Schedules of the United States (HTS). Although the HTS heading is provided for convenience and customs purposes, our written description of the scope of this investigation is dispositive.

Determination of Industry Support for the Petition

Section 732(b)(1) of the Act requires that petitions be filed on behalf of the domestic industry. Section 732(c)(4)(A) of the Act provides that a petition meets this requirement if the domestic producers or workers who support the petition account for (1) at least 25 percent of the total production of the domestic like product; and (2) more than 50 percent of the production of the domestic like product produced by that portion of the industry expressing support for, or opposition to, the petition.

On August 14, 1996, Fujitsu Limited ("Fujitsu") made a submission challenging industry support for the petition. Fujitsu argues that the petitioner's definition of the "domestic like product" as limited to vector supercomputers is unreasonable and that the proper domestic like product definition would encompass additional high-performance computer platforms that compete with vector supercomputers for many of the applications with which vector supercomputers have been associated. Specifically, Fujitsu argues that massively parallel processors and networked workstations must also be included within the domestic like product. Fujitsu further argues that the Department ought to poll the domestic producers of these other high-performance computer platforms to determine whether there is a requisite percentage of support for the petition within this broader group of domestic producers. On August 16, 1996, the petitioner submitted a rebuttal to Fujitsu's arguments. The basis of the petitioner's rebuttal is that much of the documentary information filed by Fujitsu, as well as other information, indicates that the characteristics and uses, as those terms are used in section 771(10) of the Act, of vector supercomputers distinguish them from both massively parallel processors and networked workstations. On the basis of these distinctions, the petitioner asserts that vector supercomputers are the appropriate domestic like product for the petitioned-for antidumping investigation. On August 19, 1996, Fujitsu filed a second submission to take issue with petitioner's August 16, 1996 arguments.

Section 771(4)(A) of the statute defines the "industry" as the producers of a "domestic like product." Thus, to determine whether the petition has the requisite industry support, the statute directs the Department to look to producers and workers who account for production of "the domestic like product." The International Trade Commission ("ITC"), which is responsible for determining whether "the domestic industry" has been injured, must also determine what constitutes a domestic like product in order to define the industry. However, while both the Department and the ITC must apply the same statutory definition of domestic like product, they do so for different purposes and pursuant to separate and distinct authority. Although this may result in different definitions of the like product, such differences do not render the decision of either agency contrary to the law. *See Algoma Steel Corp., Ltd.* v. *United States*, 688 F. Supp. 639, 642–44 (CIT 1988); High Information Content Flat Panel Displays and Display Glass Therefor from Japan: Final Determination; Rescission of Investigation and Partial Dismissal of Petition, 56 Fed. Reg. 32376, 32380–81 (July 16, 1991) (Flat Panel Displays).

Because the domestic like product is an integral part of the definition of the industry and because Fujitsu has provided factual information challenging the definition of the domestic like product in the petition, we are examining the definition of the like product in the petition in light of the statutory provisions governing initiation and the facts of record.

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

The scope of Cray's petition is limited specifically to vector supercomputers "* * * with a vector hardware unit as an integral part of any of its central processing unit boards ("CPU")." The petition provides examples of both imported massively parallel processors, with vector hardware, which are included within this definition of a vector supercomputer and domestically-produced mainframe computers with a vector facility that is not an integral part of the mainframe CPU boards and, therefore, not considered within the "domestic like product" asserted in the petition. The key to petitioner's definition of the scope of the investigation is the physical characteristic that the vector facility be an integral part of any of the computer's CPU boards. This characteristic

identifies both the Japanese vector supercomputers that the petitioner would have subject to the antidumping investigation and the domestically-produced products that would define the domestic industry.

There is no dispute that the vector supercomputers produced by the petitioner are like the Japanese vector supercomputers which are the subject of the petition, *i.e.*, that the petitioner produces a domestic like product. Fujitsu argues, however, that there are other types of supercomputers and that the producers of those supercomputers are part of the industry as well. In this regard, Fujitsu argues that all supercomputers constitute a single domestic like product. We disagree.

