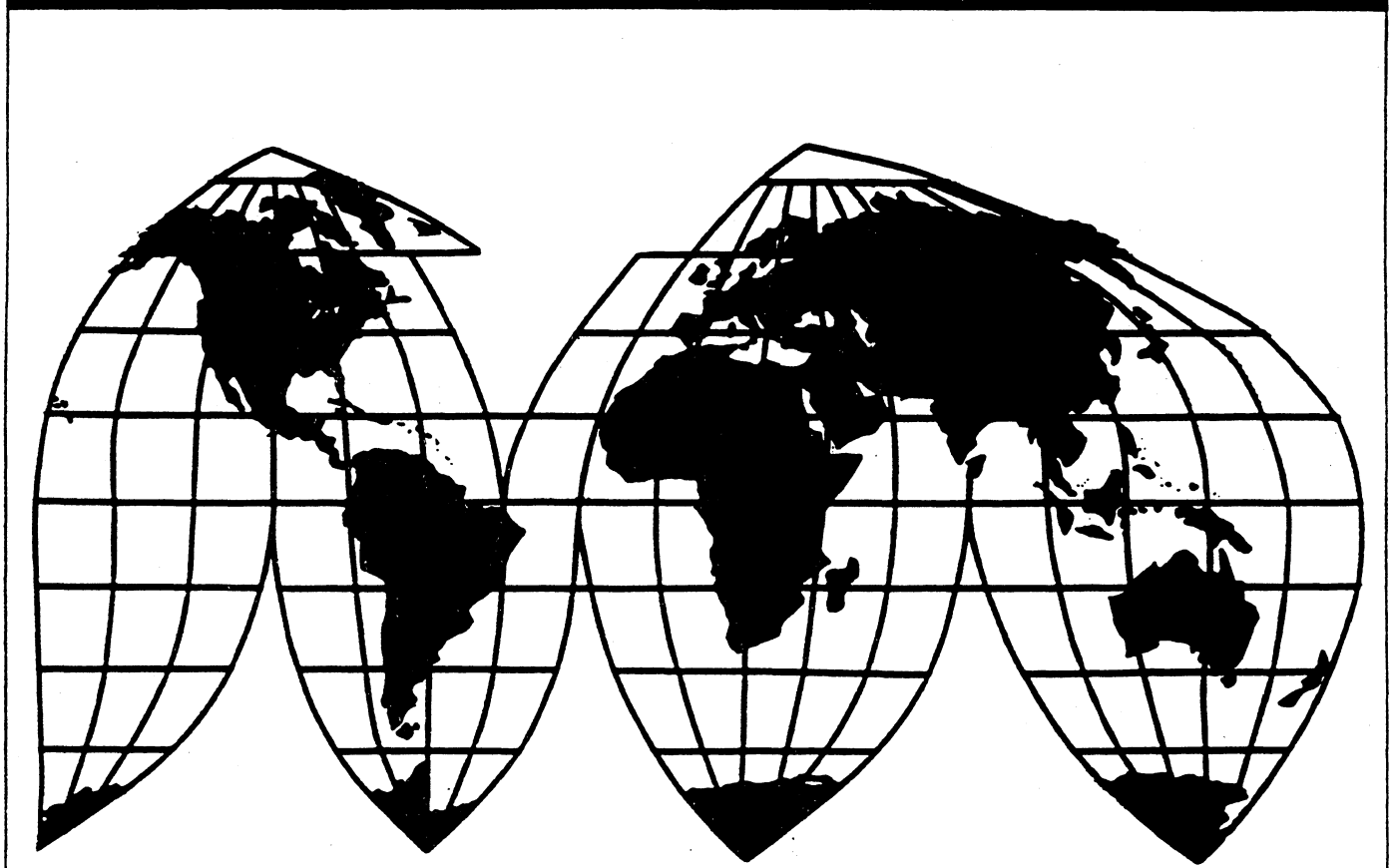
Silicon Carbide From the People's Republic of China

Investigation No. 731-TA-651 (Preliminary)

Publication 2668 **August 1993**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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Note.--Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted from this report.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

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-651 (Preliminary)

SILICON CARBIDE FROM THE PEOPLE'S REPUBLIC OF CHINA

Determination

On the basis of the record[1] 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 materially injured or threatened with material injury by reason of imports from the People's Republic of China of silicon carbide,[2] provided for in subheadings 2849.20.10 and 2849.20.20 of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value (LTFV). Four Commissioners determined there is a reasonable indication of threat of material injury by reason of alleged LTFV imports[3] and two Commissioners determined there is a reasonable indication of material injury by reason of alleged LTFV imports.[4]

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

[2] The imported merchandise covered by this investigation is silicon carbide, regardless of grade or form, containing by weight from 20 to 98 percent, inclusive, silicon carbide and with a grain size coarser than 325 F (as set by the American National Standards Institute), and inclusive of split sizes.

[3] Chairman Newquist, Vice Chairman Watson, Commissioner Rohr, and Commissioner Nuzum determine that there is a reasonable indication that an industry in the United States is threatened with material injury by reason of imports from the People's Republic of China of silicon carbide that are alleged to be sold at LTFV.

[4] Commissioners Brunsdale and Crawford determine that there is a reasonable indication that an industry in the United States is materially injured by reason of imports from the People's Republic of China of crude silicon carbide and that there is no reasonable indication that an industry in the United States is materially injured or threatened with material injury, or that the establishment of an industry in the United States is materially retarded, by reason of imports from the People's Republic of China of refined silicon carbide that are alleged to be sold at LTFV.

Background

On June 21, 1993, a petition was filed with the Commission and the Department of Commerce by the Ad Hoc Silicon Carbide Coalition, Washington, DC, alleging that an industry in the United States is materially injured and threatened with continued material injury by reason of LTFV imports of silicon carbide from the People's Republic of China. Accordingly, effective June 21, 1993, the Commission instituted antidumping investigation No. 731-TA-651 (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 June 30, 1993 (58 F.R. 35044). The conference was held in Washington, DC, on July 12, 1993, and all persons who requested the opportunity were permitted to appear in person or by counsel.

VIEWS OF THE COMMISSION

Based on the record in this preliminary investigation, we determine that there is a reasonable indication that an industry in the United States is materially injured[1] or threatened with material injury[2] by reason of imports of silicon carbide from the People's Republic of China that are allegedly sold at less than fair value (LTFV).[3]

I. THE LEGAL STANDARD FOR PRELIMINARY INVESTIGATIONS

The legal standard in preliminary antidumping duty investigations requires the Commission to determine, based upon the best 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.[4] In applying this standard, the Commission may weigh the evidence before it to determine whether "(1) the record as a whole contains clear and convincing evidence that there is no material injury or threat of material injury; and (2) no likelihood exists that any contrary evidence will arise in a final investigation."[5] The U.S. Court of Appeals for the Federal Circuit has held that this interpretation of the standard "accords with clearly discernible

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[1] Commissioner Brunsdale and Commissioner Crawford find a reasonable indication that the domestic industry producing crude silicon carbide is materially injured by reason of allegedly LTFV imports from the People's Republic of China, but make a negative determination with regard to refined silicon carbide.

[2] Chairman Newquist, Vice Chairman Watson, Commissioner Rohr and Commissioner Nuzum find a reasonable indication that the domestic industry producing silicon carbide is threatened with material injury by reason of alleged LTFV imports from the People's Republic of China.

[3] 19 U.S.C. § 1673b(a). Whether the establishment of an industry in the United States is materially retarded is not an issue in this investigation.

[4] 19 U.S.C. § 1673b(a). See also American Lamb Co. v. United States, 785 F.2d 994 (Fed. Cir. 1986); Calabrian Corp. v. United States, 794 F. Supp. 377, 386 (Ct. Int'l Trade 1992).

[5] American Lamb, 785 F.2d at 1001. See also Torrington Co. v. United States, 790 F. Supp. 1161, 1165 (Ct. Int'l Trade 1992).

legislative intent and is sufficiently reasonable."[6]

II. LIKE PRODUCT

To determine whether an industry in the United States is materially injured or is threatened with material injury by reason of the subject imports, the Commission must first define the "like product" and the "industry." Section 771(4)(A) of the Tariff Act of 1930 (the "Act") defines the relevant industry as the "domestic producers as a whole of a like product, or those producers whose collective output of the like product constitutes a major proportion of the total domestic production of that product."[7] In turn, the Act defines "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."[8]

The Commission's like product determinations are factual, and the Commission applies the statutory standard of "like" or "most similar in characteristics and uses" on a case-by-case basis.[9] No single factor is necessarily dispositive, and the Commission may consider other factors it deems relevant based upon the facts of a particular investigation.[10] Generally the Commission requires "clear dividing lines among possible like products" and disregards minor variations among them.[11]

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6 American Lamb, 785 F.2d at 1004.

7 19 U.S.C. § 1677(4)(A).

8 19 U.S.C. § 1677(10).

9 See Torrington Co. v. United States, 747 F. Supp. 744, 749 n.3 (Ct. Int'l Trade 1990), aff'd, 938 F.2d 1278 (Fed. Cir. 1991). In analyzing like product issues, 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, (5) common manufacturing facilities and production employees, and, where appropriate, (6) price. Calabrian, 794 F. Supp. at 382 n.4; Torrington, 747 F. Supp. at 749; Asociacion Colombiana de Exportadores de Flores v. United States, 693 F. Supp. 1165, 1168 n.4, 1180 n.7 (Ct. Int'l Trade 1988).

10 See S. Rep. No. 249, 96th Cong., 1st Sess. 90-91 (1979); Torrington, 747 F. Supp. at 748-49.

11 Torrington, 747 F. Supp. at 748-49.

The Department of Commerce ("Commerce") has identified the imported product subject to this investigation as:

> silicon carbide, regardless of grade or form, containing by weight from 20 to 98 percent, inclusive, silicon carbide and with a grain size coarser than size 325F (as set by the American National Standards Institute), and inclusive of split sizes. Silicon carbide covered by this investigation typically contains additional impurities: iron, aluminum, silica, silicon, and carbon as well as calcium and magnesium. Silicon carbide is provided for in subheadings 2849.20.10 and 2849.20.20 of the Harmonized Tariff Schedule (HTS).[12]

Silicon carbide is a crystalline, solid industrial mineral having the chemical formula SiC.[13] The primary uses of silicon carbide are in the manufacture of abrasives, in refractory applications, and in metallurgical or foundry applications.[14]

Silicon carbide is produced by reacting silica sand and carbon (supplied in the United States by petroleum coke) in an electron resistance furnace. The raw materials are placed around a graphite core and between electrodes through which an electric current is passed. The chemical reaction does not occur uniformly throughout the furnace, but occurs in an expanding cylinder around the graphite core. Thus, when the reaction is complete, the material closest to the center will be richest in silicon carbide.[15] Once removed from the furnace, the silicon carbide is reduced in size using a hydraulic hammer and then fed to a crusher. Silicon carbide destined for use in abrasive and refractory applications is then crushed into grains, magnetically treated to remove iron impurities, and sized by the use of screens to meet ANSI

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12 58 Fed. Reg. 38361 (1993).
13 Report of the Commission at I-5 ("Report").
14 Report at I-6.
15 Report at I-7.

specifications.[16] Alternately, crude silicon carbide may be sold to briquetters that combine it with other additives and form it into briquettes for use in the iron foundry industry.[17]

In this preliminary investigation, the principal like product issues are whether crude and refined silicon carbide are separate like products and whether metallurgical and crystalline grades of silicon carbide are separate like products. In addition, respondents urged the Commission to find that briquettes made with silicon carbide should be included within the like product.

A. Are Crude and Refined Silicon Carbide Separate Like Products?[18]

In analyzing whether a semifinished product should be included in the same like product with the finished product, the Commission typically examines five factors, including: (1) the necessity for, and costs of, further processing; (2) the degree of interchangeability of articles at different stages of production; (3) whether the article at an earlier stage of production is dedicated to use in the finished article; (4) whether there are significant independent uses or markets for the finished and unfinished articles; and (5) whether the article at the earlier stage of production embodies or imparts to the finished article an essential characteristic or function. No single factor is determinative.[19]

Petitioner argues that crude and refined silicon carbide are a single

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[16] Report at I-7. All but one of the domestic silicon carbide producers perform only the last step in this process, the crushing and screening of crude silicon carbide to particular specifications. While we adopt the parties' convention of referring to these producers as "refiners" of silicon carbide, we note that their activities do not constitute "refining" in the traditional sense, since they do not increase the purity of the silicon carbide, but merely change its size.

[17] Report at I-4.

[18] Commissioners Brunsdale and Crawford do not join in the discussion in this subsection A.

[19] Erasable Programmable Read Only Memories from Japan, Inv. No. 731-TA-288 (Preliminary), USITC Pub. 1778 at 6-7 (Nov. 1985).

like product, while respondents contend that they are two separate like products.[20] Petitioner's principal argument is that there is a continuum of sizes of silicon carbide particles and no clear dividing line between a particle size large enough to be considered crude and one small enough to be considered refined.[21] Respondents stress that the value added by refiners is significant.[22]

Crude silicon carbide is not dedicated for use as refined silicon carbide, since there is an independent market in which crude silicon carbide is sold to briquetters.[23] [24] [25] Nevertheless, for purposes of this preliminary investigation, we do not view the existence of independent markets as dispositive. In deciding like product questions, the Commission generally seeks "clear dividing lines" between like products. In this investigation, the record reflects uncertainty about the point in the production process that divides the crude and refined products. Neither party has articulated a clear

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[20] Petitioner's Post-Conference Brief at 3; Respondents' Post-Conference Brief at 6.

[21] Petitioner's Post-Conference Brief at 9.

[22] Respondents' Post-Conference Brief at 13, citing Preliminary Conference Transcript (July 12, 1993) at 23 ("Tr.").

[23] Report at I-4, I-6.

[24] For this reason, Commissioner Crawford finds two like products, crude and refined silicon carbide.

[25] Commissioner Brunsdale, consistent with the views she expressed in Sulfur Dyes from China and the United Kingdom, Inv. Nos. 731-TA-548 and 551 (Final), USITC Pub. 2602 at 57-61 (Feb. 1993), determines that there are two like products, crude and refined silicon carbide. (The distinction lies in whether a facility has its own furnace or not.) Her conclusion rests on the undisputed facts that refiners require crude silicon carbide as an input to their products, and that there is only one factory in the entire country capable of making crude silicon carbide -- the output of which even its owner ships to another facility several states away to refine. Usually this would mean that the refiners could be expected to oppose the petition, as did the non-integrated downstream manufacturers in Sulfur Dyes. However, as we note below, see n.98 infra, the explanation lies in these petitioners' Canadian crude operations which have been hurt by the increased imports of Chinese crude silicon carbide.

dividing line, and we cannot discern one.[26] Moreover, although the value added by refiners is not insubstantial, the further processing that distinguishes crude and refined silicon carbide appears to be nothing more than a grinding process and does not result in significant purification or changes in chemical composition.[27] The Commission generally views mere grinding operations as insufficient to establish a separate like product.[28] In addition, crude and refined silicon carbide share the same essential characteristic -- percentage silicon carbide content.[29]

Thus, we find that crude and refined silicon carbide are not separate like products. In any final investigation, however, we intend to seek additional information on whether crude and refined silicon carbide might be separate like products.

B. Metallurgical and Crystalline Grades of Silicon Carbide Are Not Separate Like Products

Metallurgical grade silicon carbide is generally defined as containing

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[26] Petitioner alternately defines crude as silicon carbide crushed and screened to one inch or finer or argues that there is no definition for the difference between the two. See Petitioner's Post-Conference Brief at 12; Tr. at 37, 70. Respondents argue at one point that silicon carbide is crude when it is taken from the furnace and refined at all subsequent production stages and at another point that silicon carbide is still crude when it has been crushed and screened to three-quarters of an inch or finer. Respondents' Post-Conference Brief at 8, 9.

[27] Report at I-6, I-7, I-26.

[28] Compare Antimony Trioxide from the People's Republic of China, Inv. No. 731-TA-517 (Preliminary), USITC Pub. 2395 (June 1991), the case relied upon by respondents, in which the refined product was purified rather than merely crushed, with the Commission's many cement determinations, in which the mere grinding of clinker into cement has not been considered sufficient to justify separate like products. See, e.g., Certain Calcium Aluminate Cement and Cement Clinker from France, Inv. No. 731-TA-645 (Preliminary), USITC Pub. 2637 at 11-12 (May 1993); Gray Portland Cement and Cement Clinker from Venezuela, Inv. No. 731-TA-519 (Preliminary), USITC Pub. 2400 at 4 (July 1991); Gray Portland Cement and Cement Clinker from Japan, Inv. No. 731-TA-461 (Final), USITC Pub. 2376 at 13 (Apr. 1991); Gray Portland Cement and Cement Clinker from Mexico, Inv. No. 731-TA-451 (Final), USITC Pub. 2305 at 4 (Aug. 1990); Portland Hydraulic Cement and Cement Clinker from Colombia, France, Greece, Japan, Mexico, the Republic of Korea, Spain, and Venezuela, Inv. Nos. 731-TA-356-363 (Preliminary), USITC Pub. 1925 at 5-6 (Dec. 1986).

[29] Report at I-5-I-7.

85-90 percent or less silicon carbide by weight, while crystalline grade silicon carbide contains 97-98 percent silicon carbide by weight.[30] Respondents appear to suggest that the metallurgical and crystalline grades of silicon carbide are two separate like products, while petitioner maintains that all silicon carbide is a single like product.[31]

The Commission generally does not find separate like products based on different grades of a chemical or mineral product.[32] In this investigation, there is a continuum of degrees of purity of silicon carbide; the record reflects transactions involving silicon carbide with content by weight distributed throughout the 40 to 98 percent range.[33] While abrasive applications require the higher purity crystalline grade, customers that purchase silicon carbide for foundry applications and, to some extent, for refractory applications, can purchase product with a wide range of purities and blend them to the desired purity level.[34] Thus, within at least a significant portion of all end use applications, the grades are interchangeable.[35] Both grades are produced in the same furnace at the same

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[30] Report at I-5.

[31] Petitioner argues that there is a continuum of largely interchangeable degrees of purity, that all grades are produced using the same machinery, and that prices increase incrementally with silicon carbide content. Petitioner's Post-Conference Brief at 7-17. Respondents contend at one point in their post-conference brief that metallurgical crude and crystalline crude are separate like products, applying the Commission's traditional like product factors. Exhibit 4 to Respondents' Post-Conference Brief at 6-8. As noted above, however, respondents also expressly argued that crude and refined silicon carbide (regardless of grade) are separate like products.

[32] See, e.g., Ferrosilicon from Russia and Venezuela, Inv. Nos. 303-TA-23, 731-TA-568 and 570 (Final), USITC Pub. 2650 at 7 n.22 (June 1993) (multiple grades based on percent silicon by weight all one like product); Magnesium from Canada, Inv. Nos. 701-TA-309, 731-TA-528 (Final), USITC Pub. 2550 at 11 (Aug. 1992) (lack of interchangeability among uses outweighed by similarities in physical characteristics and production process).

[33] Report at I-36, I-41.

[34] Report at I-7; Tr. at 52, 116, 121.

[35] Complete interchangeability is not required to include various articles within a single like product. See, e.g., Polychloroprene from France and the Federal Republic of Germany, Inv. Nos. 731-TA-446-447 (Preliminary), USITC

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time and are refined using the same technology,[36] although separate refining lines are often used for the two grades to preserve the purity of crystalline silicon carbide and avoid the need to clean the machinery when switching between purity levels.[37] [38] At least some producers and customers view the product as a continuum, since they can mix the products to create the needed purity level.[39] Prices are based on silicon carbide content and degree of processing and increase incrementally as purity increases and grain size decreases.[40]

For these reasons, we determine that metallurgical and crystalline grade silicon carbide are not separate like products.

C. The Like Product Does Not Include Briquettes

Respondents contend that the like product or products should include briquettes made with silicon carbide for use in the foundry industry. Respondents state that briquetters are refiners, because they "grind, pulverize or otherwise process" crude silicon carbide as part of their production process.[41] Petitioner argues that briquettes are not silicon carbide, but rather one of several downstream products for which silicon carbide is an input.[42]

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[35](...continued)
Pub. 2233 at 7 (Nov. 1989); Color Picture Tubes from Canada, Japan, the Republic of Korea, and Singapore, Inv. Nos. 731-TA-367-370 (Final), USITC Pub. 2046 at 5 (Dec. 1987) (color picture tubes of different sizes are a single like product despite a lack of interchangeability).

[36] Because of the nature of the production process, each furnace run produces product representing a range of purities. Report at I-7.

[37] Report at I-7; Tr. at 43.

[38] Commissioner Brunsdale finds that the production of both crude metallic and crystalline grade silicon carbide at the same time (and even in the same furnace) suffices to characterize both grades as the same like product.

[39] Additional information about customer perceptions will be sought through purchasers' questionnaires in any final investigation.

[40] Petitioner's Post-Conference Brief at 17; Exhibit 4 to Respondents' Post-Conference Brief at 3.

[41] Respondents' Post-Conference Brief at 16-17.

[42] Petitioner's Post-Conference Brief at 22-23.

While silicon carbide briquettes contain silicon carbide, the silicon carbide is combined with additional materials including water and cement, and the mixture is shaped into and sold as briquettes rather than being sold as grains of silicon carbide.[43] Refined silicon carbide is sold for use in refractory and abrasive applications, while briquettes are sold through different channels of distribution for use in cupola furnaces in the iron and steel industry.[44] Briquettes are not interchangeable with refined silicon carbide in refractory and abrasive applications and are manufactured using completely different production facilities, processes and employees.[45] None of the domestic silicon carbide refiners also produces briquettes, which suggests that producers and consumers perceive refined silicon carbide and briquettes as separate products.[46] Refined granular silicon carbide, because of its generally higher purity, sells at significantly higher prices than briquettes containing silicon carbide.[47] Therefore, we determine that briquettes are not part of the like product.[48] [49]

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[43] Report at I-4. See also Exhibit 4 to Respondent's Post-Conference Brief.

[44] Report at I-4, I-7. See also Exhibit 4 to Respondents' Post-Conference Brief at 2; Tr. at 100.

[45] Report at I-4; compare Exhibit 2 to Respondents' Post-Conference Brief (flow chart of briquette production process) with Report at I-7.

[46] Report at I-13-I-14.

[47] Tr. at 85-86; Exhibit 4 to Respondents' Post-Conference Brief at 3.

[48] Commissioners Brunsdale and Crawford join generally in this discussion and determine that briquettes are not part of either the crude or refined like product.

[49] Commerce's scope determination limits the imports subject to investigation to silicon carbide containing from 20 to 98 percent silicon carbide by weight and with a grain size coarser than 325F. 58 Fed. Reg. at 38361 (1993). No party has argued that silicon carbide containing less than 20 percent or more than 98 percent silicon carbide by weight should be included as a like product. Respondents argue briefly that silicon carbide with a grain size finer than 325F ("micro grit") should be included as refined silicon carbide, since it is "ground, pulverized or otherwise processed" in accordance with the definition of "refined" used in the questionnaires. Respondents' Post-Conference Brief at 18.

Ultra pure silicon carbide with a silicon carbide content of virtually 100 percent is used as a sintering powder for ceramics. It is produced using

(continued...)

For the reasons stated above, we find one like product consisting of silicon carbide, regardless of grade or form, containing by weight from 20 to 98 percent, inclusive, silicon carbide and with a grain size coarser than 325F, inclusive of split sizes.

III. DOMESTIC INDUSTRY AND RELATED PARTIES

A. Domestic Producers[50]

In this investigation, the domestic industry consists of the domestic producers of silicon carbide. Only one domestic producer, petitioner Exolon-ESK Company ("Exolon"), produces crude silicon carbide at a furnacing facility in the United States.[51] The other U.S. producers engage only in the grinding and screening of crude silicon carbide for the production of refined silicon carbide.[52] Petitioners General Abrasives Treibacher, Inc. ("General Abrasives") and Saint-Gobain/Norton Industrial Ceramics Corporation ("Norton") are integrated producers, but their furnacing facilities producing crude silicon carbide are located in Canada.[53] Other U.S. refiners purchase their crude requirements from Exolon or import crude silicon carbide from Canada, the PRC, or various South American countries.

The principal question in defining the domestic industry is whether the domestic operations of refiners are sufficient for them to be considered

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[49](...continued)
very different machinery from that used to produce commodity silicon carbide, has a grain size of only one or two microns, has entirely different end uses, and sells for much higher prices. Tr. at 55-56. The record reveals no production, sales or imports of silicon carbide containing less than 20 percent silicon carbide by weight. Micro grit silicon carbide is a high tech product used in the production of silicon wafers and is produced using distinct production equipment. Tr. at 44-46. For these reasons, we determine that the like product should not be expanded to include these additional silicon carbide products.

[50] Commissioners Brunsdale and Crawford find two domestic industries producing crude and refined silicon carbide.

[51] Tr. at 18.

[52] Report at I-13.

[53] Tr. at 23, 25, and 58.

members of the domestic industry. No party argues that refiners are not domestic producers.

In considering whether a firm is a domestic producer, the Commission has looked to the overall nature of its production-related activities in the United States.[54] In this investigation, the domestic refiners appear to have made a substantial investment in production facilities in the United States.[55] The value added by refiners is not insubstantial.[56] While employment figures are low in an absolute sense, the industry is capital-intensive.[57] Refiners import a sizeable percentage of their principal raw material, crude silicon carbide, but this is due to Exolon's inability to satisfy demand.[58] Accordingly, we determine that domestic refiners are engaging in "production" of silicon carbide at their U.S. crushing operations and should be included in the domestic industry.[59]

B. Related Parties

The related parties provision, 19 U.S.C. § 1677(4)(B), allows for the exclusion of certain domestic producers from the domestic industry for the purposes of an injury determination. Applying the provision involves two

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[54] Specifically, in resolving that issue, the Commission has examined six factors: (1) the source and extent of the firm's capital investment; (2) the technical expertise involved in U.S. production activities; (3) the value and type of parts sourced in the United States; (4) employment levels; (5) quantity and type of parts sourced in the United States; and (6) any other costs and activities in the United States directly leading to production of the like product. No single factor is determinative and the Commission may consider any other factors it deems relevant in light of the specific facts of any investigation. See, e.g., Certain Carbon Steel Butt-Weld Pipe Fittings from China and Thailand, Inv. Nos. 731-TA-520-521 (Final), USITC Pub. 2527 at 6 n.16 (June 1992); Certain Personal Word Processors from Japan, Inv. No. 731-TA-483 (Final), USITC Pub. 2411 at 18 (Aug. 1991).

[55] Report at I-29, Table 16.

[56] Report at I-26.

[57] Report at I-21, Table 9.

[58] Report at I-18 & Table 7. Commissioner Rohr does not consider this point relevant to his analysis.

[59] We note that the Commission has consistently included grinders of cement clinker in the domestic cement industry. See cases cited at n.28, supra.

steps. First, the Commission must determine whether a domestic producer meets the definition of a related party. If a producer is "related" under section 771(4)(B), the Commission then determines whether "appropriate circumstances" exist for excluding the producer in question from the definition of the domestic industry.[60] Exclusion of a related party is within the Commission's discretion based upon the facts presented in each investigation.[61]

In this investigation, petitioner raised the issue of related parties by noting that Exolon was not the importer of record when it purchased subject imports and arguing that appropriate circumstances do not exist to exclude Exolon from the domestic industry.[62] Respondent did not contest these points. Although both Exolon and one of the refiners have purchased silicon carbide imported from the PRC, neither producer has any corporate affiliation with any producer or importer of Chinese silicon carbide nor was either the importer of record for the Chinese silicon carbide it purchased.[63] In the absence of any evidence that either producer has a "special relationship" with the pertinent importer of record,[64] we determine that these two producers are not "related parties" within the meaning of the statute.

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[60] 19 U.S.C. § 1677(4)(B).

[61] See Torrington Co. v. United States, 790 F. Supp. 1161, 1168 (Ct. Int'l Trade 1992), aff'd, Nos. 92-1383 and -1392 (Fed. Cir., Mar. 5, 1993); Sandvik AB v. United States, 721 F. Supp. 1322, 1331-32 (Ct. Int'l Trade 1989), aff'd without opinion, 904 F.2d 46 (Fed. Cir. 1990); Empire Plow Co. v. United States, 675 F. Supp. 1348, 1352 (Ct. Int'l Trade 1987). The rationale for the related parties provision is the concern that domestic producers that are related parties may be in a position that shields them from any injury that might be caused by the imports. See S. Rep. No. 249, 96th Cong., 1st Sess. 83 (1979). Thus, including these parties within the domestic industry would cause the industry to appear healthier than it in fact is. See, e.g., Sandvik, 721 F. Supp. at 1331-32 (related party appeared to benefit from dumped imports).

[62] Petitioner's Post-Conference Brief at 26; Tr. at 61.

[63] Report at I-18; Tr. at 60-61.

[64] Compare Certain Carbon Steel Butt-Weld Pipe Fittings from China and Thailand, Inv. Nos. 731-TA-520-521 (Final), USITC Pub. 2528 (June 1992).

IV. CONDITION OF THE DOMESTIC INDUSTRY[65]

In assessing whether there is a reasonable indication of material injury to a domestic industry by reason of allegedly dumped imports, the Commission is instructed to consider "all relevant economic factors which have a bearing on the state of the industry in the United States."[66] These 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.[67] [68] No single factor is determinative, and we consider all relevant factors "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[69]

A significant condition of competition distinctive to this industry is

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[65] Commissioners Brunsdale and Crawford join in this general discussion, although they would characterize the distinct market segments as separate industries.

[66] 19 U.S.C. § 1677(7)(C)(iii).

[67] 19 U.S.C. § 1677(7)(C)(iii).

[68] Commissioner Rohr does not agree with his colleagues' attempt to identify the analysis of the condition of the industry, which this portion of the Commission's views represents, with the analysis of the so-called impact factors of 19 U.S.C. § 1677(7)(C)(iii) which is part of the Commission's causation analysis. A mere recitation of the statute, particularly when a reading of the analysis which follows shows that a literal following of the statute was not done, is not helpful. He does not view this as a substitute for a reasoned explanation of what the Commission actually did, particularly when the statute by its own terms was never meant to be exclusive. For example, there is no direct indicator called "output" but rather such commonly understood and measurable factors as "production" and "shipments." Similarly, "profits" standing alone are usually meaningless unless evaluated in the context of net sales, cost of goods sold, and other expenses. That is why the Commission traditionally recognized that it was evaluating the "financial performance" of the industry not merely its "profits" or just "return on investment". The traditional listing included those factors that the Commission in its experience over the last 15 years had found to be relevant, expressed in a manner that the general public as well as trade technicians would find meaningful. Its statement reflected the way in which these indicators of the industries condition were actually evaluated. He believes that this recitation of the statute decreases the transparency of Commission decisionmaking and does the public a major disservice.

[69] 19 U.S.C. § 1677(7)(C)(iii). No argument addressing the business cycle was raised by any of the parties to this investigation. Nor did the Commission receive any information relevant to such considerations.

its division into crude and refined market segments, as well as metallurgical and crystalline subsegments. Crude silicon carbide is an intermediate product used to produce either refined silicon carbide or briquettes. Refined silicon carbide is used for applications in the refractory and abrasives industries.[70]

The vast majority of subject imports consists of metallurgical grade crude silicon carbide, the principal use of which is in the production of briquettes.[71] A significant portion of domestic production is refined crystalline grade silicon carbide. Metallurgical grade crude silicon carbide cannot be used to produce crystalline grade refined silicon carbide.[72] Therefore, there is no apparent competition between the vast majority of imports and the largest domestic market segment.[73]

Another condition of competition in this industry is its dependence on imports of crude silicon carbide. Even operating at full capacity, Exolon, the only domestic producer of crude silicon carbide, would fall far short of meeting demand.[74] Imports of crude silicon carbide are therefore necessary to supply both briquetters and domestic producers' refining operations. Over the period of investigation, nonsubject imports from Canada accounted for by far the largest share of silicon carbide imports.[75]

Aside from Exolon, the only domestic source of crude silicon carbide is the Defense National Stockpile Center, which is in the process of liquidating its strategic reserve of crude silicon carbide. The existence of this

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70 Report at I-4, I-7.

71 Report at I-36 and Table 21; Tr. at 84, 119-121.

72 Tr. at 15 (refurnacing required).

73 Given the concentration of imports in the crude metallurgical grade market segment, it appears that any effect of these imports in other segments of the domestic market would be indirect. In any final investigation, we will seek further information concerning the existence and nature of such effects.

74 Report at I-15, I-18, I-35 & I-38 (market share); Tr. at 78. As we discuss infra, Exolon's crude silicon carbide production facility did operate at near full capacity throughout the period of investigation.

75 Report at Appendix H, Table H-1.

stockpile is an additional condition of competition that we have considered in this investigation. The stockpile's administrators are constrained by statute to sell off their reserves in a manner that will not disrupt the market. In response to complaints from Exolon and other industry representatives about market disruption, annual sales from the stockpile declined from 10,200 short tons in 1990 to an authorized 4,250 tons in fiscal 1993. The stockpile's total reserves now stand at 39,626 short tons.[76]

In order to avoid double counting or other aberrations caused by the use of crude silicon carbide in the production of refined silicon carbide, data on the condition of the domestic industry must be evaluated separately for the two segments.[77] Nevertheless, our analysis is based on the condition of the silicon carbide industry as a whole.[78] Because Exolon is the only domestic producer of crude silicon carbide, our analysis of the condition of its crude silicon carbide operation is discussed here in general terms in order to avoid disclosure of business proprietary information.

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[76] Report at Appendix F. Although the stockpile purchased crystalline grade crude silicon carbide, respondents contend that the stockpiled material has deteriorated and is no longer suitable for applications requiring crystalline grade without further processing. Tr. at 116. In any final investigation we will seek clarification of the end uses for which the content of the stockpile is suitable.

[77] Report at I-15. In our questionnaires, we defined refined silicon carbide as silicon carbide that had been "ground, pulverized or otherwise processed after furnacing." We are aware that different producers define the dividing line between crude and refined silicon carbide somewhat differently. Nevertheless, the distribution of data contained in the report is the best information available in this preliminary investigation of the condition of the domestic silicon carbide industry. 19 U.S.C. § 1677e(c).

[78] We note that neither the statute nor the legislative history requires the Commission to adopt any particular analysis when the market consists of several segments. Copperweld Corp. v. United States, 682 F. Supp. 552, 566 (Ct. Int'l Trade 1988). Thus, the Commission has in the past evaluated a variety of segmented markets in light of the particular features of the industry. See, e.g., New Steel Rails from Japan, Luxembourg, and the United Kingdom, Inv. Nos. 731-TA-557-559 (Preliminary), USITC Pub. 2524 at 19 (June 1992) (one market consisting of multiple shape and grade segments); Mechanical Transfer Presses from Japan, Inv. No. 731-TA-429 (Final), USITC Pub. 2257 at 26 n.26 (Feb. 1990)(market consisting of two segments).

Apparent U.S. consumption of crude silicon carbide, including that consumed internally by Exolon in the production of refined silicon carbide, declined from 1990 to 1991 but rose again in 1992 to exceed the 1990 level. Apparent consumption was lower in interim (January-March) 1993 than in interim 1992.[79] Apparent U.S. consumption of refined silicon carbide fell between 1990 and 1992, although the decline slowed in interim 1993.[80]

During the period of investigation, Exolon's production of crude silicon carbide remained relatively stable, and the company operated at very high rates of capacity utilization.[81] U.S. production of refined silicon carbide fell from 66,387 short tons in 1990 to 53,806 short tons in 1991, or by 19 percent. Production rose to 54,219 tons in 1992, a gain of less than 1 percent. Production was 15,818 short tons in interim 1992, compared with 14,557 short tons in 1993.[82] Average-of-period capacity utilization fell from 56.7 percent in 1990 to 45.7 percent in 1991, then increased to 46.1 percent in 1992 and was 49.5 percent in interim 1993.[83] Production capacity for both crude and refined silicon carbide remained relatively stable during the period of investigation, with refined capacity increasing slightly.[84]

Exolon's domestic shipments of crude silicon carbide, excluding product that was consumed internally, rose from 1990 to 1992 and were higher in interim 1993 than in interim 1992.[85] U.S. shipments of refined silicon

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[79] Report at I-12, Table 2. Apparent consumption of crude silicon carbide ***.

[80] Report at I-12, Table 2. Apparent consumption of refined silicon carbide ***. On the basis of value U.S. apparent consumption of both crude and refined silicon carbide declined over the period of investigation. Id.

[81] Report at I-16, Table 4. Exolon's production of crude silicon carbide ***. Exolon's capacity utilization rate for crude silicon carbide production ***.

[82] Report at I-16, Table 4.

[83] Report at I-16, Table 4. We note that, given Exolon's capacity utilization level, domestic refiners would have to import more crude silicon carbide in order to increase their capacity utilization level.

[84] Report at I-16, Table 4.

[85] Report at I-16-I-17 and Table 5. Exolon's domestic crude shipments ***.

carbide fell from 60,505 short tons in 1990 to 48,834 short tons in 1992, or by 19 percent. During interim 1993, the quantity of U.S. shipments was one percent lower than it was in the corresponding period of 1992.[86] Exports of crude silicon carbide rose in both volume and value over the period of investigation, but were never large.[87] Exports of refined silicon carbide declined in both volume and value, but rose in the interim period.[88] The unit value of exports was consistently above that for U.S. shipments.[89]

The unit value of Exolon's U.S. shipments of crude silicon carbide, including company transfers, rose steadily over the period of investigation.[90] The unit value of U.S. shipments of refined silicon carbide increased by 4 percent from 1990 to 1991, falling in 1992 by 3 percent from the 1991 level. The unit value continued to decline in the interim period, falling in interim 1993 to its lowest level in the period covered by the Commission's data.[91]

Exolon's end-of-period inventories of crude silicon carbide fell significantly from 1990 to 1991, rose in 1992 to exceed their 1990 level, and were substantially higher in interim 1993 than in interim 1992.[92] Inventories of refined silicon carbide fell by nearly 11 percent from 1990 to 1991 before increasing in 1992 to a level near that reported in 1990. Inventories of refined silicon carbide were about 6 percent lower in interim 1993 than in interim 1992.[93]

The average number of production and related workers producing crude

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86 Id.

87 Report at I-17, Table 5. ***.

88 Report at I-17, Table 5. Refined exports fell from 5,435 short tons in 1990 to 4,338 in 1992. Refined exports were 1,252 short tons in interim 1992 compared with 1,719 in interim 1993.

89 Report at I-17, Table 5, and I-18.

90 Report at I-17, Table 5. The unit value of Exolon's domestic crude shipments ***.

91 Id.

92 Report at I-19, Table 8. Exolon's crude silicon carbide inventories ***.

93 Id.

silicon carbide remained relatively constant during the period covered by the Commission's questionnaires. Hours worked by such workers increased slightly, while wages and total compensation also increased.[94] The average number of production and related workers producing refined silicon carbide and the corresponding hours worked declined by 16 percent and 7 percent, respectively. Wages fell by 1 percent, and total compensation rose by 2 percent in the same period.[95] The significance of this data is limited, however, by the fact that employment in this capital-intensive industry is very low.[96]

Exolon's net sales of crude silicon carbide rose from 1990 to 1992, but were lower in interim 1993 than in interim 1992. Exolon's operating income margin rose and then declined over the period of investigation, but at all times exceeded ten percent.[97] [98] Net sales of U.S. producers of refined silicon carbide decreased from $49.8 million in 1990 to $44.6 million in 1991 and $43.1 million in 1992. Net sales were slightly lower in interim 1993 than

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[94] Report at I-20.

[95] Report at I-20.

[96] Report at I-21, Table 9. Total production and related employment in 1992 was *** in the domestic crude silicon carbide industry and 102 in the domestic refined silicon carbide industry.

[97] Report at I-27, Table 14. Exolon's operating income margin ***. In any final investigation, we will seek further information concerning the allocation of costs of production between Exolon's production of crystalline and metallurgical grade crude, in order to assess the effect of imports on financial performance in both market segments.

[98] At the conference and in its brief, petitioner made several references to injury that PRC imports into the United States are allegedly causing to General Abrasives' and Norton's crude silicon carbide operations, which are located in Canada. Tr. at 27, 66-67; Petitioner's Post-Conference Brief at 34-35. The statute specifically provides that the impact of imports of the dumped merchandise must be considered "only in the context of production operations within the United States." 19 U.S.C. § 1677(7)(B)(i). See also S. Rep. No. 71, 100th Cong., 1st Sess. 115, 117 (1987); General Motors Corp. v. United States, No. 92-08-00537, Slip Op. No. 93-128 at 9 (Ct. Int'l Trade July 12, 1993) (affirming the Commission's refusal to consider injury to Chrysler's U.S.-based parts operations from the negative effect of dumping on Chrysler's ability to sell its Canadian-assembled minivans in the United States). Accordingly, we have considered the effect of allegedly LTFV imports from the PRC on the refining operations that General Abrasives and Norton conduct in the United States only, not the effects of alleged LTFV imports on their Canadian crude production.

in interim 1992. The per-short ton average sales value increased from $856 in 1990 to $890 in 1991 and then decreased to $876 in 1992.[99] The refiners realized combined operating income in each period; however, the operating income margin decreased in each comparative period from 9.3 percent in 1990 to 6.9 percent in 1991 and 5.7 percent in 1992. The operating income margin was 7.0 percent in interim 1992 compared with 0.9 percent in interim 1993.[100]

Capital expenditures on all silicon carbide rose over the period of investigation as did the value of total assets.[101] Several domestic producers stated that they had scaled back investment plans due to the effect of Chinese imports.[102] [103] [104]

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[99] Report at I-22 & Table 12.

[100] Report at I-24, Table 11.

[101] Report at I-30, Table 17 & I-29, Table 16.

[102] Report at Appendix G. We intend to seek additional information in any final investigation concerning the causes for alleged delays in Exolon's planned expansion of the Hennepin plant's crude silicon carbide production capacity. See Tr. at 95.

[103] Based on their analysis of these indicators, Chairman Newquist and Commissioner Rohr find no reasonable indication that the domestic industry is experiencing material injury.

[104] Vice-Chairman Watson does not reach a separate conclusion as to whether the domestic industry is currently experiencing material injury based solely on evidence in the record regarding the condition of the industry. He concludes, however, that the domestic industry is not currently experiencing material injury by reason of the subject imports from the People's Republic of China based on a further evaluation of the record evidence, giving due consideration to the statutory factors enumerated in 19 U.S.C. § 1677(7). In reaching his negative material injury determination, Vice Chairman Watson notes the significant and increasing volume of the subject imports from the PRC. He does not, however, find the volume of the subject imports to be significant during the period of investigation because they had little impact on the domestic industry. Given the high capacity utilization of the crude silicon carbide producer in the U.S. and the fact that Exolon's shipments of crude silicon carbide increased during the period of investigation, domestic production does not appear to have been significantly affected by the subject imports. In fact, without further expansion, it does not appear likely that Exolon could increase its share of the crude silicon carbide market. Rather than affect Exolon's share of the domestic crude market, the subject imports have displaced nonsubject imports, primarily from Canada. Although the record does indicate declining price trends and underselling by the subject imports, the lower prices of the subject imports do not appear to have had more than a de minimis impact on the financial health of the domestic industry during the period of investigation. Both the crude and the refined operations of the

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V. VIEWS OF CHAIRMAN NEWQUIST, VICE CHAIRMAN WATSON, COMMISSIONER ROHR AND COMMISSIONER NUZUM ON A REASONABLE INDICATION OF THREAT OF MATERIAL INJURY BY REASON OF ALLEGED LTFV IMPORTS

Section 771(7)(F) of the Tariff Act of 1930 directs the Commission to determine whether a U.S. industry is threatened with material injury by reason of imports "on the basis of evidence that the threat of material injury is real and that actual injury is imminent." The Commission cannot base such a determination on mere conjecture or supposition.[105]

The Commission must consider ten factors in its threat analysis, including: (1) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports; (2) any rapid increase in United States market penetration and the likelihood that the penetration will increase to an injurious level; (3) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices; (4) any substantial increase in inventories of the merchandise in the United States; (5) the presence of underutilized capacity for producing the merchandise in the exporting country; (6) any other demonstrable adverse trends that indicate the probability that importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of actual injury; and (7) the potential for product shifting if production facilities owned or controlled by the foreign manufacturers, which can be used to produce products subject to antidumping or countervailing duty investigations or orders, are also used to produce the

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[104](...continued)
domestic industry remained profitable, while both capital expenditures and the value of total assets rose.