As a starting point, the scope of the petition is not all supercomputers, but rather is limited solely to vector supercomputers. The relevant "like product" inquiry must begin by identifying the domestic product(s) which is "like" the vector supercomputer, the merchandise subject to investigation. Fujitsu effectively seeks to disregard this fact by using all supercomputers, not vector supercomputers, as its starting point. While respondents may comment on the issue of industry support, including the definition of the domestic like product, they may not seek to expand the scope of the petition, *i.e.*, the benchmark for the analysis of the domestic like product.

When properly analyzed, the evidence of record demonstrates that there are clear dividing lines between the characteristics and uses of the vector supercomputers subject to investigation and the various other types of supercomputers. Significantly, the vector supercomputer has a different computer architecture than the non-vector computer technologies and, consequently, it processes information differently. The close physical proximity of the vector hardware to the computer's central processing boards and high memory bandwidth (with limited parallelism) contribute to the high speeds with which vector supercomputers process information. These differences give vector supercomputers different performance characteristics than non-vector supercomputers. For example, vector supercomputers are more efficient dealing with linear and matrix algebra equations than are non-vector supercomputers. Given the states of the different supercomputer technologies today, there are computer modeling applications where only the vector supercomputers are used. For example, only vector supercomputer bids met the technical requirements (which involved weather forecasting and climate modeling applications) in the University Corporation for Atmospheric Research ("UCAR") procurement from which this petition derives the export price. In sum, based on the evidence submitted, we find that the domestic like product, like the scope of the investigation, is limited to vector supercomputers.

Our review of the data provided in the petition and other information readily available to the Department indicates that the petitioner accounts for more than 50 percent of the total domestic production of vector supercomputers, thus meeting the standard of section 732(c)(4)(A) of the Act and requiring no further action by the Department pursuant to section 732(c)(4)(D) of the Act. Accordingly, the Department determines that the petition is supported by the domestic industry.

Export Price and Normal Value

The petitioner based the export price on a "best and final offer" (BAFO) to supply UCAR with four vector supercomputers manufactured by NEC Corporation ("NEC"), to be imported from Japan. Deductions were made for the estimated costs of the U.S. computer systems integrator.

Section 731 of the Act provides that the Department may impose antidumping duties if it determines that the subject merchandise has been sold or is "likely to be sold" in the United States at less than fair value. Accordingly, section 772 of the Act defines export price as the price at which the subject merchandise was "sold (or agreed to be sold)" in the United States. The irrevocable BAFO on which petitioner bases export price constitutes an offer for sale (or agreement to sell) and represents a price at which the merchandise is likely to be sold. Therefore, the BAFO is a reasonable basis for determining export price.

The BAFO on which export price is based calls for a lease of the vector supercomputers. The term of the lease encompasses the useful life of the vector supercomputers. These vector supercomputers are not expected to have any residual value at the conclusion of the lease. By necessity, these supercomputers will be integrated into the climate modeling and weather forecasting operations of UCAR. It is a customary practice in the vector supercomputer industry effectively to transfer ownership through similar extended leases, rather than outright sales. Under these circumstances, generally accepted accounting principles ("GAAP") classify such leases as equivalent to sales. These same circumstances that classify this lease under GAAP also establish the lease as equivalent to a sale within the meaning of section 771(19) of the Act.

Although the Japanese home market is viable, the petitioner contends that vector supercomputers sold in Japan differ substantially from the system offered to UCAR in the United States. Consequently, the petitioner was unable to provide information concerning sales of identical or similar vector supercomputers sold by NEC in both markets. Since home market prices do not provide an appropriate basis for price comparisons, the petitioner based normal value on constructed value ("CV") for estimating a dumping margin based on the offer to UCAR.

CV includes the cost of manufacturing ("COM"), research and development costs ("R&D"), selling, general and administrative expenses ("SG&A"), interest expense, U.S. packing, and profit.