[105] 19 U.S.C. § 1677(7)(F)(ii).

merchandise under investigation.[106] The presence or absence of any single threat factor is not necessarily dispositive.[107] In addition, the Commission must consider whether dumping findings or antidumping remedies in markets of foreign countries against the same class or kind of merchandise suggest a threat of material injury to the domestic industry.[108]

In this preliminary investigation, we have been able to obtain relatively complete data on Chinese capacity and capacity utilization. Chinese silicon carbide production capacity has declined slightly over the period of investigation, from 330,690 short tons in 1990 to 308,644 short tons in 1991 and 1992.[109] Chinese producers operated at relatively high rates of capacity utilization, declining from 93.3 percent in 1990 to 85.7 percent in 1991, then rising to 92.9 percent in 1992.[110] There is some evidence suggesting that Chinese production is constrained by rising energy costs.[111]

There has been a rapid increase in United States market penetration by Chinese imports.[112] Imports of crude silicon carbide from the PRC more than tripled over the period of investigation, rising from 11,848 short tons in 1990 to 40,425 short tons in 1992.[113] The market share of crude silicon

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106 19 U.S.C. § 1677(7)(F)(i)(I)-(X). Since this investigation does not involve a subsidy or an agricultural product, Factors I and IX are not applicable. Further, the silicon carbide industry is a mature industry with little, if any, development and production of derivative products. Therefore Factor X is not significant in this investigation.

107 See, e.g., Rhone Poulenc, S.A. v. United States, 592 F. Supp. 1318, 1324 n.18 (Ct. Int'l Trade 1984).

108 19 U.S.C. § 1677(7)(F)(iii)(I).

109 Report at I-34.

110 Report at I-34.

111 Report at I-35.

112 Report at I-37, Table 20. In any final investigation, we will seek further information regarding allegations that Exolon has refused to sell crude silicon carbide to certain briquetters or placed them on allocation as a result of supply shortages.

113 Report at I-37, Table 20. In interim 1993, imports ***. Respondent argues that this rise in volume is mitigated by a decline in the silicon carbide content by weight of the subject imports. Respondents' Post-Conference Brief at 29; Tr. at 89-90, 106. In any final investigation, we

(continued...)

carbide imports from the PRC also rose substantially between 1990 and 1992, although it fell in interim 1993.[114] The volume and market share of refined silicon carbide imports from the PRC declined from a low level to zero over the period of investigation.[115]

Thus far, this increase in market penetration does not appear to have significantly affected Exolon's share of the crude silicon carbide segment of the market.[116] Rather, the subject imports appear to have displaced imports from other countries, primarily Canada.[117] Nevertheless, the rapidity of the increase in market penetration combined with other factors indicates to us a reasonable likelihood that the market penetration will increase to a level injurious to Exolon's crude silicon carbide operations.

Specifically, data gathered in this preliminary investigation show that, despite rising exports to the United States and other major export markets and rising domestic demand, Chinese silicon carbide production exceeded total shipments by over 150,000 short tons in 1990 and 1991 combined. Absent another explanation, we infer that this production has been held in inventory. Indeed, total shipments exceeded total production in 1992, suggesting sales from this inventory.[118] We have considered inventories held by the Chinese during the period of investigation to be an "other demonstrable adverse

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[113](...continued)
will seek further information regarding the silicon carbide content of imports from the PRC.

[114] Report at I-38, Table 22. Market share ***. Petitioner contends that, although first quarter 1993 import data reflects a decline over first quarter 1992, the Commission should disregard this decline as it reflects importers' advance knowledge that this case would be filed and their consequent build up of substantial inventories in late 1992. Petitioner's Post-Conference Brief at 37. Given the small volume of imports in both periods, we ascribe no particular significance to the interim volume and market share data in this preliminary investigation.

[115] Report at I-38, Table 22.

[116] Exolon's market share ***. Report at I-12, Table 2, & I-38, Table 22.

[117] Report at Appendix H, Table H-1.

[118] Report at I-34.

trend"[119] supporting our affirmative preliminary determination. We intend to gather further information regarding Chinese sales from inventory in any final investigation. We also note that Chinese exports to all destinations more than doubled between 1991 and 1992.[120] This growing reliance on export markets is an indication that exports to the United States are likely to continue to increase.[121] [122]

U.S. prices for crude metallurgical grade silicon carbide, the market segment in which the vast majority of imports from the PRC are concentrated, have fallen significantly over the period of investigation, while the U.S. producer's cost of goods sold has risen.[123] [124] Moreover, prices for Chinese crude silicon carbide have dropped dramatically, both in terms of unit values and reported prices.[125] Further, the Chinese product consistently undersold

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119 19 U.S.C. § 1677(7)(F)(i)(VII).

120 Report at I-34.

121 Commissioner Watson does not reach this conclusion concerning Chinese reliance on export markets.

122 The likelihood of increased Chinese exports to the United States may be reinforced by an antidumping proceeding currently pending against Chinese silicon carbide before the European Community. Chinese imports to the EC are subject to a price undertaking, the effectiveness of which is currently under review. The United States is the PRC's second largest export market after the EC, and imposition of an antidumping order in the EC could result in the diversion of exports to the United States. In any final investigation, we will seek the parties' views as to whether a price undertaking is a "finding" or "remedy" within the meaning of the threat provision (19 U.S.C. § 1677(7)(F)(iii)(I)), and we will have the benefit of the results of the EC review, which are due to be released in the near future.

123 Report at I-42, Table 24, I-24, Table 11, I-27, Table 14. Cost of goods sold as a percent of net sales in the production of crude silicon carbide ***.

124 It became apparent in the course of this preliminary investigation that, due to conflicting definitions of the distinction between crude and refined silicon carbide, the Commission may need to adopt an alternative method for conducting price comparisons in any final investigation. Specifically, we propose to request pricing data for silicon carbide of a specified silicon carbide content and grain size. We will also seek further information as to the cause of Exolon's increasing cost of goods sold.

125 Report at I-42, Table 24, and I-37, Table 20. The unit value of crude silicon carbide imports from the PRC fell from $324 per short ton in 1990 to $227 in 1992. We view the high interim unit values as aberrational and give them little weight. The unit value of the very small volume of refined silicon imported from the PRC ***. Report at I-37, Table 20.

the domestic product, and the margins of underselling increased during the period.[126] [127] This combination of events suggests to us a reasonable indication that future imports will enter the United States at prices that will have a depressing or suppressing effect on domestic prices.[128]

Although U.S. producers' inventories of refined silicon carbide have not increased over the period of investigation, Exolon's inventories of crude silicon carbide have risen significantly.[129]

Based on our analysis of these factors, particularly the rapid increase in imports, falling U.S. prices and apparent substantial Chinese inventories, we conclude there is a reasonable indication that the domestic silicon carbide industry is threatened with material injury by reason of the subject imports.

VI. SEPARATE VIEWS OF COMMISSIONERS BRUNSDALE AND CRAWFORD THAT THERE IS A REASONABLE INDICATION OF MATERIAL INJURY TO THE CRUDE SILICON CARBIDE INDUSTRY BY REASON OF ALLEGEDLY LTFV IMPORTS OF CRUDE SILICON CARBIDE

We have determined that crude silicon carbide is a separate like product. Therefore, we must determine whether there is a reasonable indication that the domestic industry producing crude silicon carbide is materially injured or threatened with material injury by reason of allegedly dumped imports. Our analysis follows.

In determining whether there is a reasonable indication that a domestic industry is materially injured by reason of the imports under investigation,

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[126] Report at I-42, Table 24. Margins of underselling ***.

[127] A large percentage of all imports are sold to briquetters. Data provided by briquetters indicate that they are experiencing rapid growth and, consequently, increasing demand for silicon carbide. Report at Appendix D. Under such circumstances, it is unusual for prices to be declining. In any final investigation, we intend to seek further information concerning the prices at which crude silicon carbide is sold to briquetters.

[128] In any final investigation, we will seek further information concerning respondents' allegation that favored domestic briquetters that are supplied by Exolon with inexpensive crude have instigated domestic price declines.

[129] Report at I-19, Table 8. Exolon's inventories of crude silicon carbide ***. Inventories of refined silicon carbide fell by nearly 11 percent from 1990 to 1991, before increasing in 1992 to a level near that reported in 1990.

the statute directs the Commission to consider:

> (I) the volume of imports of the merchandise which is the subject of the investigation,
>
> (II) the effect of imports of that merchandise on prices in the United States for like products, and
>
> (III) the impact of imports of such merchandise on domestic producers of like products, but only in the context of production operations within the United States . . . .[130]

In assessing the effect of dumped imports, we compare the current condition of the domestic industry to that which would have existed had imports not been dumped.[131] Then, taking into account the condition of the industry, we determine whether the resulting change of circumstances constitutes material injury. For the reasons discussed below, we find a reasonable indication that the domestic industry producing crude silicon carbide is materially injured by reason of alleged LTFV imports from the PRC.

A. Volume of the Subject Imports

Imports of crude silicon carbide from the PRC rose from 11,848 short tons in 1990 to 15,950 short tons in 1991 and then to 40,425 short tons in 1992. Imports by value followed the same pattern.[132] The market share of crude silicon carbide from the PRC throughout the period of investigation has been large,[133] and we find the volume of the imports to be significant in light of their effects.

B. Effect of Alleged LTFV Imports on Domestic Prices

To analyze the effect of subject imports on domestic prices of the like product and on the domestic industry, we consider a number of factors about the industry and the nature of the products, such as the availability of

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130 19 U.S.C. § 1677(7)(B)(i). In making its determination, the Commission may consider "such other economic factors as are relevant to the determination." 19 U.S.C. § 1677(7)(B)(ii).

131 19 U.S.C. § 1677(7)(C)(iii).

132 Report at I-37, Table 20.

133 Report at I-38, Table 22.

substitute products in the market, the degree of substitutability between the subject imports and the domestic like product, and the dumping margin, which is alleged to be between 136 and 406 percent.[134] For purposes of this preliminary investigation, we find a reasonable indication of significant price effects by the subject crude imports.

Fairly traded imports of crude silicon carbide are readily available and, like the subject imports, hold a large market share.[135] The record indicates that these nonsubject imports, particularly from Canada, are priced higher than both U.S. products and the subject imports.[136] In addition, the record supports the conclusion that the price effect of the lower-priced, allegedly dumped, subject imports was to displace higher-priced nonsubject imports.

If the subject imports had been fairly traded, they would have sold at prices up to 406 percent higher than their dumped prices. Since silicon carbide is highly substitutable within each grade and form, it is likely that this would have priced them out of the market. Because the U.S. producer is operating at a high level of capacity utilization, it could not easily have increased production to meet the demand supplied by subject imports. In the absence of subject imports, nonsubject imports would have taken a much larger share of the market. The high market share of the higher-priced nonsubject imports would in turn likely have allowed the U.S. producer to raise its prices.

In sum, Exolon is the only domestic producer of crude silicon carbide. Crude silicon carbide supplies are available from other sources, and the

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[134] Report at I-9 n.21.

[135] Report at I-38, Table 22, and Appendix H, Table H-1.

[136] Report at I-42, Table 24. In any final investigation, we will seek additional information to account for the fact that Canadian average unit values for crude silicon carbide are higher than U.S. average unit values.

limited information available at this time suggests that those sources are higher priced than the subject imports. Thus, if unfairly traded subject imports had been eliminated, prices for nonsubject imports and U.S. prices would likely have increased. The information available in this preliminary investigation likewise suggests that not all purchasers would have switched to ferrosilicon.[137] Thus, there is a reasonable indication that Exolon would have been able to raise its prices if the subject imports were fairly traded.

C. Impact on the Domestic Silicon Carbide Industry

In assessing the impact of alleged LTFV imports on the domestic industry, we consider, among other relevant factors, output, sales, inventories, capacity utilization, market share, employment, wages, productivity, profits, cash flow, return on investment, ability to raise capital and research and development.[138] These factors either encompass or reflect the volume and price effects of the allegedly dumped imports, and so we must gauge the impact of the alleged dumping through those effects.

With the high alleged dumping margins, it is unlikely that any Chinese imports would have entered at fairly traded prices. Exolon, the sole domestic producer of crude silicon carbide, is operating at nearly full capacity and cannot satisfy domestic demand. Thus, domestic shipments would not have increased significantly if subject imports were fairly traded. However, given the apparently limited availability of substitutes for the subject imports and the higher prices of nonsubject imports, it is likely that Exolon could have

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[137] There is considerable discussion in the record about the extent to which ferrosilicon may be a substitute for crude silicon carbide in metallurgical applications. Report at I-6, I-39; Tr. at 30, 73-74, 86, 89, 91, 112. We do not believe that the record in this preliminary investigation definitively establishes a high degree of substitutability, even in foundry applications. In any final investigation, we will explore further the extent to which ferrosilicon is substitutable for silicon carbide, and therefore would have limited domestic price increases in the absence of unfairly traded imports.

[138] 19 U.S.C. § 1677(C)(iii).

increased its prices. Given the large market share of subject imports, it is likely that, if the subject crude imports had been fairly traded, Exolon could have increased its prices to a level at which it would have been materially better off.

For these reasons, we conclude that there is a reasonable indication that the domestic industry producing crude silicon carbide is materially injured by reason of alleged LTFV imports of crude silicon carbide from the PRC.

VII. SEPARATE VIEWS OF COMMISSIONERS BRUNSDALE AND CRAWFORD THAT THERE IS NO REASONABLE INDICATION OF MATERIAL INJURY OR THREAT OF MATERIAL INJURY TO THE REFINED SILICON CARBIDE INDUSTRY BY REASON OF ALLEGEDLY LTFV IMPORTS OF REFINED SILICON CARBIDE

We have determined that refined silicon carbide is a separate like product. Therefore, we must determine whether there is a reasonable indication that the domestic industry producing refined silicon carbide is materially injured or threatened with material injury by reason of allegedly dumped imports of refined silicon carbide from the PRC. We have considered all of the statutory factors, and, for the reasons discussed below, we conclude that there is not a reasonable indication of material injury or threat of material injury to the domestic industry producing refined silicon carbide by reason of allegedly dumped imports from the PRC.

Even if we assumed that no subject imports of refined silicon carbide would be sold in the U.S. market at fairly traded prices, we would not find a reasonable indication of material injury or threat of material injury by reason of alleged LTFV imports of refined silicon carbide. The volume of imports of refined silicon carbide from the PRC was extremely small, with market share falling from less than one percent in 1990 to a de minimis level at the end of the period of investigation.[139]

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[139] Report at I-37, Table 20 & I-38, Table 22.

Domestic producers would not have been able to raise their prices or sales even if subject imports had been fairly traded. Purchasers could have turned to fairly traded imports to avoid any price increase. Moreover, with the significant excess capacity in the domestic industry, some producers could have expanded their production to satisfy demand of purchasers seeking to avoid the price increase. Domestic producers' excess capacity and the presence of fairly traded imports make it very unlikely that this extremely small volume of subject refined imports has had any adverse effect on domestic prices, output, or the other statutory impact factors.

There is also no evidence in the record that Chinese capacity or shipments of refined silicon carbide are likely to increase in the immediate future. We therefore find no reasonable indication of material injury or a threat of material injury to the domestic refined silicon carbide industry by reason of the allegedly dumped imports.

INFORMATION OBTAINED IN THE INVESTIGATION

INTRODUCTION

On June 21, 1993, counsel for the Ad Hoc Silicon Carbide Coalition,[1] Washington, DC, filed petitions with the United States International Trade Commission (Commission) and the United States Department of Commerce (Commerce) alleging that an industry in the United States is materially injured and threatened with continued material injury by reason of imports from the People's Republic of China (China) of silicon carbide,[2] provided for in subheadings 2849.20.10 and 2849.20.20 of the Harmonized Tariff Schedule of the United States (HTS), that are alleged to be sold in the United States at less than fair value (LTFV). Accordingly, effective June 21, 1993, the Commission instituted investigation No. 731-TA-651 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(a)) 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 of such merchandise. Notice of the institution of the Commission's investigation, and of the 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 on June 30, 1993 (58 F.R. 35044).[3] The Commission must complete preliminary antidumping investigations in 45 days, or in this case by August 5, 1993.

BACKGROUND

The petitioners argue that crude silicon carbide and refined silicon carbide, regardless of grade, constitute one like product.[4] Petitioners point to the fact that the chemical reaction that takes place in the furnace during the production process for crude silicon carbide results in the production of all grades of silicon carbide, which are later separated into the different grades.[5] Petitioners further believe that producers of crude silicon carbide

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[1] The coalition members include Exolon-ESK Co., Tonawanda, NY; General Abrasives Treibacher, Inc., Niagara Falls, NY; and Saint-Gobain/Norton Industrial Ceramics Corp., Worcester, MA.

[2] The petition covers all imports of silicon carbide from China, regardless of grade (i.e., metallurgical and crystalline) or form (i.e., crude or refined), that contain by weight from 20 to 98 percent, inclusive, silicon carbide (SiC), with a grain size coarser than size 325 F (as set by the American National Standards Institute (ANSI)), and includes split sizes (petition, p. 4.). Excluded from the scope of the petition are a number of high-tech forms and grades of silicon carbide, including very fine or micro-sized silicon carbide and high-purity silicon carbide. Data on these "specialty" silicon carbide products are not included in the body of this report.

[3] Copies of relevant Federal Register notices are presented in app. A. A list of witnesses appearing at the conference is presented in app. B.

[4] Petition, p. 12.

[5] Ibid, pp. 7 and 8.

and producers/processors of refined silicon carbide constitute the domestic industry.[6]

One of the uses of crude silicon carbide is in the production of silicon carbide briquettes for use in cupola furnaces in the iron foundry industry. However, unlike refined silicon carbide, a briquette is a product, not a chemical. That is, briquettes contain, for example, cement, designed to hold the silicon carbide together as a unit. Respondents argue that during the production process used in making briquettes, crude metallurgical grade silicon carbide is ground, pulverized, and otherwise processed.[7] The "refined" silicon carbide is then blended with other materials, including water and cement, formed into blocks, cured in kilns, and then palletized for delivery. In contrast, during the production process used to produce refined silicon carbide, additives are not used. Briquettes are sold in blocks weighing from 3 to 40 pounds; briquettes generally contain less than 40 percent silicon carbide.[8] Thus, respondents argue that "briquetters" produce a material that meets the definition of refined silicon carbide set forth in the petition and questionnaires and therefore should be included in the U.S. domestic industry for refined silicon carbide.[9] However, according to petitioner Exolon-ESK, refined silicon carbide is not larger than three quarters of an inch in any dimension.[10] Petitioners believe that briquetters are users of crude silicon carbide and do not wish them included in the domestic industry, nor did they wish to include briquettes within the scope of the petition.[11] Moreover, according to the U.S. Customs Service, imported silicon carbide briquettes are not likely classified under the same HTS heading as crude or refined silicon carbide and would therefore not fit the definition of the imported product as proposed by petitioners or as specified by Commerce in its notice of initiation.[12] Nonetheless, counsel for respondents requested that the Commission collect producers' questionnaire data on briquette production from three of its clients who are importers and briquetters.[13] At the Commission's conference on July 12, 1993, staff

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[6] There is only one U.S. producer of crude silicon carbide, petitioner Exolon-ESK; the remaining firms are processors of refined silicon carbide. Exolon-ESK also processes refined silicon carbide, although at a different location than where it produces crude silicon carbide.

[7] Respondents' postconference brief, p. 17. Gordon Austin, the commodity analyst for abrasives, including silicon carbide, at the U.S. Bureau of Mines, indicated that he considers briquetting to be a type of manufacture, such as the manufacturing of grinding wheels, rather than a method of refining silicon carbide (telephone interview, July 28, 1993).

[8] Respondents' postconference brief, exhibit 4.

[9] Letter from William E. Perry and Terry X. Gao of Miller, Canfield, Paddock and Stone, counsel to respondents, to Paul Bardos, Acting Secretary, U.S. International Trade Commission, July 9, 1993.

[10] Transcript of the conference (transcript), p. 68.

[11] Petitioners' postconference brief, pp. 22-23.

[12] See petition, pp. 4-5; section of the report entitled "U.S. tariff treatment;" and app. A.

[13] Respondents submitted a list of 15 companies that currently produce "briquetted" products for the iron and steel industry (see respondents' postconference brief, exhibit 2). Respondents estimate that annual shipments of silicon carbide briquettes are approximately 180,000 tons (respondents'

(continued...)

supplied representatives of these firms with producers' questionnaires and also asked counsel for petitioners to request similar information from their clients' briquetter-customers.

A description of crude and refined silicon carbide, metallurgical and crystalline grade silicon carbide, and the production processes are presented below. A summary of the data collected in this investigation is presented in appendix C. Summary data on silicon carbide briquette production are presented in appendix D.

THE PRODUCT

Description and Uses

Silicon carbide is a crystalline solid whose color (nearly clear, pale yellow or green, or black) is determined by its impurities. Silicon carbide is a chemical with the formula, SiC, i.e., the ratio of the number of atoms of silicon to carbon is one. Silicon carbide contains impurities including silica, silicon, carbon, iron, and aluminum. Many of the commercial applications of silicon carbide relate to its high melting point, its hardness (it is harder than alumina but less hard than diamond), and its chemical inertness. As a refractory material, silicon carbide is very resistant to thermal shock because of its high thermal conductivity and its low thermal expansion.

Although there are some minerals that contain silicon carbide, in general, silicon carbide can be produced far more economically through manufacturing by the reaction of silica sand and petroleum coke, two widely available and economical feedstocks.

There are various grades of silicon carbide. However, the industry is not always in precise agreement about the meaning of these terms, especially when it comes to establishing a precise level at which one grade is separated from another. Crystalline grade silicon carbide generally contains well over 90 percent silicon carbide, and metallurgical grade about 85-90 percent or less.[14]

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[13](...continued)
postconference brief, exhibit 3). Only 3 of these 15 companies, representing roughly *** percent of briquette shipments in 1992, as estimated by respondents, provided the Commission with partially usable data on their briquetting operations.

[14] According to petitioners, crystalline grade silicon carbide "typically describes products containing 97 to 98 percent silicon carbide" whereas metallurgical grade silicon carbide "typically describes products containing 70 to 92 percent silicon carbide." To make the metallurgical material, "material containing 93 to 96 percent silicon carbide is generally combined with other, lower-content material" (petition, p. 6).

The terms "refined" and "crude" are also used in the industry, but again the precise meaning is not always easily delineated. In general, in contrast to many other chemical products, the distinction between crude and refined silicon carbide is principally related to size and to sizing control and not to purity.[15] [16] In this investigation, crude silicon carbide has been defined as silicon carbide that "has not been ground, pulverized, or otherwise refined after furnacing" whereas refined silicon carbide is defined as that which "has been ground, pulverized, or otherwise processed after furnacing."

In addition to the most widely used commercial grades described above, there are a number of high-tech/specialty types of silicon carbide that are outside the scope of the petition (and Commerce's investigation), including very fine or micro-sized silicon carbide less than 325 mesh (less than 45 microns in size).[17] Summary data concerning specialty silicon carbide products are presented in appendix E.

Silicon carbide has three large volume uses and many other lower volume uses. The large volume uses of silicon carbide are in metallurgical or foundry applications (briquettes), in abrasives, and in refractory applications. In metallurgical applications, principally ferrous metallurgy, the silicon carbide acts as a supplier of carbon and silicon, as a deoxidant, and as a source of heat. In cupola furnaces, in the production of cast iron, silicon carbide is added to the furnace typically in the form of a briquette, whereas in induction furnaces silicon carbide is typically added as a grain. In general, the purity specification for silicon carbide in metallurgical applications is less stringent than in other applications. Silicon carbide competes with ferrosilicon in metallurgical applications; the use of these substitute products depends on their relative prices.

Before use in both abrasive and refractory applications, crude silicon carbide is crushed into a grain and is magnetically treated to remove iron impurities resulting from the use of grinding wheels. It is then carefully sized by the use of screens. For abrasive applications, obtaining the appropriate grain size is of critical importance because grains that are too large will scratch the surface whereas grains that are too small will fail to act as an abrasive. As an abrasive, silicon carbide products are used to grind very hard and/or very soft materials, especially low-tensile-strength

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[15] Transcript, p. 70.

[16] According to petitioners, silicon carbide in lumps that are 1 inch or less in any dimension is referred to as crude, even though some processing has taken place, i.e., the separation of lumps about 1 inch or finer from coarser lumps. "In its crude form, silicon carbide consists of lumps that are generally one inch and finer in size." Refining involves a more precise sizing and screening operation of smaller dimensions. "When refined, the silicon carbide is separated into predetermined sizes established by the American National Standard Institute ("ANSI")" (petition, p. 6).

[17] High-purity or green silicon carbide, which has a silicon carbide content of 99.5 percent, is used in the manufacture of precision quality abrasives such as grinding wheels for automobile manufacture and the production of heavy machinery. High-purity silicon carbide is used when precise shaping is required. It may also be used in the manufacture of composites and ceramics. Micro-sized silicon carbide is used in manufacturing polishing and sintering compounds.

materials. Appropriate materials on which silicon carbide abrasives can be used include rubber, plastics, cast iron, marble, porcelain, and non-ferrous alloys of aluminum, copper, and brass. Silicon carbide is used in both bonded abrasives, including grinding wheels, and coated abrasives, such as sandpaper. The types of applications of silicon carbide in abrasives include blasting abrasives, wiresawing abrasives, antislip abrasives, and polishing abrasives.

In refractory applications, both metallurgical and crystalline grades of silicon carbide are used. Silicon carbide may be used by itself or in conjunction with other refractories. Silicon carbide as a refractory is used in incinerators, in fire bricks for kilns, and in the lining of furnaces producing iron or steel. A characteristic of silicon carbide used in refractories is that a range of grain sizes may be required, i.e., the grain sizes are said to be split.

Silicon carbide is also used in electronics, in nuclear applications, in high-temperature applications, in coatings, and in composites.

Production Process

Crude silicon carbide is produced in an energy intensive process by reacting silica sand and carbon (usually petroleum coke in the United States; allegedly anthracite coal in China) in an electron resistance furnace. The chemical reaction in this process is represented by the formula $SiO_2 + 3C = SiC + 2CO$. The silica sand and petroleum coke are placed around a graphite core and between electrodes. An electric current is passed through the electrodes and the graphite core. When the temperature reaches about 2,000 degrees celsius, silica sand and carbon react to form silicon carbide. This reaction does not occur uniformly throughout the furnace but occurs in an expanding cylinder around the graphite core. When the reaction has reached the outer walls of the furnace, the furnace is shut down and the reacted material is removed.

The material near the graphite core that is richest in silicon carbide content, the crystalline grade, is separated from the material that is less rich in silicon carbide, the metallurgical grade.[18] Material that has not reacted sufficiently is generally considered a byproduct. It may be recycled or it may be shipped to a briquetter where material containing about 40 percent silicon carbide is usable. The crude metallurgical and crystalline material is reduced in size using an instrument such as a hydraulic hammer, and this material is then fed to a crusher. Most of the silicon carbide to be used in abrasive and refractory applications is then crushed into grains, magnetically treated to remove iron impurities, and carefully sized by the use of screens, as noted above. Figure 1 presents a graphic explanation of the production process.

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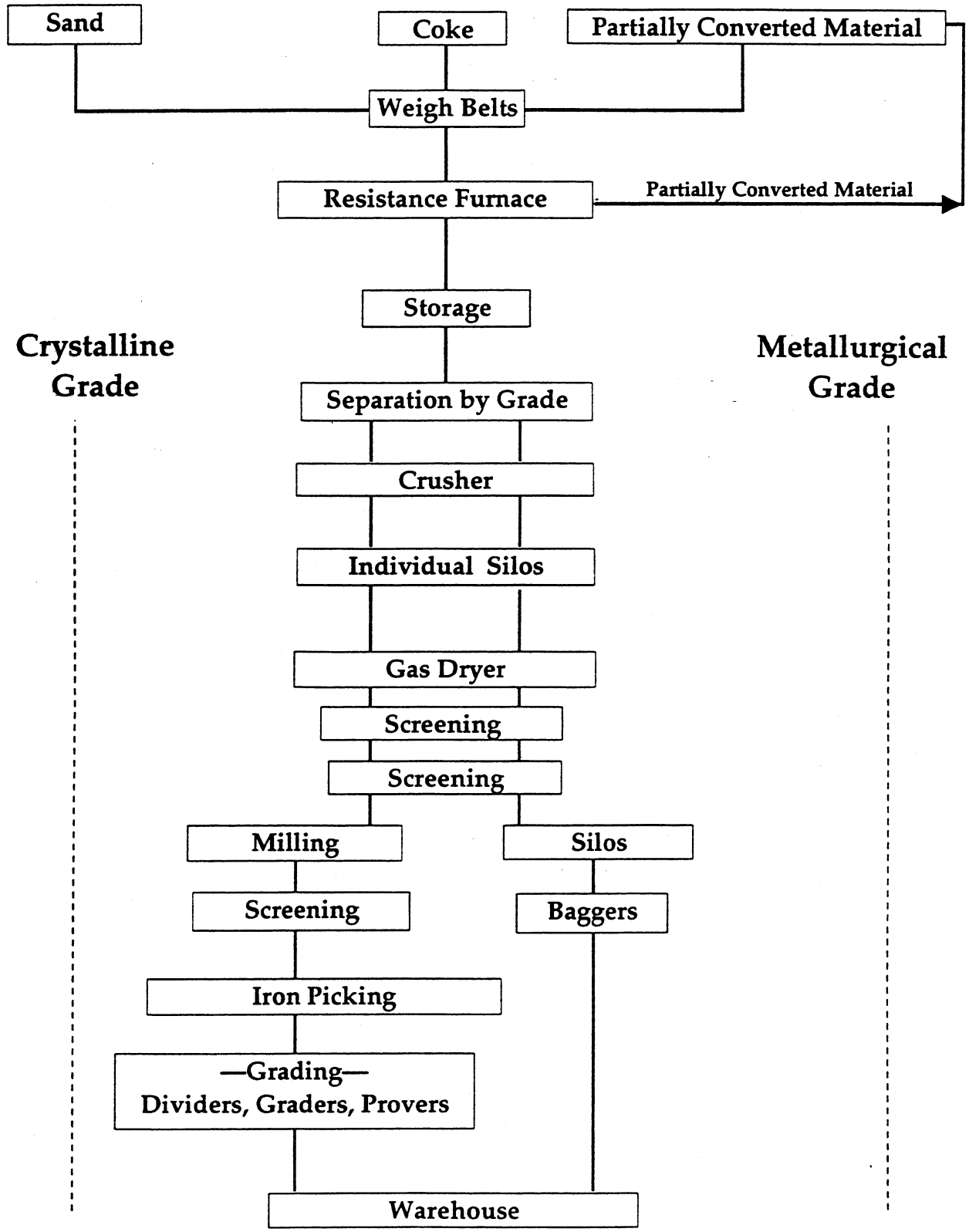
[18] Respondents allege that because the Chinese use anthracite coal rather than petroleum coke as a raw material, they are only able to produce silicon carbon for metallurgical applications (respondents' postconference brief, p. 52).

Figure 1
Silicon Carbide Manufacturing Process Flow



Source: Counsel for petitioners.

U.S. Tariff Treatment

U.S. imports of crude silicon carbide from countries entitled to the column 1-general (most-favored-nation) duty rate, including China, enter free of duty; crude silicon carbide enters under subheading 2849.20.10[19] of the HTS. The column 1-general duty rate for U.S. imports of granular, ground, pulverized, or refined silicon carbide is 0.7 cents per kilogram; refined silicon carbide enters under subheading 2849.20.20 of the HTS. The column 2 rate of duty for crude silicon carbide is also free; that for refined silicon carbide is 2.2 cents per kilogram, and is applicable to imports from those countries specified in general note 3(b) to the HTS.[20]

THE NATURE AND EXTENT OF ALLEGED SALES AT LTFV

The petitioners contend that because China is a nonmarket economy, Commerce must select a surrogate country to value the factors of production and arrive at a foreign market value. Petitioners used India as a surrogate country in their aalysis of foreign market value and used Customs unit value data as the appropriate U.S. price. The resulting price comparison yielded an alleged dumping margin of 268 percent.[21]

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[19] This subheading includes the subject silicon carbide as well as other nonsubject specialty silicon carbides discussed above.

[20] According to Joe DeMaria, National Import Specialist, U.S. Customs Service, imports of silicon carbide briquettes would not be classified under HTS heading 2849. He believes that silicon carbide briquettes would be classified under HTS heading 3823, "prepared binders for foundry molds or cores; chemical products and preparations of the chemical or allied industries (including those consisting of mixtures of natural products), not elsewhere specified or included; residual products of the chemical or allied industries, not elsewhere specified or included." Mr. DeMaria also opined, based on Customs rulings for other products, that imports of granular silicon carbide with an SiC content of less than 65 percent, by weight, would not be classified with other silicon carbide in HTS heading 2849. Customs, however, has not issued a ruling nor been asked to make a ruling on the matter. Customs has also never issued a ruling, nor been asked to, on the difference between crude and refined silicon carbide (telephone interviews, July 21 and 22, 1993). An importer confirmed that its imports of silicon carbide with an SiC content of 40 percent, by weight, were classified in HTS heading 2849.20.10 along with its higher SiC content imports (telephone interview with *** July 21, 1993).

[21] On July 9, 1993, petitioners submitted an amendment to the petition in response to a request from Commerce to use U.S. factors of production in calculating the foreign market value. Based on U.S. factors of production, petitioners arrived at alleged dumping margins ranging from 136 percent to 406 percent, with an average of *** percent.

THE U.S. MARKET

Channels of Distribution

The majority of crude and refined silicon carbide is sold directly to end users. The following tabulation presents data from Commission questionnaires on shipments of crude silicon carbide and refined silicon carbide to distributors and end users during 1992 (in short tons):

Item	Distributors		End users	
	Related	Unrelated	Related[1]	Unrelated
Crude silicon carbide:				
U.S.-produced . . .	***	***	***	***
Imported from China	0	***	0	***
Refined silicon carbide:				
U.S.-produced . . .	0	***	***	33,804
Imported from China	0	0	0	0

[1] Excludes product that was consumed internally in the production of other products.

During the period for which data were gathered in this investigation, roughly *** of U.S.-produced crude silicon carbide was sold in packaged form (table 1); the remainder was sold in bulk form. A majority of U.S.-produced refined silicon carbide is sold in packaged form. Packaged shipments accounted for approximately *** percent of U.S. shipments of crude silicon carbide from China in 1992; down from *** percent in 1990. In 1990, *** percent of U.S. shipments of refined silicon carbide from China were in packaged form; in 1991, *** percent were in bulk form.

Table 1
Silicon carbide: Packaged and bulk shipments[1] of U.S. producers and importers of product from China, by forms, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

[1] Company transfers (excluding internal consumption) and domestic shipments.

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

Federal Government Sales of Strategic Reserves

The Defense National Stockpile Center (DNSC), a defense-related program, stockpiles strategic commodities, including silicon carbide. Purchases of silicon carbide for the DNSC ceased about 1956. Periodically, the DNSC sells silicon carbide from its reserves. The amount to be sold is set by a Market Impact Committee, which requires that sales not have an impact on the market. As of December 31, 1992, 40,924 short tons of silicon carbide were held by the DNSC. During 1992, the DNSC sold 250 short tons of silicon carbide. In 1993, sales are expected to amount to about 4,250 short tons.[22] Staff requested detailed information from the DNSC on its inventories and sales of the government's strategic reserves of silicon carbide; this information is presented in appendix F.

Apparent U.S. Consumption

Table 2 presents apparent U.S. consumption of crude and refined silicon carbide. Table 3 presents apparent U.S. consumption of crude and refined silicon carbide by grades. Data on internal consumption of silicon carbide, by grades, were not requested; therefore, data on producers' U.S. shipments and apparent consumption reported in table 3 are less than those reported in table 2, which includes internal consumption.

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[22] Letter from Marilyn S. Barnett, Administrator, Defense National Stockpile Center to Brian Walters, Office of Investigations, U.S. International Trade Commission, July 29, 1993.

Table 2
Silicon carbide: U.S. shipments of domestic product, U.S. imports, and apparent U.S. consumption, by forms, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	Jan.-Mar.-- 1993
	Quantity (short tons)				
Crude silicon carbide:					
Producers' U.S. shipments	***	***	***	***	***
U.S. imports from--					
China	11,848	15,950	40,425	***	***
Other sources	74,343	48,263	49,647	***	***
Total	86,191	64,213	90,072	11,442	10,694
Apparent consumption	***	***	***	***	***
Refined silicon carbide:					
Producers' U.S. shipments	60,505	50,610	48,834	12,924	12,855
U.S. imports from--					
China	***	***	***	0	0
Other sources	***	***	***	***	***
Total	***	***	***	***	***
Apparent consumption	***	***	***	***	***
	Value (1,000 dollars)				
Crude silicon carbide:					
Producers' U.S. shipments	***	***	***	***	***
U.S. imports from--					
China	3,835	4,720	9,171	***	***
Other sources	41,548	27,310	28,307	***	***
Total	45,383	32,030	37,478	6,409	5,895
Apparent consumption	***	***	***	***	***
Refined silicon carbide:					
Producers' U.S. shipments	54,843	47,770	44,626	11,710	11,224
U.S. imports from--					
China	***	***	***	0	0
Other sources	***	***	***	***	***
Total	***	***	***	***	***
Apparent consumption	***	***	***	***	***

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

Table 3
Silicon carbide: U.S. shipments of domestic product, U.S. imports, and apparent U.S. consumption, by forms and by grades, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

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

U.S. Producers

As noted above, three firms compose the petitioning coalition; Exolon-ESK Co. (Exolon), General Abrasives Treibacher, Inc. (GAT), and Saint-Gobain/Norton Industrial Ceramics Corp. (Saint-Gobain). Five other firms produce silicon carbide in the United States. Producers' and importers' questionnaires were sent to the eight known producers of silicon carbide, as defined by the petition; responses were received from all eight.[23]

Exolon is the only U.S. producer of crude silicon carbide; it also produces refined silicon carbide. All other U.S. producers are processors/refiners. That is, they only produce refined silicon carbide products from crude silicon carbide that is imported directly by the producer or purchased from a U.S. importer, from Exolon, or from government stockpiles.

* * * * * * *

The Carborundum Co. (Carborundum) is ***.

Detroit Abrasives Co., Chelsea, MI, produces ***.

Electro Abrasives Corp., Buffalo, NY, ***.

Washington Mills Electro Minerals Corp. (Washington Mills), Niagara Falls, NY, produces ***.

Minnesota Mining and Manufacturing Co. (3M) produces ***.

The names, plant locations, grades produced, and shares of reported 1992 U.S. production of refined silicon carbide are presented in the following tabulation:

[23] In their postconference brief, respondents submitted a list of 15 companies that are believed to produce briquetted silicon carbide products for the iron and steel industry (see respondents' postconference brief, exhibit 2). Due to the lateness of the argument to include briquetters in the U.S. industry, producers' questionnaires were only served on a limited number of these companies. Three firms, accounting for roughly *** percent of estimated U.S. briquette shipments in 1992, provided the Commission with partially usable data on their briquetting operations (see app. D).

Firm	Location	Grade(s) produced	Share of 1992 U.S. production of refined silicon carbide[1] (percent)
Petitioning Coalition:			
Exolon	Tonawanda, NY	***[2]	***
GAT	Niagara Falls, NY	***	***
Saint-Gobain	Worcester, MA	***	***
Other producers:			
Carborundum[3]	Keasbey, NJ	***	***
Detroit Abrasives[3]	Chelsea, MI	***	***
Electro Abrasives[4]	Buffalo, NY	***	***
3M[5]	St. Paul, MN	***	***
Washington Mills[6]	Niagara Falls, NY	***[7]	***

[1] All grades of silicon carbide. Due to rounding, percentages do not add to 100.0.
[2] ***.
[3] ***.
[4] ***.
[5] ***.
[6] ***.
[7] ***.

U.S. Importers

The Commission mailed importers' questionnaires to the 8 U.S. producers and 12 U.S. importers[24] of silicon carbide from China identified by petitioners, and to 12 companies which the Customs Net Importer File identified as importers of silicon carbide from China but which were not identified by petitioners.[25] Eleven firms, which staff believes accounted for virtually all U.S. imports of crude and refined silicon carbide from China, returned completed importers' questionnaires.[26] Three additional firms provided data in their importers' questionnaire response; however, upon closer examination they were found not to be the importer of record.[27] Six of the 24 firms believed to import product from China responded to the Commission's importers' questionnaire indicating that they did not import silicon carbide from any country during the period covered by the investigation. Four firms did not respond to the questionnaire.[28]

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[24] Petitioners identified another company, TS & JL International, which they believe imports silicon carbide from China; however, neither they, nor the staff, were able to locate a telephone number or address for the company.

[25] Importers' questionnaires were also sent to 18 firms which the Customs Net Importer File identified as importers of more than $100,000 of silicon carbide from countries other than China.

[26] These firms are: ***. Although two U.S. producers reported having "purchased" silicon carbide from China, none was the importer of record for the merchandise. For information on U.S. producers' imports, and purchases from importers, U.S. producers, and other U.S. sources, see section of the report entitled "U.S. Producers' Imports and Purchases."

[27] These firms were ***. Two of these firms, *** and ***, are ***.

[28] The Commission was unable to obtain a telephone number for one of these firms. The importers' questionnaire, which was sent by regular mail, was returned to the Commission by the postal service as undeliverable.

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

Given that crude silicon carbide is an intermediate material used in the production of refined silicon carbide and other products, data on consumption, production, capacity, and capacity utilization must be evaluated separately for crude silicon carbide and refined silicon carbide to avoid double counting or other aberrations. The data in the following sections exclude U.S. production of refined silicon carbide that may occur during the production of silicon carbide briquettes. As mentioned above, summary data on U.S. production of silicon carbide briquettes are presented in appendix D.

U.S. Production, Capacity, and Capacity Utilization

Table 4 details capacity and production of crude and refined silicon carbide. As noted above, Exolon is the only U.S. producer of crude silicon carbide. During 1990-92, Exolon's crude operations ran at between *** and *** percent capacity utilization.[29] Capacity utilization for crude silicon carbide production ***. Exolon ***.[30] Imports of crude silicon carbide are necessary to supply domestic producers' refining operations.

U.S. production of refined silicon carbide fell from 66,387 short tons in 1990 to 53,806 short tons in 1991, or by 19 percent. In 1992, production of refined silicon carbide increased to 54,219 short tons, or by less than 1 percent from the level attained in 1991. During January-March 1993, production fell to 14,557 short tons from 15,818 short tons during the corresponding period of 1992, representing a decrease of 8 percent. During the period for which data were gathered, no U.S. producer experienced any plant closures due to equipment failures or material shortages.[31]

During 1990-91, capacity to produce refined silicon carbide increased slightly from 117,145 short tons to 117,615 short tons, or by less than 1 percent. Capacity remained constant in 1992 and between the interim periods. Refined silicon carbide capacity utilization fell from 56.7 percent in 1990 to 45.7 percent in 1991 before increasing to 46.1 percent in 1992. Capacity utilization fell during the interim periods, from 53.8 percent to 49.5 percent.

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[29] Capacity is based on operating *** hours per day, *** days per week, *** weeks per year.