The petitioner calculated the COM, R&D and SG&A on the basis of its own cost experience purchasing and manufacturing vector supercomputer components and on publicly available industry sources, including financial statement and other operational data for NEC. For calculating profit, the petitioner relied on a publicly available forecast of NEC's projected 1996 operating profit for computer sales other than personal computers. The petitioner did not include interest expenses or packing in its calculation.

Based on the comparison of the export price to normal value, the petitioner alleges a margin of 454 percent.

Fair Value Comparisons

Based on the information provided by the petitioners, there is reason to believe that vector supercomputers from Japan are likely to be sold at less than fair value. If it becomes necessary at a later date to consider the petition as a source of facts available under section 776 of the Act, we may further review the margin calculation in the petition.

Initiation of Investigation

We have examined the petition on vector supercomputers and have found that it meets the requirements of section 732 of the Act, including the requirements concerning allegations of material injury or threat of material injury to the domestic producers of a domestic like product by reason of the likely sales at less than fair value. Therefore, we are initiating an antidumping duty investigation to determine whether vector supercomputers from Japan are being, or

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are likely to be, sold at less than fair value. Unless extended, we will make our preliminary determination by January 6, 1997.

Distribution of Copies of the Petition

In accordance with section 732(b)(3)(A) of the Act, a copy of the public version of the petition has been provided to the representatives of the Government of Japan. We will attempt to provide a copy of the public version of the petition to each exporter of vector supercomputers named in the petition.

International Trade Commission Notification

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

Preliminary Determinations by the ITC

The ITC will determine by September 12, 1996, whether there is a reasonable indication that imports of vector supercomputers from Japan are causing material injury, or threatening to cause material injury, to a U.S. industry. A negative ITC determination will result in the investigation being terminated; otherwise, the investigation will proceed according to statutory and regulatory time limits.

Dated: August 19, 1996.

Jeffrey P. Bialos,

Acting Assistant Secretary for Import Administration.

[FR Doc. 96–21560 Filed 8–22–96; 8:45 am]

BILLING CODE 3510–DS–P

APPENDIX B

CALENDAR OF THE PUBLIC CONFERENCE

B-1

CALENDAR OF THE PUBLIC CONFERENCE

Those listed below appeared as witnesses at the United States International Trade Commission's conference held in connection with the following investigation:

VECTOR SUPERCOMPUTERS FROM JAPAN

Investigation No. 731-TA-750 (Preliminary)

Date - August 20, 1996, 9:30 am

The conference was held in Room 101 (Main Hearing Room) of the United States International Trade Commission Building, 500 E Street, SW, Washington, DC.

IN SUPPORT OF THE IMPOSITION OF ANTIDUMPING DUTIES:

Wilmer, Cutler & Pickering
Washington, DC
on behalf of

Cray Research, Inc.

John Sullivan, General Counsel
Dr. Earl C. Joseph, Director of Competitive Analysis
Steve Oberlin, Director of Scalable Node
Dave Blaskovich, Environmental Markets
Deborah Goldfarb, Vice President for Workstations and High Performance, International Data Corp.

John D. Greenwald)--OF COUNSEL

IN OPPOSITION TO THE IMPOSITION OF ANTIDUMPING DUTIES:

Akin, Gump, Strauss, Hauer & Feld
Washington, DC
on behalf of

Fujitsu Limited and Fujitsu America, Inc.

Thomas W. Miller, Vice President, Sales and Marketing Supercomputer Group, Fujitsu America, Inc.

Dr. Kenichi Miura, Vice President and General Manager Supercomputer Group, Fujitsu America, Inc.

Warren E. Connelly)--OF COUNSEL

Paul, Weiss, Rifkind, Wharton & Garrison
Washington, DC
on behalf of

NEC Corporation and HNSX Inc.