[30] During 1990-92, Exolon's refining operations consumed roughly *** of its crude production. Its refining operations, ***, operated at between *** and *** percent of capacity during 1990-92.

[31] ***.

Table 4
Silicon carbide: U.S. capacity, production, and capacity utilization, by forms, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	Jan.-Mar.-- 1993
	Average-of-period capacity (short tons)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide[1]	117,145	117,615	117,615	29,394	29,394
	Production (short tons)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide[2]	66,387	53,806	54,219	15,818	14,557
	Average-of-period capacity utilization (percent)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide[3]	56.7	45.7	46.1	53.8	49.5

[1] During 1990-92, the average-of-period capacity of those producers that produce only crystalline grade silicon carbide was ***, ***, and *** short tons, respectively. During January-March 1992 and 1993, such capacity was *** short tons.

[2] During 1990-92, production by those producers that produce only crystalline grade silicon carbide was ***, ***, and *** short tons, respectively. During January-March 1992 and 1993, such production was *** and *** short tons, respectively.

[3] During 1990-92, average-of-period capacity utilization of those producers that produce only crystalline grade silicon carbide was ***, ***, and *** percent, respectively. During January-March 1992 and 1993, such capacity utilization was *** and *** percent, respectively.

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

U.S. Producers' Shipments

Exolon's domestic shipments of crude silicon carbide, excluding any product that was consumed internally in the production of refined silicon carbide and/or other products, *** (table 5).

The total quantity of U.S. shipments of refined silicon carbide fell from 60,505 short tons in 1990 to 48,834 short tons in 1992, or by 19 percent. During January-March 1993, the quantity of U.S. shipments fell by less than 1 percent compared with that of the corresponding period of 1992. The value of U.S. shipments of refined silicon carbide fell by 19 percent from 1990 to 1992. During January-March 1993, the value of U.S. shipments fell by 4 percent compared with those of the corresponding period of 1992. The unit value of U.S. shipments of refined silicon carbide increased from $906.42 per short ton in 1990 to $943.88 per short ton in 1991, or by 4 percent. In 1992, the unit value of U.S. shipments of refined silicon carbide fell to $913.83 per short ton, or by 3 percent from the 1991 level. The unit value continued to decline during the interim periods, falling to $873.12 per short ton during January-March 1993, the lowest level during the period covered by the Commission's data.

Table 5
Silicon carbide: Shipments by U.S. producers, by forms and by types of shipments, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
	Quantity (short tons)				
Crude silicon carbide:					
Company transfers[1]	***	***	***	***	***
Domestic shipments	***	***	***	***	***
Subtotal	***	***	***	***	***
Exports	***	***	***	***	***
Total	***	***	***	***	***
Refined silicon carbide:					
Company transfers[1]	14,326	11,586	11,087	2,996	***
Domestic shipments	46,179	39,024	37,747	9,928	***
Subtotal	60,505	50,610	48,834	12,924	12,855
Exports	5,435	4,171	4,338	1,252	1,719
Total	65,940	54,781	53,172	14,176	14,574
	Value (1,000 dollars)				
Crude silicon carbide:					
Company transfers[1] [2]	***	***	***	***	***
Domestic shipments	***	***	***	***	***
Subtotal	***	***	***	***	***
Exports	***	***	***	***	***
Total	***	***	***	***	***
Refined silicon carbide:					
Company transfers[1]	14,014	12,249	11,541	3,044	***
Domestic shipments	40,829	35,521	33,085	8,666	***
Subtotal	54,843	47,770	44,626	11,710	11,224
Exports	5,443	4,407	4,467	1,393	1,680
Total	60,286	52,177	49,093	13,103	12,904
	Unit value (per short ton)				
Crude silicon carbide:					
Company transfers[1]	$***	$***	$***	$***	$***
Domestic shipments	***	***	***	***	***
Subtotal	***	***	***	***	***
Exports	***	***	***	***	***
Total	***	***	***	***	***
Refined silicon carbide:					
Company transfers[1]	978	1,057	1,041	1,016	***
Domestic shipments	884	910	876	873	***
Average	906	944	914	906	873
Exports	1,001	1,057	1,030	1,113	977
Average	914	952	923	924	885

[1] Includes product which was consumed internally by U.S. producers in the production of other products.
[2] ***.

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

Exports of refined silicon carbide fell irregularly by 20 percent during 1990-92, before increasing by 37 percent during the interim periods. The unit value of exports was consistently above that for U.S. shipments. Canada was named as the single most important export market, followed by ***, ***, and ***.

All U.S. producers/processors of silicon carbide produced refined crystalline grade silicon carbide.[32] During the period covered by the Commission's investigation, only ***, ***, and *** produced refined metallurgical grade silicon carbide.[33] ***. Table 6 provides data on U.S. producers' shipments of silicon carbide by forms and by grades. As noted above, data on internal consumption of silicon carbide, by grades, were not requested; therefore, data on producers' shipments by grades reported in table 6 are less than those reported in table 5, which includes internal consumption.

Table 6
Silicon carbide: U.S. shipments[1] of U.S. producers, by forms and by grades, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

[1] Excludes "company transfers" of product which was consumed internally by U.S. producers in the production of other products. Includes company transfers that were made to related U.S. companies.

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

U.S. Producers' Imports and Purchases

All of the responding producers of silicon carbide reported purchases of crude and/or refined silicon carbide from domestic and/or foreign sources. This is necessitated by the fact that there is only one U.S. producer of crude silicon carbide, whose U.S. capacity to produce crude is insufficient to supply its refining operations and those of other U.S. producers/processors. Data on U.S. producers' imports and purchases of silicon carbide are presented in table 7.

* * * * * * *

[32] Because the production of crude silicon carbide yields both metallurgical and crystalline grade product, Exolon, the only U.S. producer of crude material, also produces crude metallurgical grade product. Roughly *** of Exolon's production and shipments of crude product were metallurgical grade.

[33] ***.

Table 7
Silicon carbide: U.S. producers' imports and purchases, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

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

U.S. Producers' Inventories

The level of end-of-period inventories of crude silicon carbide held by Exolon *** (table 8). As of March 31, 1993, inventories of crude were ***.

Inventories of refined silicon carbide fell by nearly 11 percent from 1990 to 1991, before increasing in 1992 to a level near that reported in 1990. As of March 31, 1993, inventories of refined silicon carbide were about 6 percent lower than those reported as of the corresponding time in 1992.

Table 8
Silicon carbide: End-of-period inventories of U.S. producers, by forms, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
	Quantity (short tons)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide[1]	9,262	8,287	9,284	9,879	9,267
	Ratio to production (percent)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	14.0	15.4	17.1	15.6	15.9
	Ratio to total shipments (percent)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	14.0	15.1	17.5	17.4	15.9

[1] During 1990-92, end-of-period inventories held by those producers that produce only crystalline grade silicon carbide were ***, ***, and *** short tons, respectively. During January-March 1992 and 1993, these inventories were *** and *** short tons, respectively.

Note.--Ratios are calculated using data of firms supplying both numerator and denominator information. Part-year inventory ratios are annualized.

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

U.S. Producers' Employment

The number of production and related workers (PRWs) employed by Exolon in the production of crude silicon carbide *** (table 9). Hours worked by such workers ***. During 1990-92, wages and total compensation paid to PRWs producing crude silicon carbide ***. During the interim periods, wages and total compensation ***. Hourly total compensation paid followed a similar trend. During 1990-92, unit labor costs involved in producing crude silicon carbide ***. Productivity ***.

During 1990-92, the number of PRWs and the corresponding hours worked in the production of refined silicon carbide declined by 16 percent and 7 percent, respectively. Wages paid fell by 1 percent and total compensation paid increased by 2 percent during the same period. During the interim periods, the number of PRWs fell by 3 percent and the corresponding hours worked and wages and total compensation fell between 8 and 9 percent each. Productivity of workers producing refined silicon carbide fell by 12 percent during 1990-92, and fell by 1 percent during the interim periods. Conversely, unit labor costs increased by 24 percent during 1990-92 and increased by 1 percent during the interim periods.

Because Exolon produces crude and refined silicon carbide at different locations (Hennepin, IL, and Tonawanda, NY, respectively), different PRWs are used to produce these forms of silicon carbide. Although ***.

In its questionnaire, the Commission requested U.S. producers to provide detailed information concerning reductions in the number of PRWs producing silicon carbide during January 1990-March 1993, if such reductions involved at least 5 percent of the workforce, or 50 workers. ***, ***, and *** were the only producers reporting any such reductions. Such reductions are shown in the following tabulation:

Firm	Date of reduction	Number of workers	Duration	Reason(s)
*	*	*	*	*	*	*

Table 9
Average number of production and related workers (PRWs) in U.S. establishments wherein silicon carbide is produced, hours worked,[1] wages and total compensation paid to such employees, and hourly compensation, productivity, and unit production costs,[2] by forms, 1990-92, January-March 1992, and January-March 1993[3]

Item	1990	1991	1992	Jan.-Mar.-- 1992	Jan.-Mar.-- 1993
	Number of production and related workers (PRWs)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide[4]	121	114	102	102	99
	Hours worked by PRWs (1,000 hours)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	205	187	191	50	46
	Wages paid to PRWs (1,000 dollars)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	3,416	3,206	3,393	894	818
	Total compensation paid to PRWs (1,000 dollars)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	4,640	4,389	4,751	1,225	1,132
	Hourly total compensation paid to PRWs				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	$20.72	$21.30	$22.42	$21.04	$22.37
	Productivity (short tons per 1,000 hours)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	269.5	240.9	237.9	272.1	270.1
	Unit labor costs (per short ton)				
Crude silicon carbide	***	***	***	***	***
Refined silicon carbide	$75	$86	$93	$82	$83

[1] Includes hours worked plus hours of paid leave time.
[2] On the basis of total compensation paid.
[3] *** producers, accounting for *** percent of 1992 production of refined silicon carbide, provided data on the number of PRWs, and wages and total compensation paid to PRWs. *** producers, accounting for approximately *** percent of 1992 production of refined silicon carbide, provided data on the number of hours worked by PRWs.
[4] During 1990-92, the number of PRWs employed by those producers that produce only crystalline grade silicon carbide was ***, ***, and ***, respectively. During January-March 1992 and 1993, the number of these PRWs was *** and ***, respectively.

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

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

Financial Experience of U.S. Producers

*** producers of refined silicon carbide, ***, supplied usable financial data[34] on overall establishment operations and operations on refined silicon carbide. These producers represented approximately *** percent of U.S. production of refined silicon carbide in 1992. Exolon, the only U.S. crude producer, also provided financial data on crude silicon carbide.

* * * * * * *

Overall Establishment Operations

Income-and-loss data on the overall establishment operations of the U.S. producers are shown in table 10. Refined silicon carbide[35] accounted for approximately 27 percent of the overall establishment operations in 1992.[36]

Operations on Refined Silicon Carbide

The refined silicon carbide operations of the U.S. producers responding to the Commission questionnaires are shown in table 11. Net sales decreased from $49.8 million in 1990 to $44.6 million in 1991 and to $43.1 million in 1992. As indicated in table 12, the per-short-ton average sales value increased from $856 in 1990 to $890 in 1991 and then decreased to $876 in 1992. The net sales value decreased from $11.6 million in January-March 1992 to $11.3 million in the comparable period of 1993, based on lower per-unit net sales values and higher sales volume.

The companies realized combined operating income in each period; however, the operating income margin decreased in each comparative period, from 9.3 percent in 1990 to 6.9 percent in 1991 and 5.7 percent in 1992. The operating income margin decreased from 7.0 percent in interim 1992 to 0.9 percent in interim 1993.

As shown in table 13, *** were the only companies realizing an operating income in all periods. The other companies incurred an operating loss in at least one period. ***.

---

[34] ***.

[35] ***.

[36] *** of the producers also produce aluminum oxide. Aluminum oxide accounted for approximately *** percent of the combined overall establishment operations in 1992.

Table 10
Income-and-loss experience of U.S. producers on the overall operations of their establishments wherein silicon carbide is produced, fiscal years 1990-92, January-March 1992, and January-March 1993[1]

Item	1990	1991	1992	January-March-- 1992	1993
	Value (1,000 dollars)				
Net sales	166,765	153,147	161,139	40,752	41,608
Cost of goods sold	140,688	135,485	142,064	35,388	36,653
Gross profit	26,077	17,662	19,075	5,364	4,955
Selling, general, and administrative expenses	13,241	13,027	11,565	2,937	2,972
Operating income	12,836	4,635	7,510	2,427	1,983
Interest expense	***	***	***	***	***
Other expense, net	***	***	***	***	***
Net income before income taxes	***	***	***	***	***
Depreciation and amortization	***	***	***	***	***
Cash flow[2]	***	***	***	***	***
	Ratio to net sales (percent)				
Cost of goods sold	84.4	88.5	88.2	86.8	88.1
Gross profit	15.6	11.5	11.8	13.2	11.9
Selling, general, and administrative expenses	7.9	8.5	7.2	7.2	7.1
Operating income	7.7	3.0	4.7	6.0	4.8
Net income before income taxes	***	***	***	***	***
	Number of firms reporting				
Operating losses	***	***	***	***	***
Net losses	***	***	***	***	***
Data	***	***	***	***	***

[1] The producers are ***.
[2] Cash flow is defined as net income or loss plus depreciation and amortization.

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

Table 11
Income-and-loss experience of U.S. producers on their operations producing refined silicon carbide, fiscal years 1990-92, January-March 1992, and January-March 1993[1]

Item	1990	1991	1992	January-March-- 1992	1993
	Value (1,000 dollars)				
Net sales:					
Trade sales	***	***	***	***	***
Company transfers	***	***	***	***	***
Total net sales	49,832	44,616	43,054	11,551	11,300
Cost of goods sold	41,045	37,267	36,675	9,747	10,174
Gross profit	8,787	7,349	6,379	1,804	1,126
Selling, general, and administrative expenses	4,148	4,261	3,945	999	1,022
Operating income	4,639	3,088	2,434	805	104
Interest expense	***	***	***	***	***
Other expense, net	***	***	***	***	***
Net income before income taxes	***	***	***	***	***
Depreciation and amortization	***	***	***	***	***
Cash flow[2]	***	***	***	***	***
	Ratio to net sales (percent)				
Cost of goods sold	82.4	83.5	85.2	84.4	90.0
Gross profit	17.6	16.5	14.8	15.6	10.0
Selling, general, and administrative expenses	8.3	9.6	9.2	8.6	9.0
Operating income	9.3	6.9	5.7	7.0	0.9
Net income before income taxes	***	***	***	***	***
	Number of firms reporting				
Operating losses	***	***	***	***	***
Net losses	***	***	***	***	***
Data	***	***	***	***	***

[1] The producers are ***.
[2] Cash flow is defined as net income or loss plus depreciation and amortization.

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

Table 12
Income-and-loss experience (on a per-short-ton basis)[1] of U.S. producers on their operations producing refined silicon carbide, fiscal years 1990-92, January-March 1992, and January-March 1993[2]

Item	1990	1991	1992	January-March-- 1992	1993
	Quantity (short tons)				
Net sales:					
Trade sales	***	***	***	***	***
Company transfers	***	***	***	***	***
Total net sales	49,715	42,126	41,812	11,335	11,527
	Value (per short ton)				
Net sales:					
Trade sales	$***	$***	$***	$***	$***
Company transfers[3]	***	***	***	***	***
Total net sales	856	890	876	873	845
Cost of goods sold	709	746	753	741	767
Gross profit	148	144	124	133	78
Selling, general, and administrative expenses	71	89	77	73	72
Operating income	77	55	47	60	6

[1] The per-short-ton analysis is subject to the effects of the mix of metallurgical and crystalline grades of refined silicon carbide.

[2] The producers are ***. *** did not provide quantities. *** was unable to provide a detail of cost of goods sold for all periods. A detailed comparative analysis of direct material, direct labor, and factory overhead is not presented because it would not include ***, which accounted for *** percent of 1992 net sales.

[3] ***.

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

Table 13
Income-and-loss experience of U.S. producers on their operations producing refined silicon carbide, by firms, fiscal years 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	January-March-- 1992	1993

* * * * * * *

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

The value added for fabrication costs and selling, general, and administrative expenses (SG&A) as a percent of total cost for the producers of refined silicon carbide is shown in the following tabulation for 1992. The data presented are in dollars per short ton except for ***, which is in thousands of dollars, except as noted.

* * * * * * *

The value added by fabrication costs as a share of total cost ranged from *** percent for *** to *** percent for ***. The value added by fabrication costs and SG&A as a share of total cost ranged from *** percent for *** to *** percent for ***.

Operations of the Producers That Only Produce Refined Crystalline Grade Silicon Carbide

*** of the reporting producers produce only the crystalline grade of refined silicon carbide. Summary financial data are presented in table 13A.

Table 13A
Income-and-loss experience of the U.S. producers that produce only crystalline grade refined silicon carbide, by firms, fiscal years 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	January-March-- 1992	1993
*	*	*	*	*	*

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

Operations of the Producers That Produce Both Refined Metallurgical and Crystalline Grades of Silicon Carbide

*** of the reporting companies produce both the metallurgical and crystalline grades of refined silicon carbide. Summary financial data are presented in table 13B.

Table 13B
Income-and-loss experience of the U.S. producers that produce both the metallurgical and crystalline grades of refined silicon carbide, by firms, fiscal years 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	January-March-- 1992	1993
*	*	*	*	*	*

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

Operations on Crude Silicon Carbide

The crude silicon carbide operations of Exolon, the only U.S. producer, are shown in table 14. Net sales value ***. As shown in table 15, the per-short-ton average sales value ***.

Table 14
Income-and-loss experience of Exolon on its operations producing crude silicon carbide, fiscal years 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	January-March-- 1992	1993
*	*	*	*	*	*

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

Table 15
Income-and-loss experience (on a per-short-ton basis) of Exolon on its operations producing crude silicon carbide, fiscal years 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	January-March-- 1992	1993
*	*	*	*	*	*

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

Summary financial data are presented in the following tabulation (in thousands of dollars, except as noted) for Exolon's trade only[37] sales of crude silicon carbide. The operating income margins for the trade sales were ***.

Item	1990	1991	1992	Jan.-Mar.-- 1991	1992
* *	*	*	*	*	

Investment in Productive Facilities and Return on Assets

Data on investment in productive facilities and return on assets are shown in table 16 for overall establishment, refined silicon carbide, and crude silicon carbide operations.

Capital Expenditures

The capital expenditures of the U.S. silicon carbide producers are shown in table 17. Capital expenditures for crude and refined silicon carbide decreased from 1990 to 1991 and then increased in 1992. The trends were mixed for the interim periods, with capital expenditures for crude decreasing while those for refined increased.

[37] The costs for trade sales only were computed using the average per ton cost for direct material, direct labor, other factory costs, and selling, general, and administrative expenses. Product mix may have an effect on this computation.

Table 16
Value of assets and return on assets of U.S. producers' operations producing silicon carbide, fiscal years 1990-92, January-March 1992, and January-March 1993[1]

Item	As of the end of fiscal year-- 1990	1991	1992
	Value (1,000 dollars)		
All products:			
Fixed assets:			
Original cost	39,058	38,404	41,318
Book value	19,489	20,398	20,417
Total assets[2]	145,913	140,785	151,058
Crude silicon carbide:			
Fixed assets:			
Original cost	***	***	***
Book value	***	***	***
Total assets[3]	***	***	***
Refined silicon carbide:			
Fixed assets:			
Original cost	9,005	6,887	7,430
Book value	2,986	2,948	2,964
Total assets[3]	27,853	18,704	20,118
	Return on total assets (percent)[4]		
All products:			
Operating return[5]	7.4	6.5	5.9
Net return[6]	***	***	***
Crude silicon carbide:			
Operating return[5]	***	***	***
Net return[6]	***	***	***
Refined silicon carbide:			
Operating return[5]	16.3	16.6	15.6
Net return[6]	***	***	***

[1] The producers are ***. *** did not provide data on its investment in productive facilities.

[2] Defined as book value of fixed assets plus current and noncurrent assets.

[3] Total establishment assets are apportioned, by firm, to product groups on the basis of the ratios of the respective book values of fixed assets.

[4] Computed using data from only those firms supplying both asset and income-and-loss information and, as such, may not be derivable from data presented.

[5] Defined as operating income or loss divided by asset value.

[6] Defined as net income or loss divided by asset value.

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

Table 17
Capital expenditures by U.S. producers of silicon carbide, by products, fiscal years 1990-92, January-March 1992, and January-March 1993[1]

(1,000 dollars)

Item	1990	1991	1992	January-March-- 1992	January-March-- 1993
*	*	*	*	*	*	*

[1] The producers are ***. *** did not provide capital expenditures. *** did not provide capital expenditures for the interim periods.

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

Research and Development Expenses

The research and development expenditures of the responding producers are shown in table 18. Research and development increased in each comparative period for crude silicon carbide while the trends for refined silicon carbide were mixed, decreasing from 1990 to 1991 and then increasing in 1992, but remaining below the level of 1990. Research and development for refined silicon carbide decreased in interim 1993 compared to interim 1992.

Table 18
Research and development expenses of U.S. producers of silicon carbide, by products, fiscal years 1990-92, January-March 1992, and January-March 1993[1]

(In thousands of dollars)

Item	1990	1991	1992	January-March-- 1992	January-March-- 1993
*	*	*	*	*	*	*

[1] The producers are ***. *** responded that research and development is minor and is not tracked separately in their accounting systems.

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

Capital and Investment

The Commission requested the U.S. producers to describe any actual or potential negative effects of imports of silicon carbide from China on their growth, development and production efforts, investment, and ability to raise capital (including efforts to develop a derivative or improved version of its product). Comments from the companies are presented in appendix G.

CONSIDERATION OF THE QUESTION OF THREAT OF MATERIAL INJURY

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

> In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of the merchandise, the Commission shall consider, among other relevant economic factors[38]--
>
> (I) If a subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the subsidy is an export subsidy inconsistent with the Agreement),
>
> (II) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports of the merchandise to the United States,
>
> (III) any rapid increase in United States market penetration and the likelihood that the penetration will increase to an injurious level,
>
> (IV) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices of the merchandise,
>
> (V) any substantial increase in inventories of the merchandise in the United States,
>
> (VI) the presence of underutilized capacity for producing the merchandise in the exporting country,
>
> (VII) any other demonstrable adverse trends that indicate the probability that the importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of actual injury,

---

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

> (VIII) the potential for product-shifting if production facilities owned or controlled by the foreign manufacturers, which can be used to produce products subject to investigation(s) under section 701 or 731 or to final orders under section 706 or 736, are also used to produce the merchandise under investigation,
>
> (IX) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both), and
>
> (X) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the like product.[39]

Subsidies (item (I)) and agricultural products (item (IX)) are not issues in this investigation; information on the volume, U.S. market penetration, and pricing of imports of the subject merchandise (items (III) and (IV) above) is presented in the section entitled "Consideration of the Causal Relationship Between Imports of the Subject Merchandise and the Alleged Material Injury;" and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts (item (X)) is presented in the section entitled "Consideration of Alleged Material Injury to an Industry in the United States." Available information on U.S. inventories of the subject products (item (V)); foreign producers' operations, including the potential for "product-shifting" (items (II), (VI), and (VIII) above); any other threat indicators, if applicable (item (VII) above); and any dumping in third-country markets, follows.

U.S. Importers' Inventories

Table 19 presents data on U.S. importers' inventories of crude and refined silicon carbide from China and from other sources.

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

Table 19
Silicon carbide: End-of-period inventories of U.S. importers, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar. 1992	Jan.-Mar. 1993
	Quantity (short tons)				
Crude silicon carbide:					
China[1]	7,188	10,704	13,328	***	***
Other sources	3,030	2,977	6,681	***	***
Total	10,218	13,681	20,009	7,773	9,706
Refined silicon carbide:					
China[2]	0	***	***	***	***
Other sources	***	***	***	***	***
Total	***	***	***	***	***
	Ratio to imports (percent)				
Crude silicon carbide:					
China	60.7	67.1	33.0	***	***
Other sources	4.1	6.2	13.2	***	***
Average	11.9	21.3	22.1	16.1	22.7
Refined silicon carbide:					
China	0	***	***	(3)	(3)
Other sources	***	***	***	***	***
Average	***	***	***	***	***

[1] During 1990-92, end-of-period inventories held by those importers that import only metallurgical grade silicon carbide from China were ***, ***, and *** short tons, respectively. During January-March 1992 and 1993, these inventories were *** and *** short tons, respectively.

[2] During 1990-92, refined metallurgical grade silicon carbide accounted for virtually all refined imports from China.

[3] Not applicable. There were no imports reported for the January-March periods.

Note.--Ratios are calculated using data of firms supplying both numerator and denominator information. Part-year inventory ratios are annualized.

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

Ability of Foreign Producers to Generate Exports and the Availability of Export Markets Other Than the United States

According to petitioners there may be over 80 producers of silicon carbide in China; the petition named 19 companies that it believes are the major producers.[40] Counsel for respondents, which are all importers of Chinese product, provided the Commission with information on the industry in China. There were several sources of data, with differing degrees of coverage and completeness. The data with the broadest coverage were provided by the China Chamber of Commerce for Import and Export of Machinery and Electronics (China Chamber of Commerce) and MOFFERT. The data, which are for crude silicon carbide, are presented in the following tabulation (in short tons, except as noted):[41]

	1990	1991	1992
Production	308,644	264,552	286,598
Capacity	330,690	308,644	308,644
Capacity utilization (percent)	93.3	85.7	92.9
Domestic demand	143,299	154,322	176,368
Exports to--			
United States	***	***	36,376
Europe	***	***	43,210
Japan	***	***	25,463
All destinations	***	***	116,844
Exports to the United States as a share of production (percent)	***	***	12.7
Exports to Europe as a share of production (percent)	***	***	15.1
Exports to Japan as a share of production (percent)	***	***	8.9
Domestic demand as a share of production (percent)	46.4	58.3	61.5

These data show that during 1990-92, production fell irregularly by 7 percent. In 1991, capacity fell by 7 percent compared with the year-earlier level; it then remained constant in 1992. Capacity utilization fell between 1990 and 1991, before increasing in 1992 to 92.9 percent, a level slightly less than that reported in 1990. In 1992, exports to the two top export destinations, the European Community (EC)[42] and the United States, accounted for 37 and 31 percent of total exports, respectively.

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[40] Petition, pp. 12 and 13.

[41] Respondents' postconference brief, exhibit 10.

[42] There is an antidumping investigation pending in the EC against silicon carbide from China (foreign producers' questionnaire responses of the China Abrasives Export Corp. and the China National Minerals Import and Export Corp., p. 3). At the time this report was prepared, the EC had not yet issued a decision with respect to its antidumping investigation.

Respondents provided the Commission with similar data from two other sources, the China Abrasives Export Corp. and the China National Minerals Import and Export Corp, which are Chinese foreign trading companies. These data, however, represent only a limited number of Chinese factories (accounting for less than 25 percent of 1992 industry-wide production as reported by the China Chamber of Commerce), and are therefore not presented here.[43] The Chinese trading companies indicated that the producers from whom they purchase silicon carbide produce only crude silicon carbide for metallurgical applications.[44] They also reported that some producers have reduced production because of rising electricity costs.[45] In fact, the China Chamber of Commerce reported that during the first half of 1993, electricity costs have increased 30 percent compared with those in 1992.[46] According to the China Chamber of Commerce, this is important because "China is gradually turning to market economy [sic]; individual entities, therefore, have to be responsible for their own market and profitability."[47] Both groups of Chinese respondents indicated that, as a result of the increasing energy costs, production is expected to decline. The China Chamber of Commerce also reported that domestic demand has been "substantially increasing."[48]

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

U.S. Imports

As noted above, because Exolon, the only U.S. producer of crude silicon carbide, does not have sufficient capacity to supply the refining operations of other U.S. producers/refiners, imports of crude silicon carbide are necessary.

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[43] According to respondents, there are about 100 silicon carbide factories in China. These factories consist of "small collectives and village workshops located in southcentral, northwest, and southwest part of China where water and electricity are relatively sufficient" (respondents' postconference brief, exhibit 10).

[44] Foreign producers' questionnaire responses of the China Abrasives Export Corp. and the China National Minerals Import and Export Corp., p. 2. Respondents allege that because the Chinese use coal rather than petroleum coke as a raw material, they are only able to produce silicon carbon for metallurgical applications (respondents' postconference brief, p. 52).

[45] Ibid, p. 3.

[46] Respondents' postconference brief, exhibit 10.

[47] Ibid.

[48] Ibid (also see tabulation above). It reported that the use of silicon carbide by the Chinese in non-abrasive applications has been increasing at an annual rate of about 8 percent since the early 1980s. These applications include fire-resistant materials and deoxidizers. Silicon carbide has replaced silicon metal in many of these applications because of its low cost. Ibid.

During the course of the investigation, it was determined that there were errors in the official import statistics of the Department of Commerce. Table 20 presents import data, by forms and by sources, as submitted in response to questionnaires. There were no imports of specialty silicon carbide from China reported by U.S. importers.

Respondents allege that 90 percent of imports from China are of crude silicon carbide for the metallurgical briquette market.[49] Table 21 presents import data, by forms, by grades, and by sources, as submitted in response to questionnaires. Official import statistics are reported in appendix H.

In its questionnaire, the Commission asked U.S. importers whether they had imported, or arranged for the importation of, silicon carbide from China for delivery after March 31, 1993 (the end of the period covered by the Commission's questionnaires), and to provide information on any such imports or orders. The following tabulation presents data gathered in response to that question:

Firm	Date(s)	Quantity (Short tons)	SiC content and form
* * * * * * *			
Total		43,775	

These data show that if all of the above imports and expected deliveries of silicon carbide are imported, imports of crude and refined silicon carbide from China in calendar year 1993 will reach at least *** short tons, or a level roughly *** percent above that attained in 1992.

[49] Respondents' postconference brief, p. 3, and exhibits 5 and 6.

Table 20
Silicon carbide: U.S. imports, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
	Quantity (short tons)				
Crude silicon carbide:					
China	11,848	15,950	40,425	***	***
Other sources	74,343	48,263	49,647	***	***
Total	86,191	64,213	90,072	11,442	10,694
Refined silicon carbide:					
China	***	***	***	0	0
Other sources	***	***	***	***	***
Total	***	***	***	***	***
	Value (1,000 dollars)				
Crude silicon carbide:					
China	3,835	4,720	9,171	***	***
Other sources	41,548	27,310	28,307	***	***
Total	45,383	32,030	37,478	6,409	5,895
Refined silicon carbide:					
China	***	***	***	0	0
Other sources	***	***	***	***	***
Total	***	***	***	***	***
	Unit value (per short ton)				
Crude silicon carbide:					
China	$324	$296	$227	$***	$***
Other sources	559	566	570	***	***
Average	527	499	416	560	551
Refined silicon carbide:					
China	***	***	***	(1)	(1)
Other sources	***	***	***	***	***
Average	***	***	***	***	***

[1] Not applicable.

Note.--Unit values are calculated using data of firms supplying both quantity and value information.

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

Table 21
Silicon carbide: U.S. imports, by forms, by grades, and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

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

U.S. Market Shares

Market shares of silicon carbide, by forms and by sources, are presented in table 22.[50] Market shares of silicon carbide, by forms, by grades, and by sources, are presented in table 23. As noted above, data on internal consumption of silicon carbide, by grades, were not requested. Therefore, market share data reported in table 23 will not correspond to those reported in table 22, which includes internal consumption.

Table 22
Silicon carbide: U.S. market shares, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

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

Table 23
Silicon carbide: U.S. market shares, by forms, by grades, and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

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

[50] Consumption and market shares using official import statistics are presented in app. I.

Prices

Market Characteristics

Since silicon carbide is an intermediate product used principally for applications in the abrasive and refractory industries and as an deoxidizing agent in the iron foundry industry, its demand depends upon the demand for products produced by those industries. Questionnaire responses from some producers and importers indicate that the overall demand for silicon carbide in these industries has declined since 1990 as a result of the general weakness in the U.S. economy.

Silicon carbide competes with a variety of substitute products for sales in its major markets. Ferrosilicon is an important substitute for silicon carbide in metallurgical applications. In some cases, particularly foundry uses, ferrosilicon and silicon carbide compete directly on the basis of price.[51] In the abrasive market, aluminum oxide, diamonds, garnet, emery, and aluminum zirconia are all potential substitutes in some applications. In the refractory market, clays, calcined bauxite, kaolin, fireclay, fused bauxite, chromite, and magnesite are all potential substitutes.

Opinions differ concerning the extent of substitutability between domestically produced and imported silicon carbide from China. Although the majority of questionnaire respondents consider the products to be completely interchangeable in use, some producers and importers regard the Chinese product as inferior. Problems cited included high impurity levels and a lack of toughness and bulk density.

U.S. producers and importers market both crude and refined silicon carbide in the United States. Producers' sales consist primarily of refined products, since Exolon is the only domestic producer of crude silicon carbide. The largest share of imports from China consists of crude silicon carbide, although refined silicon carbide from China is also sold in the United States.

Refined silicon carbide is sold to distributors and end users for further manufacture into other commodities such as grinding wheels, coated abrasives, and refractory products.[52] It is also sold to other companies that convert it into abrasive and refractory products and then sell it to end users. The largest share of metallurgical grade crude silicon carbide is sold directly to the iron foundry industry or to companies that produce briquettes for use in the iron foundries, and smaller amounts have applications in the refractory industry.

Silicon carbide is commonly marketed on either a spot basis or a contract basis by producers and importers. Questionnaire responses indicate

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[51] Gordon Austin, a silicon carbide analyst with the U.S. Bureau of Mines, said that silicon carbide and ferrosilicon are close substitutes in foundry applications. However, in the case of advanced steel products, ferrosilicon is generally preferred. Mr. Austin said that declining ferrosilicon prices in recent years have exerted downward pressure on silicon carbide prices (telephone interview, July 15, 1993). Domestic price data in Ferrosilicon from the People's Republic of China, Investigation No. 731-TA-567 (Final), USITC Pub. 2606, March 1993, show that the price of ferrosilicon declined sharply from 1989 through the first 3 quarters of 1992 (pp. I-58-I-67).

[52] Petition, p. 11.

that over half of all sales by producers are on a contract basis. Contract sales as a share of total sales ranged from a low of *** percent for *** to a high of *** percent for ***. Contracts reported by producers are commonly 1 year in duration, with prices, and in some cases quantities, fixed during the period. In contrast, imports of silicon carbide from China are more commonly sold on a spot basis than on a contract basis. The contracts reported in importers' questionnaires were for periods of only 4 months.

Domestic producers most commonly quote prices on an f.o.b. plant basis with the customer paying the transportation charges. An exception is ***, which commonly quotes prices on a delivered basis. Policies vary widely among importers. Some importers regularly quote prices on an f.o.b. warehouse basis while others quote delivered prices. In still other cases, the method of quoting depends upon the preference of the customer. Most of the producers reported that they publish list prices, but all indicated that they commonly depart from the list prices when negotiating for a sale. In contrast to the domestic producers, none of the importers reported publishing price lists.

Producers and importers both generally consider inland transportation costs to be an important consideration in customer sourcing decisions. Estimates of typical costs ranged widely from about 2 percent of the delivered price to as much as 10 percent. Silicon carbide is shipped by train or truck in bulk or in a variety of different containers including drums, paper bags, supersacks, and plastic pails. Some suppliers allow the supersacks and drums to be returned for a credit, but company policies vary. While the largest share of domestically produced silicon carbide is shipped in some form of container, imports from China are more commonly shipped in a bulk form. Silicon carbide is commonly sold by producers and importers in all areas of the United States. The majority of silicon carbide is shipped distances of 100 miles or more from a producers' storage facilities.[53] Shipments of distances of more than 500 miles are common.

The average lead time between a customer's order and the date of delivery is significantly shorter for U.S. producers than for importers of silicon carbide from China. Lead times reported by producers ranged from 1 to 3 days to as much as 2 weeks. In contrast, most importers reported lead times ranging from 2 to 4 months.[54]

Questionnaire Price Data

Prices of silicon carbide vary depending upon the grade and degree of refining; with higher prices associated with the more refined products.[55] Price data were requested for five separate categories of silicon carbide. The categories specified below are commonly used in foundry, abrasive, and refractory applications. For each of the products, producers and importers were asked to provide prices on their largest sales in each quarter and total quantities and total values shipped in all quarters during January 1990-March 1993. Requests for data were also broken down further between bulk shipments

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[53] Reported shipments by importers were commonly less than 100 miles.

[54] One importer, ***, reported that the lead time for delivery of imported silicon carbide from China ranged from 1 week to 3 months. All other importers reported lead times of at least 2 months. Four months was most common.

[55] Petition, p. 11.

and shipments in containers, and between different customer categories, including distributors, end users, and converters. The product categories were--

Product 1: Metallurgical grade silicon carbide containing 88-90 percent silicon carbide (for foundry applications),

Product 2: Abrasive grain silicon carbide containing 96-98 percent silicon carbide with a grit size of 24,

Product 3: Silicon carbide containing 90 percent or more silicon carbide with a grit size of 8/F (for refractory applications),

Product 4: Crude silicon carbide containing 97 percent silicon carbide, and

Product 5: Metallurgical grade silicon carbide containing 45 percent silicon carbide (for foundry applications).

Five U.S. producers and six importers provided varied amounts of useable price information. The producers that provided price data accounted for nearly 90 percent of U.S. production of refined silicon carbide in 1992. *** was able to provide largely complete data for all products during the period for which data were requested, and other producers were able to provide complete data for some product categories. However, the importer price data were extremely limited, consisting mainly of data for product 1. In some cases, questionnaire respondents reported imports and sales of silicon carbide from China that did not fit into the five specified product categories.

Price Trends

Quarterly prices for the period January 1990-March 1993, are presented in tables 24 and 25. Domestic price data were available for all five products, but a quarterly price series on imports from China was only available for product 1. In all cases the prices shown are for sales to end users and the data reflect sales in containers rather than bulk shipments. Prices of products 1-4 were reported on an f.o.b. basis and prices of product 5 were reported on a delivered basis.

The data show that the prices of product 1 declined significantly during the January 1990-March 1993 period, while prices of the other products did not show a clear trend. The price of domestic product 1 declined irregularly from a high of $*** per short ton in the third quarter of 1990 to a low of $*** per short ton in the first quarter of 1993. The price of Chinese product 1 fluctuated widely throughout most of the 11 quarters for which data were available. It decreased sharply from over $*** per short ton in the first half of 1990 to significantly lower levels during the following 2 years. Domestic prices of products 2, 4, and 5 all fluctuated significantly during the 13 quarters for which data were available, with no evident trend. The price of product 3 remained at $*** per pound throughout 1990-92 and then declined to $*** per pound in the first quarter of 1993.

Table 24
Weighted-average net f.o.b. prices of product 1 reported by U.S. producers and importers, margins of underselling (overselling), and total shipments, by quarters, January 1990-March 1993

Period	United States Price	United States Quantity	China Price	China Quantity	Margin
	*	*	*	*	*

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

Table 25
Weighted-average prices of products 2, 3, 4, and 5 reported by U.S. producers, by quarters, January 1990-March 1993

Period	Product 2	Product 3	Product 4	Product 5
	*	*	*	*

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

Price Comparisons

The price of product 1 from China was below the domestic price in all 11 quarters in which comparisons were possible, by margins ranging from *** to *** percent. Additional data for bulk shipments of product 1 (not shown in the tables) also indicate that import prices of product 1 have tended to be lower, although direct price comparisons on sales to the same classes of customers were not possible. ***.

In contrast to product 1, the small amount of data available for product 4 indicate that the prices of imports from China have been higher than domestic prices. ***

Exchange Rates

The value of China's currency is determined by the Chinese Government rather than the free market. Therefore, an accurate description of movements in the Chinese exchange rate cannot be provided.

Lost Sales and Lost Revenues

Four U.S. producers provided 15 allegations of lost sales and 15 allegations of lost revenues relating to imports of silicon carbide from China during January 1990-March 1993. The lost sales allegations involved over 11,000 short tons of silicon carbide valued at more than $7 million, and the lost revenue allegations involved nearly 28,000 short tons and totaled over $300,000. The staff investigated seven of the lost sales allegations and two of the lost revenue allegations.

* * * * * * *

APPENDIX A

FEDERAL REGISTER NOTICES

[Investigation No. 731-TA-651 (Preliminary)]

Silicon Carbide From the People's Republic of China

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-651 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. 1673b(a)) to determine whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from the People's Republic of China of silicon carbide, whether or not chemically defined, and whether crude, in grains, or ground, pulverized or refined, provided for in subheadings 2849.20.10 and 2849.20.20 of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value. The Commission must complete preliminary antidumping investigations in 45 days, or in this case by August 5, 1993.

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: June 21, 1993.

FOR FURTHER INFORMATION CONTACT: Brian Walters (202-205-3198), 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.

SUPPLEMENTARY INFORMATION:

Background

This investigation is being instituted in response to a petition filed on June 21, 1993, by the Ad Hoc Silicon Carbide Coalition, Washington, DC.

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 §§ 201.11 and 207.10 of the Commission's rules, not later than seven (7) 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 § 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 application is made not later than seven (7) 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 July 12, 1993, at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC. Parties wishing to participate in the conference should contact Brian Walters (202-205-3198) not later than July 8, 1993, 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 §§ 201.8 and 207.15 of the Commission's rules, any person may submit to the Commission on or before July 15, 1993, 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 (3) days before the conference. If briefs or written testimony contain BPI, they must conform with the requirements of §§ 201.6, 207.3, and 207.7 of the Commission's rules.

In accordance with §§ 201.16(c) and 207.3 of the rules, each document filed by a party to the 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 the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.12 of the Commission's rules.

Issued: June 25, 1993.

By order of the Commission.

Paul R. Bardos,

Acting Secretary.

[FR Doc. 93-15424 Filed 6-29-93; 8:45 am]

BILLING CODE 7020-02-P

International Trade Administration

[A-570-824]

Initiation of Antidumping Duty Investigation: Silicon Carbide from the People's Republic of China

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

EFFECTIVE DATE: July 16, 1993.

FOR FURTHER INFORMATION CONTACT: Andrew McGilvray or Steve Alley, Office of Antidumping Investigations, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, NW., Washington, DC 20230; telephone (202) 482-0108 and 482-5288, respectively.

INITIATION OF INVESTIGATION:

The Petition

On June 21, 1993, we received a petition filed in proper form by the Ad Hoc Silicon Carbide Coalition (petitioner). Petitioner filed supplements to the petition on July 6 and July 9, 1993. In accordance with 19 CFR 353.12, petitioner alleges that silicon carbide from the People's Republic of China (PRC) is being, or is likely to be, sold in the United States at less than fair value within the meaning of section 731 of the Tariff Act of 1930, as amended (the Act), and that these imports are materially injuring, or threaten material injury to, a U.S. industry.

Petitioner has stated that it has standing to file the petition because it is an interested party, as defined under section 771(9)(C) of the Act, and because the petition was filed on behalf of the U.S. industry producing the product subject to this investigation. If any interested party, as described under paragraphs (C), (D), (E) or (F) of section 771(9) of the Act, wishes to register support for, or opposition to, this petition, it should file a written notification with the Assistant Secretary for Import Administration.

Scope of Investigation

Merchandise covered by this investigation is silicon carbide, regardless of grade or form, containing by weight from 20 to 98 percent, inclusive, silicon carbide and with a grain size coarser than size 325F (as set by the American National Standards Institute), and inclusive of split sizes. Silicon carbide covered by this investigation typically contains additional impurities: iron, aluminum, silica, silicon, and carbon as well as calcium and magnesium. Silicon carbide is provided for in subheadings 2849.20.10.10 and 2849.20.20.20 of the Harmonized Tariff Schedule (HTS). The HTS numbers are provided for convenience and customs purposes. The written description remains dispositive.