Samuel Adams, HNSX Supercomputers, Inc., Vice President, Sales & Marketing
Philip Tannenbaum, HNSX Supercomputers, Inc., Director, Marketing

Richard D. Boltuck, Trade Resources, Senior Economist

Terence J. Fortune)--OF COUNSEL
David J. Weiler)--OF COUNSEL

Holme Roberts & Owen
Denver, CO
on behalf of

National Center for Atmospheric Research, Boulder, CO

Dr. Bill Buzbee, Director, Scientific Computing,

Frank Schuchat)--OF COUNSEL

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APPENDIX C

SUMMARY TABLES

C-1

Table C-1
Vector supercomputers: Summary data concerning the U.S. market using systems as the measure of quantity, 1993-95, Jan.-June 1995, and Jan.-June 1996

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Table C-2
Vector supercomputers: Summary data concerning the U.S. market using processors as the measure of quantity, 1993-95, Jan.-June 1995, and Jan.-June 1996

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Table C-3
Vector supercomputers: Summary data concerning the U.S. market using Gflops as the measure of quantity, 1993-95, Jan.-June 1995, and Jan.-June 1996

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Table C-4
MPPs: Summary data concerning the U.S. market, 1993-95, Jan.-June 1995, and Jan.-June 1996

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Table C-5
Vector supercomputers and MPPs: Summary data concerning the U.S. market, 1993-95, Jan.-June 1995, and Jan.-June 1996

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Figure C-1: Installed Cray vector and MPP supercomputer systems, by industry

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C-3

APPENDIX D

SUMMARY OF UCAR'S PROCUREMENT PROCESS

D-1

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D-3

APPENDIX E

INFORMATION CONCERNING ***'S PROCUREMENT

E-1

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E-3

APPENDIX F

MPP SUPERCOMPUTER SALES

F-1

Table F-1
MPP sales not subject to "Buy American" restrictions: Final bid specifications, values, and prices for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996, by specification

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Table F-2
MPP sales subject to "Buy American" restrictions (i.e., DOD-funded and classified sales): Final bid specifications, values, and prices for responding U.S. producers' and importers' 10 largest bids during Jan. 1993-June 1996, by specification

* * * * * * *

APPENDIX G

FINANCIAL OPERATIONS ON VECTOR AND MPP SUPERCOMPUTERS

G-1

OPERATIONS ON VECTOR SUPERCOMPUTER AND MPP SYSTEMS

Income-and-loss data on the U.S. producers' combined MPP and vector supercomputer operations are presented in table G-1. Revenue, gross profit, and gross profit as a percent of revenue are presented by firm, by product (vector supercomputer and MPP systems), and by market (U.S. and other) in table G-2. CRI, IBM, and TMC produced MPPs, but CRI is the only current U.S. producer of vector supercomputers.

Aggregate net revenues, which include sales, leases, and service fees, were ***. There was a ***. The effects of CRI's restructuring expenses on the aggregate operating income are presented in the following tabulation (in thousands of dollars):

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Table G-1
Income-and-loss experience of U.S. producers on their operations for vector and MPP supercomputers, calendar years 1993-95, Jan.-June 1995, and Jan.-June 1996

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Table G-2
Vector supercomputer and MPP systems: Summary data concerning the U.S. and export markets, by firm, calendar years 1993-95, Jan.-June 1995, and Jan.-June 1996

G-3

APPENDIX H

EFFECTS OF IMPORTS ON PRODUCERS' EXISTING DEVELOPMENT AND PRODUCTION EFFORTS, GROWTH, INVESTMENT, AND ABILITY TO RAISE CAPITAL

H-1

Response of U.S. producers to the following questions:

1. Since January 1, 1993, has your firm experienced any actual negative effects on its return on investment or its employment, growth, investment, ability to raise capital, existing development and production efforts (including efforts to develop a derivative or more advanced version of the product), or the scale of investments as a result of imports of vector supercomputers from Japan?

CRI--***.

IBM--***.

2. Does your firm anticipate any negative impact of imports of vector supercomputers from Japan?

CRI--***.

IBM--***.

H-3