United States Price and Foreign Market Value

Petitioner based its estimate of United States Price (USP) on delivered price quotes from a Chinese exporter. Petitioner adjusted the quoted price for ocean freight.

Petitioner calculated foreign market value (FMV) by using factors of production based on the experience of one of the petitioning companies, and supported the use of these factors by stating that the Chinese industry uses essentially the same technology and factor inputs as the U.S. industry. Petitioner furnished values for those factors in India, a country which petitioner states is appropriate as a surrogate for the PRC under the Department's methodology for non-market economies. Petitioner inflated the Indian values using IMF-sourced inflation rates, to take into account input price differences between the time period of the U.S. price quotes and the time period of the supplied factor values.

Dumping margins alleged by petitioner range from 136.00 to 406.00 percent.

Initiation of Investigation

We have examined the petition on silicon carbide from the PRC and have found that it meets the requirements of section 732(b) of the Act. Therefore, we are initiating an antidumping duty investigation to determine whether imports of silicon carbide from the PRC are being, or are likely to be, sold in the United States at less than fair value.

Preliminary Determination by the International Trade Commission

The International Trade Commission (ITC) will determine by August 5, 1993, whether there is a reasonable indication that imports of silicon carbide from the PRC are materially injuring, or threaten 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.

This notice is published pursuant to section 732(c)(2) of the Act and 19 CFR 353.13(b).

Dated: July 12, 1993.

Joseph A. Spetrini,

Acting Assistant Secretary for Import Administration.

[FR Doc. 93-16958 Filed 7-15-93; 8:45 am]

BILLING CODE 3510-DS-P

APPENDIX B

CALENDAR OF PUBLIC CONFERENCE

CALENDAR OF PUBLIC CONFERENCE

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

Subject	:	SILICON CARBIDE FROM THE PEOPLE'S REPUBLIC OF CHINA
Inv. No.	:	731-TA-651 (Preliminary)
Date and Time	:	July 12, 1993 - 9:30 a.m.

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

In Support of Imposition of Antidumping Duties:

Baker & Hostetler
Washington, DC
On behalf of

Ad Hoc Silicon Carbide Coalition

Hans Pfingstl, President and Chief Executive Officer, Exolon-Esk Co.

Dr. Herwig Winkler, President, General Abrasives Treibacher, Inc.

John Crowe, Business Director, Saint-Gobain/Norton Industrial Ceramics Corp.

Roger Hickey, Law & Economics Consulting Group

John Davitt, Law & Economics Consulting Group

Shirley A. Coffield)
John C. Lindsey) --OF COUNSEL

In Opposition to the Imposition of
Antidumping Duties:

Miller, Canfield, Paddock and Stone
Washington, DC
On behalf of

Burrell Industries, Wheeling, WV

Derek Raphael, Sheffield, England

Minmetals, Inc, Leonia, NJ

Transtech, Inc, Wenonah, NJ

Chuck Knapp, Vice President, United Metallurgical, Inc.

Terry Kelly, Manager of Alloys, R.I. Lampus Co.

John Adcock, Product Manager, Miller & Co.

John Barney, President, Transtech, Inc.

Mr. Shi Xiaoqi, Sales Manager, Minmetals, Inc.

Sudhir Gupta, Manager of Material Processing, Miller & Co.

William E. Perry
Terry X. Gao
)--OF COUNSEL

APPENDIX C

SUMMARY DATA TABLES

Table C-1
Crude silicon carbide: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are short ton, period changes=percent, except where noted)

Item	Reported data			Jan.-Mar.--		Period changes			
	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	Jan.-Mar. 1992-93
U.S. consumption quantity:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share 1/	***	***	***	***	***	***	***	***	***
Importers' share: 1/									
China	***	***	***	***	***	***	***	***	***
Other sources	***	***	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share 1/	***	***	***	***	***	***	***	***	***
Importers' share: 1/									
China	***	***	***	***	***	***	***	***	***
Other sources	***	***	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***	***	***
U.S. importers' imports from--									
China:									
Imports quantity	11,848	15,950	40,425	***	***	+241.2	+34.6	+153.4	***
Imports value	3,835	4,720	9,171	***	***	+139.1	+23.1	+94.3	***
Unit value	$324	$296	$227	$***	$***	-29.9	-8.6	-23.3	***
Ending inventory qty	7,188	10,704	13,328	***	***	+85.4	+48.9	+24.5	***
Other sources:									
Imports quantity	74,343	48,263	49,647	***	***	-33.2	-35.1	+2.9	***
Imports value	41,548	27,310	28,307	***	***	-31.9	-34.3	+3.7	***
Unit value	$559	$566	$570	$***	$***	+2.0	+1.3	+0.8	***
Ending inventory qty	3,030	2,977	6,681	***	***	+120.5	-1.7	+124.4	***
All sources:									
Imports quantity	86,191	64,213	90,072	11,442	10,694	+4.5	-25.5	+40.3	-6.5
Imports value	45,383	32,030	37,478	6,409	5,895	-17.4	-29.4	+17.0	-8.0
Unit value	$527	$499	$416	$560	$551	-21.0	-5.3	-16.6	-1.6
U.S. producers'--									
Average capacity quantity	***	***	***	***	***	***	***	***	***
Production quantity	***	***	***	***	***	***	***	***	***
Capacity utilization 1/	***	***	***	***	***	***	***	***	***
U.S. shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	$***	$***	$***	$***	$***	***	***	***	***
Export shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Exports/shipments 1/	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	$***	$***	$***	$***	$***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Inventory/shipments 1/	***	***	***	***	***	***	***	***	***
Production workers	***	***	***	***	***	***	***	***	***
Hours worked (1,000s)	***	***	***	***	***	***	***	***	***
Total comp. ($1,000)	***	***	***	***	***	***	***	***	***
Hourly total compensation	$***	$***	$***	$***	$***	***	***	***	***
Productivity (short tons per 1,000 hours)	***	***	***	***	***	***	***	***	***
Unit labor costs	$***	$***	$***	$***	$***	***	***	***	***
Net sales--									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS)	***	***	***	***	***	***	***	***	***
Gross profit (loss)	***	***	***	***	***	***	***	***	***
SG&A expenses	***	***	***	***	***	***	***	***	***
Operating income (loss)	***	***	***	***	***	***	***	***	***
Capital expenditures	***	***	***	***	***	***	***	***	***
Unit COGS	$***	$***	$***	$***	$***	***	***	***	***
COGS/sales 1/	***	***	***	***	***	***	***	***	***
Op.income (loss)/sales 1/	***	***	***	***	***	***	***	***	***

1/ 'Reported data' are in percent and 'period changes' are in percentage-point.

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

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

Table C-2
Refined silicon carbide: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are short ton, period changes=percent, except where noted)

Item	Reported data			Jan.-Mar.--		Period changes			Jan.-Mar.
	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	1992-93
U.S. consumption quantity:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share 1/	***	***	***	***	***	***	***	***	***
Importers' share: 1/									
China	***	***	***	***	***	***	***	***	***
Other sources	***	***	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share 1/	***	***	***	***	***	***	***	***	***
Importers' share: 1/									
China	***	***	***	***	***	***	***	***	***
Other sources	***	***	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***	***	***
U.S. importers' imports from--									
China:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	$***	$***	$***	$***	$***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***	***	***	***
Other sources:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	$***	$***	$***	$***	$***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***	***	***	***
All sources:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	$***	$***	$***	$***	$***	***	***	***	***
U.S. producers'--									
Average capacity quantity	117,145	117,615	117,615	29,394	29,394	+0.4	+0.4	0	0
Production quantity	66,387	53,806	54,219	15,818	14,557	-18.3	-19.0	+0.8	-8.0
Capacity utilization 1/	56.7	45.7	46.1	53.8	49.5	-10.6	-10.9	+0.4	-4.3
U.S. shipments:									
Quantity	60,505	50,610	48,834	12,924	12,855	-19.3	-16.4	-3.5	-0.5
Value	54,843	47,770	44,626	11,710	11,224	-18.6	-12.9	-6.6	-4.2
Unit value	$906	$944	$914	$906	$873	+0.8	+4.1	-3.2	-3.6
Export shipments:									
Quantity	5,435	4,171	4,338	1,252	1,719	-20.2	-23.3	+4.0	+37.3
Exports/shipments 1/	8.2	7.6	8.2	8.8	11.8	-0.1	-0.6	+0.5	+3.0
Value	5,443	4,407	4,467	1,393	1,680	-17.9	-19.0	+1.4	+20.6
Unit value	$1,001	$1,057	$1,030	$1,113	$977	+2.8	+5.5	-2.5	-12.2
Ending inventory quantity	9,262	8,287	9,284	9,879	9,267	+0.2	-10.5	+12.0	-6.2
Inventory/shipments 1/	14.0	15.1	17.5	17.4	15.9	+3.4	+1.1	+2.3	-1.5
Production workers	121	114	102	102	99	-15.7	-5.8	-10.5	-2.9
Hours worked (1,000s)	205	187	191	50	46	-6.8	-8.8	+2.1	-8.0
Total comp. ($1,000)	4,640	4,389	4,751	1,225	1,132	+2.4	-5.4	+8.2	-7.6
Hourly total compensation	$20.72	$21.30	$22.42	$21.04	$22.37	+8.2	+2.8	+5.3	+6.3
Productivity (short tons per 1,000 hours)	269.5	240.9	237.9	272.1	270.1	-11.7	-10.6	-1.2	-0.7
Unit labor costs	$75	$86	$93	$82	$83	+24.1	+14.0	+8.9	+1.2
Net sales--									
Quantity	49,715	42,126	41,812	11,335	11,527	-15.9	-15.3	-0.7	+1.7
Value	49,832	44,616	43,054	11,551	11,300	-13.6	-10.5	-3.5	-2.2
Cost of goods sold (COGS)	41,045	37,267	36,675	9,747	10,174	-10.6	-9.2	-1.6	+4.4
Gross profit (loss)	8,787	7,349	6,379	1,804	1,126	-27.4	-16.4	-13.2	-37.6
SG&A expenses	4,148	4,261	3,945	999	1,022	-4.9	+2.7	-7.4	+2.3
Operating income (loss)	4,639	3,088	2,434	805	104	-47.5	-33.4	-21.2	-87.1
Capital expenditures	***	***	***	***	***	***	***	***	***
Unit COGS	$709	$746	$753	$741	$767	+6.2	+5.3	+0.9	+3.5
COGS/sales 1/	82.4	83.5	85.2	84.4	90.0	+2.8	+1.2	+1.7	+5.7
Op.income (loss)/sales 1/	9.3	6.9	5.7	7.0	0.9	-3.7	-2.4	-1.3	-6.0

1/ 'Reported data' are in percent and 'period changes' are in percentage-point.

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

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

APPENDIX D

SUMMARY DATA ON SILICON CARBIDE BRIQUETTE PRODUCTION

Table D-1
Silicon carbide briquettes: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

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

APPENDIX E

SUMMARY DATA ON SPECIALTY SILICON CARBIDE

Table E-1
Crude, micro-sized, silicon carbide containing by weight from 20 to 98 percent, inclusive, silicon carbide, with a grain size of 325 F or finer: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are short ton, period changes=percent, except where noted)

	Reported data					Period changes			
				Jan.-Mar.--					Jan.-Mar.
Item	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	1992-93
*	*	*	*	*	*	*			

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

Table E-2
Refined, coarse grain, high-purity speciality silicon carbide: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are short ton, period changes=percent, except where noted)

	Reported data					Period changes			
				Jan.-Mar.--					Jan.-Mar.
Item	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	1992-93
*	*	*	*	*	*	*			

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

Table E-3
Refined, micro-sized, high-purity speciality silicon carbide: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are short ton, period changes=percent, except where noted)

	Reported data					Period changes			
				Jan.-Mar.--					Jan.-Mar.
Item	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	1992-93
*	*	*	*	*	*	*			

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

Table E-4
Refined, micro-sized, silicon carbide containing by weight from 20 to 98 percent, inclusive, silicon carbide, with a grain size of 325 F or finer: Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are per short ton, period changes=percent, except where noted)

	Reported data					Period changes			
				Jan.-Mar.--					Jan.-Mar.
Item	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	1992-93
*	*	*	*	*	*	*			

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

Table E-5
Refined speciality silicon carbide (all types): Summary data concerning the U.S. market, 1990-92, January-March 1992, and January-March 1993

(Quantity=short tons, value=1,000 dollars, unit values, unit labor costs, and unit COGS are per short ton, period changes=percent, except where noted)

	Reported data					Period changes			
				Jan.-Mar.--					Jan.-Mar.
Item	1990	1991	1992	1992	1993	1990-92	1990-91	1991-92	1992-93
*	*	*	*	*	*	*			

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

APPENDIX F

INFORMATION ON THE DEFENSE NATIONAL STOCKPILE CENTER'S (DNSC) STRATEGIC RESERVES OF SILICON CARBIDE

Table F-1
Crude crystalline grade silicon carbide:[1] DNSC's inventories, purchases, and sales, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
Beginning-of-period inventories (short tons)	58,412	48,019	41,035	41,035	40,924
Purchases:[2]					
Quantity (short tons)	0	0	0	0	0
Value (1,000 dollars)	0	0	0	0	0
Sales:[3]					
Quantity (short tons)	10,200	6,825	250	0	1,000
Value (1,000 dollars)	4,871	2,120	99	0	395
Unit value (per short ton)	$478	$428	$395	([4])	$395
End-of-period inventories (short tons)	48,019	41,035	40,924	41,035	39,626

[1] The DNSC does not handle refined silicon carbide or metallurgical grade product. The remaining silicon carbide contains between 96.88 and 97.633 percent silicon carbide.

[2] The DNSC has not purchased silicon carbide since 1956. No further purchases are anticipated given that the existing material has been determined to be in excess of the government's requirements. The country of origin of DNSC's supply of silicon carbide is almost exclusively Canada, with a small amount from the British West Indies.

[3] Sales are made in bulk quantities. That is, they are not, in any way, packaged.

[4] Not applicable.

Source: U.S. Department of Defense, Defense Logistics Agency, Defense National Stockpile Center.

Prior to May 1992, sales of silicon carbide were made on a sealed bid basis. Thereafter, the method of sale was changed to a continuously open sales solicitation whereby offers may be made at any time if material is available for sale. Sales prices are based on an analysis of the current market prices for similar materials at the time of sale. According to the DNSC, "every effort is made to protect the Government against avoidable loss and attain the highest realistic price consistent with the market place."[1]

Detailed information on actual sales transactions of silicon carbide by the DNSC are provided below. Also attached is a letter from the DNSC to the Commission staff which contains background on DNSC's operations.

[1] DNSC's response to a Commission request for information, p. 2.

Exhibit B

	SILICON CARBIDE	DATE	Removal P	CONTRACTOR	Bart/Cash	CONTRACT	NUMBER	CODE	UNITS		UNIT PRICE	TOTAL VALUE	LOCATION
	1	1-Dec-89	26-Nov-90	Billiton Metals Inc.	Barter	DL-00-DS-(S)-	04006	Item #1	250.00	ST	$525.00	$131,250.00	Somerville, NJ
	2	27-Apr-90	22-Apr-91	Billiton Metals Inc.	Barter	DL-00-DS-(S)-	04029	Item #1	250.00	ST	$475.00	$118,750.00	Somerville, NJ
								Item #1	500.00	ST	$450.00	$225,000.00	$343,750.00
	3	26-Apr-90	21-Apr-91	Miller & Co.	Cash	DL-00-DS-(S)-	04030	Item #1	250.00	ST	$451.00	$112,750.00	Somerville, NJ
	4	29-Jun-90	24-Jun-91	General Motors Corp.	Cash	DL-00-DS-(S)-	04040	Item #1	500.00	ST	$471.50	$235,750.00	Somerville, NJ
	5	29-Jun-90	24-Jun-91	Miller & Co.	Cash	DL-00-DS-(S)-	04041	Item #1	1,000.00	ST	$472.50	$472,500.00	Somerville, NJ
								Item #1	275.00	ST	$465.00	$127,875.00	$600,375.00
	6	29-Jun-90	24-Jun-91	R. I. Lampus Co.	Cash	DL-00-DS-(S)-	04042	Item #1	225.00	ST	$481.00	$108,225.00	Somerville, NJ
	7	24-Jul-90	19-Jul-91	R. I. Lampus Co.	Cash	DL-00-DS-(S)-	04045	Item #1	225.00	ST	$474.00	$106,650.00	Somerville, NJ
	8	24-Jul-90	19-Jul-91	Elkem Metals Co.	Cash	DL-00-DS-(S)-	04046	Item #1	225.00	ST	$470.00	$105,750.00	Somerville, NJ
								Item #1	225.00	ST	$465.00	$104,625.00	$210,375.00
	9	17-Aug-90	12-Aug-91	Exolon-ESK Co.	Cash	DL-00-DS-(S)-	04050	Item #1	225.00	ST	$508.00	$114,300.00	Somerville, NJ
								1,000 ST	775.00	ST	$475.00	$368,125.00	$482,425.00
	10	17-Aug-90	12-Aug-91	R. I. Lampus Co.	Cash	DL-00-DS-(S)-	04051	Item #1	300	ST	$476.00	$142,800.00	Somerville, NJ
	11	25-Sep-90	20-Sep-91	Exolon-ESK Co.	Cash	DL-00-DS-(S)-	04053	Item #1	250	ST	$508.00	$127,000.00	Somerville, NJ
								Item #1	250	ST	$477.00	$119,250.00	$246,250.00
	12	25-Sep-90	20-Sep-91	R. I. Lampus Co.	Cash	DL-00-DS-(S)-	04054	Item #1	300	ST	$481.00	$144,300.00	Somerville, NJ
								Item #1	300	ST	$475.00	$142,500.00	$286,800.00
CY90= 10,200	13	25-Sep-90	20-Sep-91	Magnum Carbide, Inc.	Cash	DL-00-DS-(S)-	04055	Item #1	225	ST	$478.00	$107,550.00	Somerville, NJ
FY90= 6,775								Item #1	225	ST	$476.00	$107,100.00	$214,650.00
	1	19-Oct-90	14-Oct-91	R. I. Lampus Co.	Cash	DL-00-DS-(S)-	14001	Item #1	500	ST	$481.00	$240,500.00	Somerville, NJ
									500	ST	$480.00	$240,000.00	
									225	ST	$479.00	$107,775.00	
									225	ST	$478.00	$107,550.00	
								1612.5	162.5	ST	$477.00	$77,512.50	$773,337.50
	2	19-Oct-90	14-Oct-91	Magnum Carbide Inc.	Cash	DL-00-DS-(S)-	14002	Item #1	225.00	ST	$479.00	$107,775.00	Somerville, NJ
								387.50	162.50	ST	$477.00	$77,512.50	$185,287.50
	3	29-Nov-90	24-Nov-91	Exolon-ESK Co.	Cash	DL-00-DS-(S)-	14008	Item #1	250.00	ST	$502.00	$125,500.00	Somerville, NJ
									250.00	ST	$490.00	$122,500.00	
								1,000.00	500.00	ST	$485.00	$242,500.00	$490,500.00
	4	29-Nov-90	24-Nov-91	Magnum Carbide Inc.	Cash	DL-00-DS-(S)-	14012	Item #1	225.00	ST	$485.00	$109,125.00	Somerville, NJ
	5	26-Dec-90	21-Dec-91	Exolon-ESK Co.	Cash	DL-00-DS-(S)-	14015	Item #1	225.00	ST	$502.00	$112,950.00	Somerville, NJ
	6	26-Dec-90	21-Dec-91	Magnum Carbide Inc.	Cash	DL-00-DS-(S)-	14016	Item #1	225.00	ST	$485.00	$109,125.00	Somerville, NJ
	7	1-May-91	25-Apr-92	Burrell Industries, Inc.	Cash	DL-00-DS-(S)-	14034	Item #1	250.00	ST	$486.00	$121,500.00	Somerville, NJ
CY91= 6,825	8	2-Jul-91	26-Jun-92	Commodity Improvisors	Barter	DL-00-DS-(S)-	14047	Item #1	2,000.00	ST	$432.00	$864,000.00	Somerville, NJ
FY91= 6,500	9	29-Aug-91	23-Aug-92	Commodity Improvisors	Barter	DL-00-DS-(S)-	14055	Item #1	575.00	ST	$432.00	$248,400.00	Somerville, NJ
	1	27-Nov-91	21-Nov-92	Commodity Improvisors	Barter	DL-00-DS-(S)-	24006	Item #1	500.00	ST	$432.00	$216,000.00	Somerville, NJ
CY92= 250	2	26-Dec-91	20-Dec-92	Commodity Improvisors	Barter	DL-00-DS-(S)-	24008	Item #1	3,500.00	ST	$420.00	$1,470,000.00	Somerville, NJ
FY92= 4,250	3	10-Jul-92	5-Jul-93	Burrell Industries	Cash	DL-00-DS-(S)-	24050	Item #1	250.00	ST	$395.00	$98,750.00	Somerville, NJ
	1	3-Mar-93	26-Feb-94	O'Dell Construction	Barter	DL-00-DS-(S)-	31108	Item #1	1,000.00	ST	$395.00	$395,000.00	Somerville, NJ
	2	5-Apr-93	31-Mar-94	Miller and Company	Cash	DL-00-DS-(S)-	31132	Item #1	1,000.00	ST	$395.00	$395,000.00	Somerville, NJ
	3	14-Apr-93	9-Apr-94	United Metallurgical	Cash	DL-00-DS-(S)-	31140	Item #1	100.00	ST	$395.00	$39,500.00	Somerville, NJ
	4	3-May-93	28-Apr-94	Commodity Improvisors	Cash	DL-00-DS-(S)-	31174	Item #1	130.00	ST	$395.00	$51,350.00	Somerville, NJ
	5	6-May-93	1-May-94	General Abrasive	Cash	DL-00-DS-(S)-	31177	Item #1	500.00	ST	$395.00	$197,500.00	Somerville, NJ
	6	10-May-93	5-May-94	Commodity Improvisors	Cash	DL-00-DS-(S)-	31179	Item #1	640.00	ST	$396.00	$253,440.00	Somerville, NJ
CY93= 4,250	7	10-May-93	5-May-94	General Abrasive	Cash	DL-00-DS-(S)-	31178	Item #1	500.00	ST	$405.00	$202,500.00	Somerville, NJ
FY93= 4,250	8	10-May-93	1-Nov-94	R. I. Lampus	Cash	DL-00-DS-(S)-	31180	Item #1	380.00	ST	$396.00	$150,480.00	Somerville, NJ

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
1745 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VIRGINIA 22202

IN REPLY REFER TO DNSC-D

29 JUL 1993

Mr. Brian Walters
Office of Investigations
United States International Trade Commission
Room 615
500 E Street, SW
Washington, DC 20436

Dear Mr. Walters:

This is in response to your inquiry regarding the Defense National Stockpile Center's (DNSC) sales program for silicon carbide. The following is a brief description of the role of the DNSC in sales of silicon carbide. Detailed answers to your questions are set forth at Enclosure 1.

The Defense National Stockpile Center is a primary level field activity of the Defense Logistics Agency (DLA). DLA has been delegated the responsibility for managing the National Defense Stockpile. Under the Strategic and Critical Materials Stock Piling Act of 1946, as amended, the Department of Defense (DoD) maintains a stockpile of strategic and critical materials to sustain military, industrial and essential civilian needs. As those requirements change, DoD then computes the amounts of inventory that either do not meet or exceed the estimated requirements and determines the amount of materials needed to be purchased or that can be sold without disrupting material markets.

In accordance with the Stock Piling Act, DoD prepares and submits to Congress an Annual Materials Plan (AMP) detailing planned purchases and sales over the next fiscal year and the succeeding four fiscal years. The statute further requires DoD to avoid undue disruption of the usual markets of producers, processors, and consumers to the maximum extent feasible. Before submission to Congress, the AMP is referred to an interagency Market Impact Committee.

The Committee is co-chaired by the Departments of Commerce and State and includes representatives from the Departments of Agriculture, Energy, Interior, and Treasury. The Committee's responsibility is to advise the National Defense Stockpile Manager on the projected domestic and foreign economic effects of all acquisitions and disposals of materials from the stockpile that are included in the AMP.

In the event the Stockpile Manager proposes an action inconsistent with a recommendation of the Committee, the AMP must include a justification for that action.

The current AMP, including sales of silicon carbide determined to be excess to the needs of the Government, was approved by the Market Impact Committee. The Committee approved sales quantity of 8500 tons for fiscal year 1993. However, due to concerns expressed by industry representatives, including Exolon, this quantity was scaled back to 4250 tons to avoid undue market disruption. It should be pointed out, however, that other industry representatives have urged DNSC to increase the amount of silicon carbide being offered.

DNSC sales can be materially impacted by the actions of foreign governments and producers. In the event there is a determination that dumping has occurred, this would have a negative impact on the return that the U.S. taxpayers can expect to realize from the sale of the NDS stockpile of silicon carbide. Accordingly, we have a significant interest in the outcome of the current proceedings.

We appreciate the opportunity to present our views. If you have any additional questions, please contact Ms. Cheryl Deister, Chief, Disposal Division. She can be reached at (703) 607-3176.

Sincerely,

Marilyn S. Barnett

Encls

MARILYN S. BARNETT
Administrator

APPENDIX G

COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS OF SILICON CARBIDE FROM THE PEOPLE'S REPUBLIC OF CHINA ON THEIR GROWTH, INVESTMENT, ABILITY TO RAISE CAPITAL, AND/OR EXISTING DEVELOPMENT AND PRODUCTION EFFORTS

The Commission requested U.S. producers to describe any actual or anticipated negative effects of imports of silicon carbide from the People's Republic of China on their growth, investment, ability to raise capital, or existing development and production efforts, including efforts to develop a derivative or more advanced version of the product. Their responses are as follows:

Actual Negative Effects

* * * * * * *

Anticipated Negative Effects

* * * * * * *

Influence of Imports on Capital Investment

* * * * * * *

APPENDIX H

OFFICIAL IMPORT STATISTICS

Table H-1
Silicon carbide: U.S. imports, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
	Quantity (short tons)				
Crude silicon carbide:					
China	6,496	22,287	40,072	482	56
Brazil	1,865	6,265	5,463	1,209	813
Canada	64,002	41,036	44,043	10,111	9,372
Germany	142	52	94	83	23
Norway	261	14	487	0	21
Venezuela	0	1,414	1,503	0	545
Other sources	535	826	232	107	21
Total	73,300	71,893	91,894	11,992	10,853
Refined silicon carbide:					
China	2,250	349	17	0	0
Brazil	563	11	164	41	0
Canada	991	289	551	119	184
Germany	784	754	1,458	346	122
Norway	4,630	2,749	2,862	819	876
Venezuela	0	0	0	0	0
Other sources	861	994	1,284	254	173
Total	10,079	5,146	6,337	1,579	1,354
	Value (1,000 dollars)				
Crude silicon carbide:					
China	2,147	7,083	9,309	182	31
Brazil	991	3,401	2,573	669	514
Canada	35,323	23,095	24,140	5,611	5,291
Germany	312	98	302	282	75
Norway	91	53	345	0	58
Venezuela	0	561	641	0	223
Other sources	647	637	585	175	107
Total	39,510	34,929	37,894	6,918	6,298
Refined silicon carbide:					
China	1,171	170	15	0	0
Brazil	301	22	299	54	0
Canada	810	231	581	141	140
Germany	2,584	2,499	4,834	1,007	431
Norway	8,071	6,861	7,042	1,757	2,291
Venezuela	0	0	0	0	0
Other sources	2,595	3,418	2,937	596	612
Total	15,531	13,201	15,708	3,555	3,473

Table continued on next page.

Table H-1--Continued
Silicon carbide: U.S. imports, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	Jan.-Mar.-- 1993
	Unit value (per short ton)				
Crude silicon carbide:					
China	$331	$318	$232	$377	$547
Brazil	531	543	471	553	632
Canada	552	563	548	555	565
Germany	2,197	1,899	3,222	3,390	3,194
Norway	348	3,726	707	(1)	2,721
Venezuela	(1)	397	426	(1)	408
Other sources	1,210	772	2,519	1,639	5,038
Average	539	486	412	577	580
Refined silicon carbide:					
China	520	488	917	(1)	(1)
Brazil	534	1,996	1,818	1,328	(1)
Canada	817	799	1,054	1,178	760
Germany	3,295	3,315	3,315	2,913	3,541
Norway	1,743	2,495	2,461	2,144	2,615
Venezuela	(1)	(1)	(1)	(1)	(1)
Other sources	3,015	3,439	2,287	2,348	3,545
Average	1,541	2,565	2,479	2,251	2,565
	Share of total quantity (percent)				
Crude silicon carbide:					
China	8.9	31.0	43.6	4.0	0.5
Brazil	2.5	8.7	5.9	10.1	7.5
Canada	87.3	57.1	47.9	84.3	86.4
Germany	.2	.1	.1	.7	.2
Norway	.4	(2)	.5	0	.2
Venezuela	0	2.0	1.6	0	5.0
Other sources	.7	1.1	.3	.9	.2
Total	100.0	100.0	100.0	100.0	100.0
Refined silicon carbide:					
China	22.3	6.8	.3	0	0
Brazil	5.6	.2	2.6	2.6	0
Canada	9.8	5.6	8.7	7.6	13.6
Germany	7.8	14.6	23.0	21.9	9.0
Norway	45.9	53.4	45.2	51.9	64.7
Venezuela	0	0	0	0	0
Other sources	8.5	19.3	20.3	16.1	12.7
Total	100.0	100.0	100.0	100.0	100.0

See footnotes at end of table.

Table H-1--Continued
Silicon carbide: U.S. imports, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
	Share of total value (percent)				
Crude silicon carbide:					
China	5.4	20.3	24.6	2.6	0.5
Brazil	2.5	9.7	6.8	9.7	8.2
Canada	89.4	66.1	63.7	81.1	84.0
Germany	.8	.3	.8	4.1	1.2
Norway	.2	.2	.9	0	.9
Venezuela	0	1.6	1.7	0	3.5
Other sources	1.6	1.8	1.5	2.5	1.7
Total	100.0	100.0	100.0	100.0	100.0
Refined silicon carbide:					
China	7.5	1.3	.1	0	0
Brazil	1.9	.2	1.9	1.5	0
Canada	5.2	1.7	3.7	4.0	4.0
Germany	16.6	18.9	30.8	28.3	12.4
Norway	52.0	52.0	44.8	49.4	66.0
Venezuela	0	0	0	0	0
Other sources	16.7	25.9	18.7	16.8	17.6
Total	100.0	100.0	100.0	100.0	100.0

[1] Not applicable.
[2] Positive figure, but less than significant digits displayed.

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

Table H-2
Crude silicon carbide: U.S. imports from China, Brazil, Canada, Germany, Norway, Venezuela, and all other sources, by months, January 1990-March 1993

Year and month	Imports from-- China	Brazil	Canada	Germany	Norway	Venezuela	All other sources	All sources
	Quantity (short tons)							
1990:								
January	0	0	7,009	21	0	0	20	7,051
February	1,146	0	6,272	38	50	0	33	7,539
March	0	0	6,710	11	25	0	50	6,797
April	502	0	4,959	10	25	0	43	5,539
May	0	331	6,333	0	25	0	44	6,733
June	0	0	5,234	0	0	0	60	5,294
July	0	22	4,639	0	0	0	31	4,693
August	4,290	551	4,873	16	73	0	67	9,870
September	0	221	4,556	14	0	0	75	4,866
October	558	122	6,024	23	37	0	65	6,829
November	0	287	4,012	1	0	0	(1)	4,300
December	0	331	3,380	7	25	0	46	3,789
Total	6,496	1,865	64,002	142	261	0	535	73,300
1991:								
January	463	507	4,123	0	12	0	44	5,150
February	4,862	66	4,373	14	0	0	44	9,359
March	19	718	4,494	3	0	0	44	5,278
April	198	486	4,885	1	0	0	72	5,642
May	1,603	1,074	2,632	0	0	0	44	5,353
June	2,741	1,103	2,154	0	0	0	52	6,050
July	3,638	628	2,642	8	0	808	11	7,734
August	220	695	2,417	10	0	0	10	3,352
September	154	265	2,913	15	0	606	(1)	3,955
October	5,278	473	3,692	0	0	0	39	9,481
November	1,610	22	3,750	0	2	0	439	5,824
December	1,499	228	2,962	0	0	0	26	4,715
Total	22,287	6,265	41,036	52	14	1,414	826	71,893
1992:								
January	132	350	3,338	0	0	0	56	3,876
February	328	0	3,418	83	0	0	20	3,849
March	22	859	3,354	0	0	0	31	4,267
April	2,184	0	3,123	0	441	468	0	6,215
May	3,173	2,518	3,793	0	0	0	38	9,522
June	5,323	475	3,752	0	0	0	20	9,570
July	375	0	4,318	0	0	0	10	4,703
August	15,247	368	4,354	0	0	0	(1)	19,969
September	1,596	480	3,762	0	0	0	21	5,860
October	0	44	4,081	0	0	513	0	4,638
November	0	368	3,994	0	23	0	13	4,398
December	11,692	0	2,755	11	24	522	24	15,028
Total	40,072	5,463	44,043	94	487	1,503	232	91,894
1993:								
January	56	210	3,044	0	0	0	21	3,331
February	0	0	2,653	0	21	0	1	2,675
March	0	604	3,674	23	0	545	0	4,847
Total	56	813	9,372	23	21	545	21	10,853

See footnotes at end of table.

Table H-2--Continued
Crude silicon carbide: U.S. imports from China, Brazil, Canada, Germany, Norway, Venezuela, and all other sources, by months, January 1990-March 1993

Year and month	Imports from-- China	Brazil	Canada	Germany	Norway	Venezuela	All other sources	All sources
	Value[2] (1,000 dollars)							
1990:								
January	0	0	3,794	46	0	0	19	3,859
February	672	0	3,335	94	14	0	61	4,177
March	0	0	3,686	16	7	0	73	3,782
April	223	0	2,709	45	7	0	35	3,019
May	0	159	3,503	0	7	0	179	3,848
June	0	0	2,930	0	0	0	57	2,987
July	0	14	2,520	0	0	0	25	2,559
August	1,026	285	2,642	26	20	0	53	4,052
September	0	132	2,521	26	0	0	54	2,733
October	225	84	3,392	42	30	0	41	3,814
November	0	158	2,307	2	0	0	2	2,469
December	0	159	1,986	14	7	0	46	2,211
Total	2,147	991	35,323	312	91	0	647	39,510
1991:								
January	375	265	2,356	0	23	0	33	3,053
February	1,412	37	2,494	33	0	0	35	4,010
March	7	380	2,593	7	0	0	35	3,023
April	73	265	2,895	5	0	0	141	3,380
May	365	663	1,538	0	0	0	34	2,601
June	1,174	470	1,258	0	0	0	41	2,943
July	1,178	351	1,245	12	0	310	53	3,150
August	88	388	1,217	18	0	0	47	1,758
September	62	147	1,606	24	0	251	11	2,100
October	1,474	286	2,099	0	0	0	94	3,953
November	352	17	2,125	0	30	0	84	2,608
December	522	130	1,668	0	0	0	30	2,350
Total	7,083	3,401	23,095	98	53	561	637	34,929
1992:								
January	49	204	1,823	0	0	0	54	2,130
February	123	0	1,917	282	0	0	33	2,354
March	10	465	1,871	0	0	0	88	2,435
April	525	0	1,700	0	260	218	0	2,703
May	988	1,020	2,027	0	0	0	54	4,090
June	1,460	225	1,935	0	0	0	34	3,654
July	158	0	2,381	0	0	0	52	2,592
August	3,177	162	2,391	0	0	0	2	5,733
September	359	253	2,101	0	0	0	113	2,826
October	0	27	2,240	0	0	209	0	2,476
November	0	217	2,175	0	37	0	52	2,480
December	2,459	0	1,579	20	48	213	103	4,423
Total	9,309	2,573	24,140	302	345	641	585	37,894
1993:								
January	31	127	1,744	0	0	0	105	2,007
February	0	0	1,524	0	58	0	2	1,584
March	0	387	2,022	75	0	223	0	2,707
Total	31	514	5,291	75	58	223	107	6,298

[1] Less than 0.5 short tons.
[2] Landed duty-paid value.

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

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

Table H-3
Refined silicon carbide: U.S. imports from China, Brazil, Canada, Germany, Norway, and all other sources, by months, January 1990-March 1993

Year and month	Imports from-- China	Brazil	Canada	Germany	Norway	All other sources	All sources
	Quantity (short tons)						
1990:							
January	278	0	48	68	213	127	735
February	66	552	102	33	227	5	985
March	176	11	87	89	167	42	571
April	246	0	24	60	309	55	694
May	496	0	54	77	362	13	1,002
June	6	0	165	85	208	138	601
July	152	0	114	113	585	13	978
August	132	0	81	29	452	122	817
September	110	0	78	28	451	56	723
October	322	0	72	67	723	98	1,283
November	132	0	65	77	629	171	1,074
December	132	0	102	59	304	21	618
Total	2,250	563	991	784	4,630	861	10,079
1991:							
January	349	0	151	69	170	34	773
February	0	0	0	27	185	85	296
March	0	0	24	81	234	110	449
April	0	0	0	49	333	173	555
May	0	0	(1)	112	177	58	347
June	0	11	0	16	164	53	244
July	0	0	0	88	270	37	395
August	0	0	24	91	166	120	401
September	0	0	(1)	21	178	71	270
October	0	0	47	57	349	93	546
November	0	0	20	87	179	138	424
December	0	0	23	55	345	22	445
Total	349	11	289	754	2,749	994	5,146
1992:							
January	0	19	(1)	103	199	85	407
February	0	22	48	14	305	83	471
March	0	0	71	229	315	86	701
April	0	33	24	84	293	102	536
May	0	0	49	106	195	161	511
June	0	44	73	172	273	82	644
July	0	0	72	170	207	144	593
August	0	0	24	143	201	178	545
September	0	0	45	100	143	92	380
October	0	2	48	147	284	123	604
November	0	0	48	122	203	44	416
December	17	44	48	69	244	107	528
Total	17	164	551	1,458	2,862	1,284	6,337
1993:							
January	0	0	96	34	246	55	431
February	0	0	45	7	226	57	335
March	0	0	43	80	404	61	588
Total	0	0	184	122	876	173	1,354

See footnotes at end of table.

Table H-3--Continued
Refined silicon carbide: U.S. imports from China, Brazil, Canada, Germany, Norway, and all other sources, by months, January 1990-March 1993

Year and month	Imports from-- China	Brazil	Canada	Germany	Norway	All other sources	All sources
	Value[2] (1,000 dollars)						
1990:							
January	127	0	43	157	645	298	1,270
February	31	277	75	92	556	58	1,089
March	76	24	61	293	395	145	994
April	118	0	17	209	563	194	1,101
May	377	0	39	332	723	225	1,696
June	5	0	180	268	396	223	1,072
July	106	0	78	334	884	167	1,569
August	49	0	66	79	731	213	1,138
September	41	0	59	120	621	253	1,094
October	147	0	52	290	1,031	370	1,891
November	46	0	64	209	853	282	1,455
December	46	0	74	199	672	168	1,160
Total	1,171	301	810	2,584	8,071	2,595	15,531
1991:							
January	170	0	90	198	621	211	1,291
February	0	0	0	86	331	232	649
March	0	0	17	256	655	267	1,196
April	0	0	0	157	717	465	1,339
May	0	0	10	510	474	296	1,290
June	0	22	0	73	412	235	742
July	0	0	0	243	787	188	1,218
August	0	0	17	285	368	352	1,021
September	0	0	10	108	468	330	916
October	0	0	50	134	891	230	1,305
November	0	0	15	253	322	331	920
December	0	0	21	196	815	281	1,313
Total	170	22	231	2,499	6,861	3,418	13,201
1992:							
January	0	10	3	452	412	233	1,110
February	0	44	61	55	688	179	1,027
March	0	0	76	500	657	185	1,418
April	0	66	38	245	704	235	1,288
May	0	0	59	394	514	295	1,261
June	0	88	84	553	608	206	1,539
July	0	0	49	595	659	281	1,584
August	0	0	53	377	438	276	1,144
September	0	0	51	381	437	225	1,093
October	0	2	35	459	677	272	1,444
November	0	0	35	490	457	203	1,185
December	15	88	36	334	792	349	1,615
Total	15	299	581	4,834	7,042	2,937	15,708
1993:							
January	0	0	89	133	624	170	1,016
February	0	0	33	30	664	227	954
March	0	0	18	268	1,003	214	1,503
Total	0	0	140	431	2,291	612	3,473

[1] Less than 0.5 short tons.
[2] Landed duty-paid value.

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

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

APPENDIX I

APPARENT CONSUMPTION AND MARKET SHARES USING OFFICIAL IMPORT STATISTICS

Table I-1
Silicon carbide: U.S. shipments of domestic product, U.S. imports, and apparent U.S. consumption, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
	Quantity (short tons)				
Crude silicon carbide:					
Producers' U.S. shipments	***	***	***	***	***
U.S. imports from--					
China	6,496	22,287	40,072	482	56
Other sources	66,804	49,607	51,822	11,510	10,796
Total	73,300	71,893	91,894	11,992	10,853
Apparent consumption	***	***	***	***	***
Refined silicon carbide:					
Producers' U.S. shipments	60,505	50,610	48,834	12,924	12,855
U.S. imports from--					
China	2,250	349	17	0	0
Other sources	7,829	4,797	6,320	1,579	1,354
Total	10,079	5,146	6,337	1,579	1,354
Apparent consumption	70,584	55,756	55,171	14,503	14,209
	Value (1,000 dollars)				
Crude silicon carbide:					
Producers' U.S. shipments	***	***	***	***	***
U.S. imports from--					
China	2,147	7,083	9,309	182	31
Other sources	37,363	27,846	28,585	6,737	6,267
Total	39,510	34,929	37,894	6,918	6,298
Apparent consumption	***	***	***	***	***
Refined silicon carbide:					
Producers' U.S. shipments	54,843	47,770	44,626	11,710	11,224
U.S. imports from--					
China	1,171	170	15	0	0
Other sources	14,360	13,031	15,693	3,555	3,473
Total	15,531	13,201	15,708	3,555	3,473
Apparent consumption	70,374	60,971	60,334	15,265	14,697

Table continued on next page.

Table I-1--Continued
Silicon carbide: U.S. shipments of domestic product, U.S. imports, and apparent U.S. consumption, by forms and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	Jan.-Mar.-- 1993
	Share of the quantity of U.S. consumption (percent)				
Crude silicon carbide:					
Producers' U.S. shipments	***	***	***	***	***
U.S. imports from--					
China	***	***	***	***	***
Other sources	***	***	***	***	***
Total	***	***	***	***	***
Refined silicon carbide:					
Producers' U.S. shipments	85.7	90.8	88.5	89.1	90.5
U.S. imports from--					
China	3.2	.6	(1)	0	0
Other sources	11.1	8.6	11.5	10.9	9.5
Total	14.3	9.2	11.5	10.9	9.5
	Share of the value of U.S. consumption (percent)				
Crude silicon carbide:					
Producers' U.S. shipments	***	***	***	***	***
U.S. imports from--					
China	***	***	***	***	***
Other sources	***	***	***	***	***
Total	***	***	***	***	***
Refined silicon carbide:					
Producers' U.S. shipments	77.9	78.3	74.0	76.7	76.4
U.S. imports from--					
China	1.7	.3	(1)	0	0
Other sources	20.4	21.4	26.0	23.3	23.6
Total	22.1	21.7	26.0	23.3	23.6

[1] Less than 0.05 percent.

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

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce.

Table I-2
Silicon carbide: U.S. shipments of domestic product, U.S. imports, and apparent U.S. consumption, by forms, by grades, and by sources, 1990-92, January-March 1992, and January-March 1993

Item	1990	1991	1992	Jan.-Mar.-- 1992	1993
*	*	*	*	*	*	*

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce.