Silicon Metal from Australia, Brazil, Kazakhstan, and Norway

Investigation Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final)

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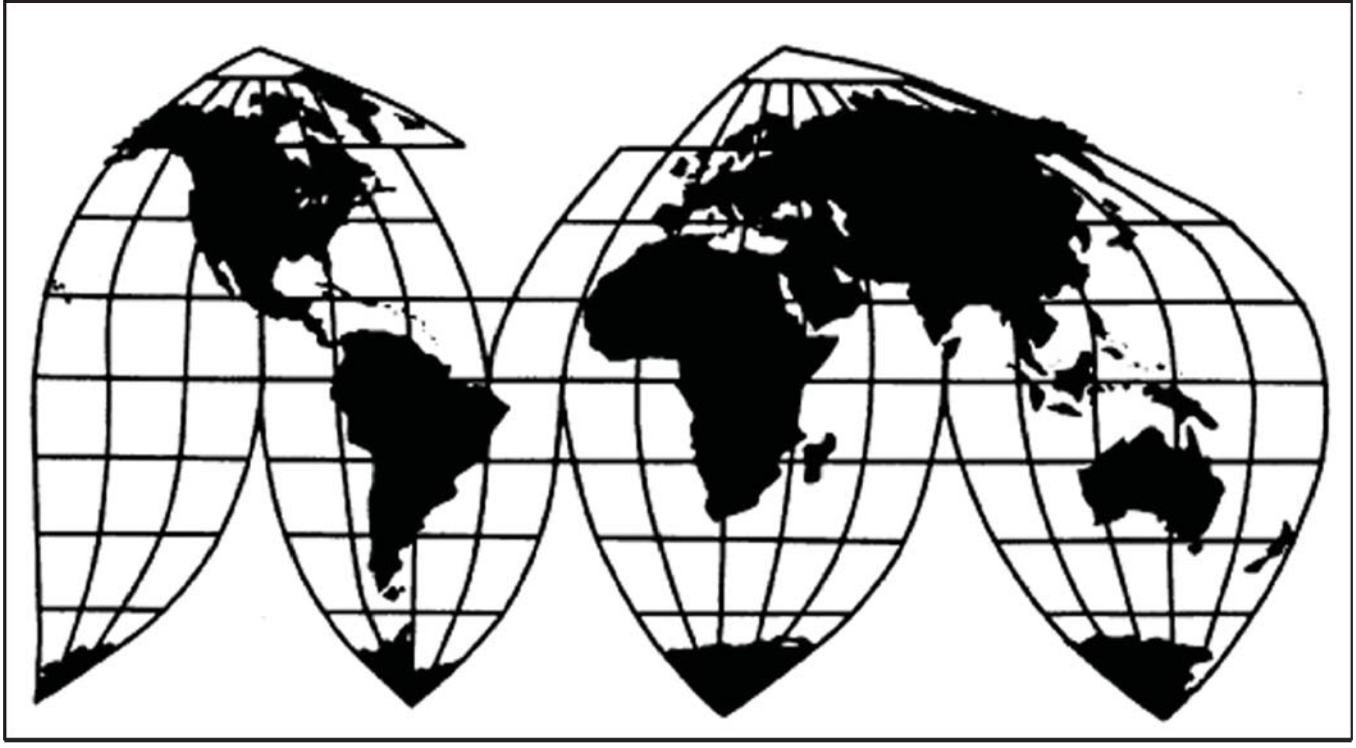
U.S. International Trade Commission



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Note.—Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted from this report.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

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final)

Silicon Metal from Australia, Brazil, Kazakhstan, and Norway

DETERMINATIONS

On the basis of the record[1] developed in the subject investigations, the United States International Trade Commission ("Commission") determines, pursuant to the Tariff Act of 1930 ("the Act"), that an industry in the United States is not materially injured or threatened with material injury, and the establishment of an industry in the United States is not materially retarded by reason of imports of silicon metal (provided for in subheadings 2804.69.10 and 2804.69.50 of the Harmonized Tariff Schedule of the United States) from Australia, Brazil, and Norway, that have been found by the U.S. Department of Commerce ("Commerce") to be sold in the United States at less than fair value ("LTFV"), and from Australia, Brazil, and Kazakhstan that have been found by Commerce to be subsidized by the governments of those countries.

BACKGROUND

The Commission, pursuant to sections 705(b) and 735(b) of the Act (19 U.S.C. 1671d(b) and 19 U.S.C. 1673d(b)), instituted these investigations effective March 8, 2017, following receipt of petitions filed with the Commission and Commerce by Globe Specialty Metals, Inc., Beverly, Ohio. The final phase of the investigations was scheduled by the Commission following notification of preliminary determinations by Commerce that imports of silicon metal from Australia, Brazil, and Kazakhstan were subsidized within the meaning of section 703(b) of the Act (19 U.S.C. 1671b(b)) and that imports of silicon metal from Australia, Brazil, and Norway were sold at LTFV within the meaning of 733(b) of the Act (19 U.S.C. 1673b(b)). Notice of the scheduling of the final phase of the Commission's investigations and of a public hearing to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* on October 27, 2017 (82 FR 49848). The hearing was held in Washington, DC, on February 15, 2018, and all persons who requested the opportunity were permitted to appear in person or by counsel.

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

Views of the Commission

Based on the record in the final phase of these investigations, we determine that an industry in the United States is not materially injured or threatened with material injury by reason of imports of silicon metal from Australia, Brazil, and Norway that are sold in the United States at less than fair value and imports of silicon metal that are subsidized by the governments of Australia, Brazil, and Kazakhstan.[1]

I. Background

The petitioner is Globe Specialty Metals, Inc. ("Globe" or "Petitioner"), a domestic producer of silicon metal. Representatives appeared at the hearing accompanied by counsel and submitted prehearing and posthearing briefs.

A number of respondent entities (collectively "Respondents") participated in these investigations: Dow Silicones Corporation[2] ("Dow"), a U.S. producer and importer of subject merchandise;[3] Simcoa Operations Pty. ("Simcoa"), a producer of subject merchandise from Australia; Ligas de Aluminio S.A. ("LIASA") and Companhia Ferroligas Minas-Gerais ("MINASLIGAS"), both producers of subject merchandise from Brazil; Elkem Silicon Materials ("Elkem"), a producer of subject merchandise from Norway; Tau-Ken-Temir ("TKT"), a producer of subject merchandise from Kazakhstan; Wacker Chemicals Norway ("Wacker Chemicals"), a producer of subject merchandise from Norway, Wacker Polysilicon North America ("WPNA"), a U.S. purchaser of subject merchandise, and Wacker Chemie AG, the parent company of Wacker Chemicals and WPNA (collectively "Wacker"); MPM Holdings Inc. ("MPM"), a U.S. importer of subject merchandise; and REC Silicon Inc., REC Solar Grade Materials LLC, and REC Advanced Silicon Materials LLC. (collectively "REC"), U.S. purchasers or importers of subject merchandise.

Representatives from Simcoa, Wacker, LIASA, MINASLIGAS, MPM, REC, and Dow appeared at the hearing. Five sets of prehearing briefs were filed by respondent parties: one each from Dow, Elkem, and REC; one filed jointly by LIASA and MINASLIGAS ("LIASA's Prehearing Brief"); and one filed jointly by Simcoa and Wacker ("Wacker's Prehearing Brief"). Seven sets of posthearing briefs were filed by respondent parties: one each from Dow, Elkem, REC, MPM, and TKT; one filed jointly by LIASA and MINASLIGAS ("LIASA's Posthearing Brief"); and one filed jointly by Simcoa and Wacker ("Wacker's Posthearing Brief").

[1] Whether establishment of an industry in the United States is materially retarded is not an issue in these investigations.

[2] During the preliminary phase of these investigations, Dow was known as Dow Corning Corporation. It changed its name in February 2018. Confidential Report (INV-QQ-031, March 14, 2018) ("CR") at I-5, Public Report ("PR") at I-4.

[3] During the preliminary phase of these investigations, Dow did not submit a U.S. producers' questionnaire and was identified as a U.S. importer. In the final phase of these investigations, Dow submitted a U.S. producers' questionnaire and identified Dow Corning Alabama Inc. ("DC Alabama") and WVA Manufacturing ("WVA") as part of its production locations. CR/PR at Table III-2.

U.S. industry data are based on the questionnaire responses from three domestic producers that accounted for all known domestic production of silicon metal in 2016.[4] U.S. import data are based on official import statistics and questionnaire responses. Importer questionnaire responses were received from 24 companies, representing virtually all subject imports from Australia, virtually all subject imports from Brazil, virtually all subject imports from Kazakhstan, 96.7 percent of subject imports from Norway, and virtually all imports of silicon metal from nonsubject countries in 2016. Foreign industry data are based on questionnaire responses of one firm in Australia whose exports accounted for *** subject imports from Australia, four firms in Brazil whose exports accounted for *** subject imports from Brazil, one firm in Kazakhstan whose exports accounted for *** percent of subject imports from Kazakhstan, and two firms in Norway whose exports accounted for *** percent of subject imports from Norway in 2016.[5]

II. Domestic Like Product

In determining whether an industry in the United States is materially injured or threatened with material injury by reason of imports of subject merchandise, the Commission first defines the "domestic like product" and the "industry."[6] Section 771(4)(A) of the Tariff Act of 1930, as amended ("the Tariff Act"), defines the relevant domestic industry as the "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[7] In turn, the Tariff Act defines "domestic like product" as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation."[8]

The decision regarding the appropriate domestic like product in an investigation is a factual determination, and the Commission has applied the statutory standard of "like" or "most similar in characteristics and uses" on a case-by-case basis.[9] No single factor is dispositive, and the Commission may consider other factors it deems relevant based on the

[4] CR/PR at Table III-2.

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

[6] 19 U.S.C. § 1677(4)(A).

[7] 19 U.S.C. § 1677(4)(A).

[8] 19 U.S.C. § 1677(10).

[9] *See, e.g., Cleo Inc. v. United States*, 501 F.3d 1291, 1299 (Fed. Cir. 2007); *NEC Corp. v. Department of Commerce*, 36 F. Supp. 2d 380, 383 (Ct. Int'l Trade 1998); *Nippon Steel Corp. v. United States*, 19 CIT 450, 455 (1995); *Torrington Co. v. United States*, 747 F. Supp. 744, 749 n.3 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991) ("every like product determination 'must be made on the particular record at issue' and the 'unique facts of each case'"). The Commission generally considers a number of factors, including the following: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) customer and producer perceptions of the products; (5) common manufacturing facilities, production processes, and production employees; and, where appropriate, (6) price. *See Nippon*, 19 CIT at 455 n.4; *Timken Co. v. United States*, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

facts of a particular investigation.[10] The Commission looks for clear dividing lines among possible like products and disregards minor variations.[11] Although the Commission must accept the Department of Commerce's ("Commerce") determination as to the scope of the imported merchandise that is subsidized or sold at less than fair value,[12] the Commission determines what domestic product is like the imported articles Commerce has identified.[13]

Commerce defined the imported merchandise within the scope of these investigations as:

> . . . {A}ll forms and sizes of silicon metal, including silicon metal powder. Silicon metal contains at least 85.00 percent but less than 99.99 percent silicon, and less than 4.00 percent iron, by actual weight. Semiconductor grade silicon (merchandise containing at least 99.99 percent silicon by actual weight and classifiable under Harmonized Tariff Schedule of the United States (HTSUS) subheading 2804.61.0000) is excluded from the scope of these investigations.
>
> Silicon metal is currently classifiable under subheadings 2804.69.1000 and 2804.69.5000 of the HTSUS. While HTSUS numbers are provided for convenience and customs purposes, the written description of the scope remains dispositive.[14]

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

[11] *Nippon*, 19 CIT at 455; *Torrington*, 747 F. Supp. at 748-49; *see also* S. Rep. No. 96-249 at 90-91 (Congress has indicated that the like product standard should not be interpreted in "such a narrow fashion as to permit minor differences in physical characteristics or uses to lead to the conclusion that the product and article are not 'like' each other, nor should the definition of 'like product' be interpreted in such a fashion as to prevent consideration of an industry adversely affected by the imports under consideration.").

[12] *See*, *e.g., USEC, Inc. v. United States*, 34 Fed. Appx. 725, 730 (Fed. Cir. 2002) ("The ITC may not modify the class or kind of imported merchandise examined by Commerce."); *Algoma Steel Corp. v. United States*, 688 F. Supp. 639, 644 (Ct. Int'l Trade 1988), *aff'd*, 865 F.3d 240 (Fed. Cir.), *cert. denied*, 492 U.S. 919 (1989).

[13] *Hosiden Corp. v. Advanced Display Mfrs.*, 85 F.3d 1561, 1568 (Fed. Cir. 1996) (the Commission may find a single like product corresponding to several different classes or kinds defined by Commerce); *Cleo*, 501 F.3d at 1298 n.1 ("Commerce's {scope} finding does not control the Commission's {like product} determination."); *Torrington*, 747 F. Supp. at 748-52 (affirming the Commission's determination defining six like products in investigations in which Commerce found five classes or kinds).

[14] Silicon Metal from Australia: Affirmative Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances in Part, 83 Fed. Reg. 9839 (Mar. 8, 2018); Silicon Metal From Brazil: Affirmative Final Determination of Sales at Less Than Fair Value, 83 Fed. Reg. 9835 (Mar. 8, 2018); Silicon Metal From Norway: Affirmative Final Determination of Sales at Less Than Fair Value, Final Determination of No Sales, and Final Negative Determination of Critical Circumstances, 83 Fed. Reg. 9829 (Mar. 8, 2018); Silicon Metal from the Republic of Kazakhstan: Final Affirmative Countervailing Duty Determination, 83 Fed. Reg. 9831-9833 (Mar. 8, 2018); Silicon Metal From Australia: (Continued...)

Silicon metal is normally composed entirely of elemental silicon, along with small amounts of other elements, such as iron, aluminum, and calcium. It is used as an alloying agent in the production of both primary aluminum (produced from ore) and secondary aluminum (produced from scrap). It is used by the chemical industry as an input in the production of silicones and polysilicon.[15] Silicon metal is manufactured and sold in various degrees of purity and it is usually sold in lump or powder form. It can be categorized as semiconductor grade,[16] chemical grade, metallurgical grade used to produce primary aluminum, and metallurgical grade used to produce secondary aluminum.[17]

Silicon metal is produced by combining silica, in the form of high purity quartz, to a "charge" that includes low-ash coal, charcoal, or petroleum coke, and a bulking agent, usually in the form of wood chips. This mix is heated in a submerged electric arc furnace to approximately 3,000 degrees Fahrenheit, at which point off-gas escapes the furnace leaving liquid state silicon metal.[18] The molten silicon metal is often refined by oxygen injection to remove impurities, principally aluminum and calcium.[19] Some impurities, such as boron, cannot be removed from the liquid state and must be controlled by raw material selection.[20] The molten silicon metal is then poured into molds or onto beds of silicon fines to create ingot or billets, and is subsequently crushed to customer specification.[21]

In the preliminary determinations, the Commission found a single domestic like product coextensive with the scope.[22] It found that silicon metal of all grades have the same physical appearance and share largely the same manufacturing facilities, production process, and employees. It also found that all domestically produced silicon metal shares the same channel of distribution (end users), and that silicon metal is interchangeable within any given grade. It observed that producers and customers perceive all silicon metal within the scope to be a

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(…Continued)
Final Affirmative Countervailing Duty Determination, 83 Fed. Reg. 9834 (Mar. 8, 2018); Silicon Metal from Brazil: Final Affirmative Countervailing Duty Determination, 83 Fed. Reg. 9838 (Mar. 8, 2018).

[15] CR at I-14 to I-18, PR at I-11 to I-I3. Aluminum producers consume silicon metal in lump form and chemical producers consume silicon metal in powder form, but some of these producers have grinding facilities. CR at I-15 to I-16, PR at I-12 to I-13.

[16] Semiconductor grade is a high-purity product generally containing over 99.99 percent silicon, which is outside the scope of these investigations. CR at I-18 n.46, PR at I-14 n.46.

[17] CR at I-18 to I-19, PR at I-14. The type and level of impurities and the silicon content are the principal factors that determine if the silicon metal product can be used in a given application. It is not an indicator of the quality of the silicon metal product. CR at I-19 n.48, PR at I-14 n.48.

[18] CR at I-20 to I-21, PR at I-15 to I-16.

[19] CR at I-21, PR at I-16.

[20] CR at I-21, PR at I-16. ***. *Id*.

[21] CR at I-20 to I-22, PR at I-16.

[22] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway*, Inv. No. 701-TA-567-569 and 731-TA-1343-1345 (Preliminary),USITC Pub. 4685 at 8 (May 2017) ("Preliminary Determinations").

single product. It also observed that the three domestically produced pricing product prices fell within a fairly narrow range.[23]

In the final phase of these investigations, Petitioner states that the Commission should again define a single domestic like product coextensive with the scope.[24] None of the respondents contests the domestic like product definition. There is no new information in the final phase of these investigations about the characteristics of silicon metal being different from that in the preliminary phase of the investigations.[25] Accordingly, we define a single domestic like product coextensive with Commerce's scope.

III. Domestic Industry

The domestic industry is defined as the domestic "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[26] In defining the domestic industry, the Commission's general practice has been to include in the industry producers of all domestic production of the like product, whether toll-produced, captively consumed, or sold in the domestic merchant market.

We must determine whether any producer of the domestic like product should be excluded from the domestic industry pursuant to section 771(4)(B) of the Tariff Act. This provision allows the Commission, if appropriate circumstances exist, to exclude from the domestic industry producers that are related to an exporter or importer of subject merchandise or which are themselves importers.[27] Exclusion of such a producer is within the Commission's discretion based upon the facts presented in each investigation.[28] In the preliminary

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[23] Preliminary Determinations, USITC Pub. 4685 at 7-8.

[24] Globe's Prehearing Brief at 3-4.

[25] CR at I-14 to I-27, PR at I-11 to I-19. No party requested that the Commission collect data concerning other possible domestic like products in their comments on the Commission's draft questionnaires.

[26] 19 U.S.C. § 1677(4)(A).

[27] *See Torrington Co. v. United States*, 790 F. Supp. 1161, 1168 (Ct. Int'l Trade 1992), *aff'd without opinion*, 991 F.2d 809 (Fed. Cir. 1993); *Sandvik AB v. United States*, 721 F. Supp. 1322, 1331-32 (Ct. Int'l Trade 1989), *aff'd mem*., 904 F.2d 46 (Fed. Cir. 1990); *Empire Plow Co. v. United States*, 675 F. Supp. 1348, 1352 (Ct. Int'l Trade 1987).

[28] The primary factors the Commission has examined in deciding whether appropriate circumstances exist to exclude a related party include the following:

(1) the percentage of domestic production attributable to the importing producer;

(2) the reason the U.S. producer has decided to import the product subject to investigation (whether the firm benefits from the LTFV sales or subsidies or whether the firm must import in order to enable it to continue production and compete in the U.S. market);

(3) whether inclusion or exclusion of the related party will skew the data for the rest of the industry;

(4) the ratio of import shipments to U.S. production for the imported product; and

(Continued...)

determinations, the Commission defined the domestic industry to include all U.S. producers of silicon metal except DC Alabama.[29]

Two domestic producers qualify as related parties. DC Alabama is wholly owned by Dow, which also wholly owns Brazilian producer ***, which exports subject merchandise to the United States.[30] Dow also imported subject merchandise from Brazil during the January 2014 to September 2017 period of investigation ("POI").[31] Consequently, DC Alabama is a related party under 19 U.S.C. § 1677(4)(B)(ii)(III).

Domestic producer MS Silicon ***, a Brazilian exporter of subject merchandise, and ***, an importer of subject merchandise.[32] While the record does not contain sufficient information to demonstrate clearly a direct or indirect controlling relationship among MS Silicon, ***, we assume *arguendo* for purposes of our analysis that a control relationship exists between MS Silicon and *** or MS Silicon and *** under 19 U.S.C. § 1677(4)(B)(ii), and that MS Silicon therefore would be a related party.

Arguments of the Parties. Petitioner argues that DC Alabama should be excluded from the domestic industry because corporate entity Dow's interest is in the importation of subject merchandise based on its *** subject import to domestic production ratio.[33] Petitioner also argues that any production by WVA, Dow's joint venture with Globe, should not be attributed to Dow because WVA is a *** and Dow has only a *** WVA's output.[34]

Respondents argue that the domestic industry consists of all domestic producers of silicon metal.[35] While Dow recognizes that it imported subject merchandise *** at levels *** than that of DC Alabama's domestic production, Dow claims that this importation was only necessary because of the domestic industry's inability to supply *** and the domestic industry lacks the capacity to satisfy demand.[36]

Dow and Wacker also contend that the Commission should attribute Dow's *** percent share of WVA output as part of Dow's domestic production. They assert that Dow acquired a *** percent interest in WVA in 2009, and under the ***.[37] They claim that once Dow's ***, the final figure exceeds its import volume of subject merchandise from *** throughout the POI.[38]

(…Continued)

(5) whether the primary interest of the importing producer lies in domestic production or importation. *Changzhou Trina Solar Energy Co. v. USITC*, 100 F. Supp.3d 1314, 1326-31 (Ct. Int'l. Trade 2015); *see also Torrington Co. v. United States*, 790 F. Supp. at 1168.

[29] Preliminary Determinations, USITC Pub. 4685 at 11.

[30] CR/PR at Table III-2.

[31] CR/PR at Table III-8.

[32] CR/PR at Table III-3.

[33] Globe's Posthearing Brief at 2.

[34] Globe's Prehearing Brief at 7-8; Globe's Posthearing Brief at 1-2, Attachment A at 2-3, 7-8.

[35] Dow's Prehearing Brief at 5-16; Dow's Posthearing Brief at 3-8; Wacker's Prehearing Brief at 14-16.

[36] Dow's Prehearing Brief at 7-9, 11-12; Dow's Posthearing Brief at 4, Exhibit 1 at 10-11

[37] Dow's Prehearing Brief at 14; Wacker's Prehearing Brief at 15.

[38] Dow's Prehearing Brief at 14; Wacker's Prehearing Brief at 15.

The parties agree that MS Silicon should be included in the domestic industry, consistent with the Commission's preliminary determination.[39]

Analysis. *DC Alabama/Dow*. We first discuss Dow's contention that, for purposes of a related parties analysis, the firm's domestic production is not merely what DC Alabama produces, but also includes a portion of WVA's output. Although Dow has some equity and revenue interest in WVA and it ***, its stake is ***.[40] Furthermore, while Dow ***, Globe is the *** relating to WVA's operations.[41] Additionally, Dow's use of its portion of WVA production is ***, which suggests that Dow ***.[42] Therefore, based on the information available in the record, we do not attribute any of WVA's domestic production to the Dow corporate entity and instead use the data in Table III-9 of the Commission Report, which is based on Dow's U.S. producers' questionnaire response.[43]

We find that appropriate circumstances exist to exclude DC Alabama from the domestic industry. DC Alabama is the *** of the three domestic producers, accounting for *** percent of domestic production in 2016.[44] It opposes the petitions.[45] Dow imported ***. The ratio of Dow's subject imports to DC Alabama's domestic production was ***.[46] Dow states that it imports subject merchandise because ***.[47] DC Alabama was ***.[48] The *** ratio of Dow's subject imports to DC Alabama's domestic production suggests that the primary interest of Dow as a corporate entity is importation rather than domestic production. Accordingly, we find that appropriate circumstances exist to exclude DC Alabama from the domestic industry.

MS Silicon. MS Silicon is the *** of the three domestic producers, accounting for *** percent of domestic production in 2016.[49] It ***.[50]

MS Silicon's related importer, ***, imported ***.[51] The ratio of ***'s subject imports to MS Silicon's domestic production was ***.[52] MS Silicon's capital expenditures were $***, $***,

[39] Globe's Prehearing Brief at 8; Wacker's Prehearing Brief at 14-15.

[40] Dow's Posthearing Brief, Attachment A. *** Dow's Posthearing Brief, Attachment B at 5.

[41] Globe's Posthearing Brief, Attachment 8 at 2-3. ***. *Id*. We also observe that Dow has treated the WVA as if it is a separate supplier that is operated by Globe. *See, e.g.,* Dow's Prehearing Brief, Exhibit 2 at 5-6; Dow's Posthearing Brief, Exhibit 1 at 10-11.

[42] Dow's Posthearing Brief, Attachment B at 3. ***

[43] We observe that Dow's U.S. producers' questionnaire reports ***. *See generally* Dow's U.S. Producers' Questionnaire. Nonetheless, Dow did not comment on the questionnaire format with respect to the collection of joint venture data in its comments on the draft questionnaires in the final phase of these investigations.

[44] CR/PR at Table III-2.

[45] CR/PR at Table III-2.

[46] CR/PR at Table III-9.

[47] *See* CR at III-13 to III-14, PR at III-7.

[48] CR/PR at Table VI-3.

[49] CR/PR at Table III-3.

[50] CR/PR at Table III-2.

[51] ***'s U.S. Importer's Questionnaire at II-6b.

[52] MS Silicon *** in 2014. Calculated from CR/PR at Table III-5.

$***, and *** in 2014, 2015, 2016, and interim 2017 respectively.[53] Its capital expenditures accounted for the *** of the domestic industry's capital expenditures in 2014 and 2015.[54] MS Silicon was the *** domestic producer, with *** operating margins throughout the POI.[55]

We find that appropriate circumstances do not exist to exclude MS Silicon from the domestic industry. In 2014, MS Silicon *** any domestic production and *** imported subject merchandise from Brazil through related importer ***. MS Silicon *** domestic production in late 2015 and the volume of its domestic production *** increased the following year, while its subject import volume correspondingly decreased. Therefore, MS Silicon's primary interest appears to be in domestic production. Furthermore, its financial performance indicates that it has not benefitted from its affiliate's importation of subject merchandise. No party argued for its exclusion from the domestic industry.

Accordingly, we define the domestic industry to include all U.S. producers of silicon metal except Dow/DC Alabama.

IV. Cumulation[56]

For purposes of evaluating the volume and effects for a determination of material injury by reason of subject imports, section 771(7)(G)(i) of the Tariff Act requires the Commission to cumulate subject imports from all countries as to which petitions were filed and/or investigations self-initiated by Commerce on the same day, if such imports compete with each other and with the domestic like product in the U.S. market. In assessing whether subject

[53] CR/PR at Table VI-7.

[54] CR/PR at Table VI-7.

[55] CR/PR at Table VI-3.

[56] Pursuant to Section 771(24) of the Tariff Act, imports from a subject country of merchandise corresponding to a domestic like product that account for less than 3 percent of all such merchandise imported into the United States during the most recent 12 months for which data are available preceding the filing of the petition shall be deemed negligible. 19 U.S.C. §§ 1671b(a), 1673b(a), 1677(24)(A)(i), 1677(24)(B); *see also* 15 C.F.R. § 2013.1 (developing countries for purposes of 19 U.S.C. § 1677(36)). The statute further provides that subject imports from a single country which comprise less than 3 percent of total such imports of the product may not be considered negligible if there are several countries subject to investigation with negligible imports and the sum of such imports from all those countries collectively accounts for more than 7 percent of the volume of all such merchandise imported into the United States. 19 U.S.C. § 1677(24)(A)(ii). In the case of countervailing duty investigations involving developing countries (as designated by the United States Trade Representative), the statute indicates that the negligibility limits are 4 percent and 9 percent, rather than 3 percent and 7 percent. 19 U.S.C. § 1677(24)(B).

According to official import statistics, during March 2016 to February 2017, the 12-month period prior to the filing of the petitions, subject imports from Australia accounted for 10.6 percent of total imports, subject imports from Brazil accounted for 46.0 percent, subject imports from Kazakhstan accounted for 5.9 percent, and subject imports from Norway accounted for 8.5 percent. CR/PR at Table IV-4. Because subject imports from each of the four subject countries exceed the pertinent statutory negligibility threshold, we find that imports from each subject country are not negligible.

imports compete with each other and with the domestic like product, the Commission generally has considered four factors:

(1) the degree of fungibility between subject imports from different countries and between subject imports and the domestic like product, including consideration of specific customer requirements and other quality related questions;

(2) the presence of sales or offers to sell in the same geographic markets of subject imports from different countries and the domestic like product;

(3) the existence of common or similar channels of distribution for subject imports from different countries and the domestic like product; and

(4) whether the subject imports are simultaneously present in the market.[57]

While no single factor is necessarily determinative, and the list of factors is not exclusive, these factors are intended to provide the Commission with a framework for determining whether the subject imports compete with each other and with the domestic like product.[58] Only a "reasonable overlap" of competition is required.[59]

A. Petitioner's Arguments

Petitioner contends that the Commission should cumulate imports from all four subject countries. Petitioner claims that silicon metal is a commodity product that is "entirely interchangeable" within a given specification and higher purity silicon metal may be used for lower purity applications.[60] Petitioner maintains that the *** silicon metal from Brazil that *** is fungible with imports from other subject countries and the domestic like product.[61] It further argues that subject imports and the domestic like product are sold through the same channels

[57] *See Certain Cast-Iron Pipe Fittings from Brazil, the Republic of Korea, and Taiwan*, Inv. Nos. 731-TA-278-280 (Final), USITC Pub. 1845 (May 1986), *aff'd*, *Fundicao Tupy, S.A. v. United States*, 678 F. Supp. 898 (Ct. Int'l Trade), *aff'd*, 859 F.2d 915 (Fed. Cir. 1988).

[58] *See*, *e.g.*, *Wieland Werke, AG v. United State*s, 718 F. Supp. 50 (Ct. Int'l Trade 1989).

[59] The Statement of Administrative Action (SAA) to the Uruguay Round Agreements Act (URAA), expressly states that "the new section will not affect current Commission practice under which the statutory requirement is satisfied if there is a reasonable overlap of competition." H.R. Rep. No. 103-316, Vol. I at 848 (1994) (*citing Fundicao Tupy, S.A. v. United States*, 678 F. Supp. at 902; *see Goss Graphic Sys., Inc. v. United States*, 33 F. Supp. 2d 1082, 1087 (Ct. Int'l Trade 1998) ("cumulation does not require two products to be highly fungible"); *Wieland Werke, AG*, 718 F. Supp. at 52 ("Completely overlapping markets are not required.").

[60] Globe's Prehearing Brief at 28; Globe's Posthearing Brief, Attachment A at 15.

[61] Globe's Prehearing Brief at 30-32; Globe's Posthearing Brief at 6-7, Attachment A at 10-23.

of distribution, are present in the same geographic markets, and are simultaneously present in the U.S. market.[62]

B. Respondents' Arguments

Brazil. Dow, LIASA, and Wacker argue that there is a limited degree of fungibility between subject imports from Brazil and imports from other subject sources and the domestic like product because a *** of U.S. shipments of subject imports from Brazil were of low-boron silicon metal while the domestic industry and other subject countries reported no or few shipments of low-boron silicon metal.[63] They also argue that subject imports from Brazil and imports from the other subject sources do not share the same channels of distribution.[64]

Wacker and LIASA also contend that there is limited geographic overlap between subject imports from Brazil and the domestic like product and silicon metal from other subject sources.[65]

Kazakhstan. Wacker argues that imports from Kazakhstan should not be cumulated with other subject imports because the imports from Kazakhstan *** segment and the subject producer in Kazakhstan is incapable of supplying the polysilicon and chemicals segment, which is the predominant end user market in the United States. It also argues that subject imports from Kazakhstan serve *** channel of distribution and are available *** form under ***. It further contends that subject imports from Kazakhstan were not present at all times in the U.S. market during the POI.[66] [67]

[62] Globe's Prehearing Brief at 32-33; Globe's Posthearing Brief at 7-8, Attachment A at 17-19.

[63] Hearing Tr. at 167 (Brown); Dow's Prehearing Brief at 18-19; Dow's Posthearing Brief, Exhibit 1 at 17; LIASA's Prehearing Brief at 3-4, 6; LIASA's Posthearing Brief at 2-3; Wacker's Prehearing Brief at 19. LIASA also contends that the bulk of *** silicon metal involved a unique product supplied by *** to ***, which limits its fungibility with silicon metal from other subject countries and the domestic like product. LIASA's Prehearing Brief at 7; LIASA's Posthearing Brief at 4-5.

[64] Dow's Prehearing Brief at 19-21; LIASA's Prehearing Brief at 9-12; LIASA's Posthearing Brief at 6-7. LIASA asserts that although a *** portion of subject imports from Norway were to *** in 2014, the absolute volume of such imports was much smaller than that of subject imports from Brazil. LIASA's Prehearing Brief at 10

[65] Wacker's Prehearing Brief at 20; LIASA's Prehearing Brief at 15; LIASA's Posthearing Brief at 11-12.

[66] Wacker's Prehearing Brief at 21-23.

[67] Respondents additionally asserted that subject imports from Norway should not be cumulated with other subject imports, but did not provide substantive arguments in support of the contention. Wacker's Prehearing Brief at 23.

C. Analysis

The statutory threshold for cumulation is satisfied in these investigations because Petitioners filed the antidumping and countervailing duty petitions with respect to all four subject countries on the same day, March 8, 2017.[68]

Fungibility. The record indicates that the domestic like product and subject imports from each of the four countries are generally interchangeable. A majority of market participants reported that the domestic like product and subject imports from each of the four subject countries are "always" or "frequently" interchangeable.[69] With few exceptions, a majority of U.S. producers, importers, and purchasers reported that subject imports from different subject countries are "always" or "frequently" interchangeable.[70] In comparisons with the domestic like product on 17 non-price purchasing factors, pluralities or majorities of purchasers found the domestic like product comparable with subject imports from Australia on 15 factors, subject imports from Brazil on 12 factors, subject imports from Kazakhstan on 10 factors, and subject imports from Norway on 13 factors.[71] Notably, majorities of purchasers found the domestic like product comparable with imports from each of the subject countries with respect to the factors of low-boron content and whether quality meets industry standards.[72]

We acknowledge that in 2016 a *** of U.S. shipments of subject imports from Brazil were low-boron content silicon metal, while the other subject countries had *** U.S. shipments of this product type and only *** percent of U.S. shipments of the domestic like product was of

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[68] None of the statutory exceptions to cumulation apply. We observe that these investigations involve dumping findings regarding silicon metal from Australia, Brazil, and Norway and subsidy findings regarding silicon metal from Australia, Brazil, and Kazakhstan. Consequently, any decision to cumulate imports from all subject sources in these investigations will involve "cross-cumulating" dumped imports with subsidized imports. Wacker argues against cross-cumulation. Wacker's Prehearing Brief at 16-18. We have previously explained why we are continuing our longstanding practice of cross-cumulating. *See Polyethylene Terephthalate (PET) Resin from Canada, China, India, and Oman,* Inv. Nos. 701-TA-531-532 and 731-TA-1270-1273 (Final), USITC Pub. 4604 at 9-11 (April 2016); *Circular Welded Carbon-Quality Steel Pipe from India, Oman, the United Arab Emirates, and Vietnam*, Inv. Nos. 701-TA-482 to 484 (Final), USITC Pub. 4362 at 12 n.59 (Dec. 2012); *Softwood Lumber from Canada*, Inv. Nos. 701-TA-414 and 731-TA-928 (Final), USITC Pub. 3509 at 29-31 (May 2009); *Bingham & Taylor v. United States*, 815 F.2d 982 (Fed. Cir. 1987).

[69] CR/PR at Table II-10. The two reporting U.S. producers were evenly divided between finding the domestic like product and subject imports from Kazakhstan as "always" and "sometimes" interchangeable. *Id.*

[70] CR/PR at Table II-10. The two reporting U.S. producers were evenly divided in finding subject imports from Kazakhstan as "always" or "sometimes" interchangeable with subject imports from each of the subject countries. *Id*. Among the six U.S. purchasers comparing subject imports from Brazil and Norway, three reported that they are "always" interchangeable and three reported they are "sometimes" interchangeable. *Id.*

[71] CR/PR at Table II-9.

[72] CR/PR at Table II-9.

this type.[73] However, U.S. shipments of subject imports from Brazil of metallurgical grade silicon metal in 2016 were *** in volume, and this product type comprised a *** of U.S. shipments of the domestic like product and between *** percent of shipments of subject imports from Australia, Kazakhstan, and Norway.[74] Consequently, the record indicates that both the domestic like product and appreciable quantities of imports from each of the four subject countries are of metallurgical grade silicon metal, notwithstanding the arguments of Respondents that subject imports from Brazil and Kazakhstan are unique products. In light of this, and the general perceptions of interchangeability and comparability between and among the domestic like product and imports from each of the four subject countries, the record indicates that there is sufficient fungibility among and between the domestic like product and subject imports from each subject country to meet the reasonable overlap standard.

Channels of Distribution. *** of U.S. commercial shipments by U.S. producers and importers were to end users.[75] However, the record indicates that there are differences in the end users to which these products were shipped. The domestic like product and subject imports from Brazil were shipped *** to polysilicon and other chemical producers, subject imports from Australia and Kazakhstan were shipped *** to secondary aluminum producers, and subject imports from Norway were shipped primarily to a mix of *** and ***.[76]

Despite these differences, the record indicates an overlap in shipments to secondary aluminum producers. The share of subject imports from Brazil that was shipped to secondary aluminum producers, in terms of percentage, was *** when compared to that of other subject imports and the domestic like product, but the absolute volume of these shipments was ***

[73] CR/PR at Table IV-5. We observe that Dow was the only *** in 2016. *Compare* Dow's U.S. Importers' Questionnaire at II-6c *with* CR/PR at Table IV-5. Petitioner asserts that the domestic industry is capable of producing low-boron silicon metal. Hearing Tr. at 40 (Huck); Globe's Posthearing Brief, Attachment A at 12.

[74] CR/PR at Table IV-5. In 2016, the U.S. shipment volume of metallurgical grade subject imports was *** for Australia, Brazil, Kazakhstan, and Norway, respectively. The volume of U.S. shipments in this product segment by U.S. producers was ***. *Id*. As a share of U.S. shipment volume of silicon metal, metallurgical grade silicon metal accounted for *** of the domestic industry's shipments, *** percent of subject imports from Australia, *** percent of subject imports from Brazil, *** percent of subject imports from Kazakhstan, and *** percent of subject imports from Norway. *Id*.

[75] CR/PR at Table II-1.

[76] CR/PR at Tables II-1, IV-7. In 2016, *** percent of the domestic like product was shipped to polysilicon and other chemical producers, *** percent to primary aluminum producers, and *** percent to secondary aluminum producers; *** percent of subject imports from Australia were shipped to polysilicon and other chemical producers, *** percent to primary aluminum producers, and *** percent to secondary aluminum producers; *** percent of subject imports from Brazil were shipped to polysilicon and other chemical producers, *** percent to primary aluminum producers, and *** percent to secondary aluminum producers; *** percent of subject imports from Kazakhstan were shipped to primary aluminum producers and *** percent to secondary aluminum producers; and *** percent of subject imports from Norway were shipped to polysilicon and other chemical producer, *** percent to secondary aluminum producers, and *** percent to other end users. *Id*.

compared to other subject sources.[77] Consequently, the record indicates an overlap of channels of distribution between the domestic like product and subject imports from all sources, including Brazil and Kazakhstan.

We also observe that the record contains numerous pricing observations furnished by importers of subject imports from Brazil.[78] Indeed, several purchasers identified instances where subject imports from Brazil competed directly with the domestic like product.[79] Therefore, although Respondents argue that subject imports from Brazil serve a unique channel of distribution because the majority of these imports are internally consumed by Dow, this argument does not address the substantial volume of subject imports from Brazil that are sold in the merchant market with the domestic like product and other subject imports.

Geographic Overlap. Domestically produced silicon metal is sold nationwide. The record indicates that subject imports from each of the four subject countries serve the Northeast, Midwest, Southeast, and Pacific Coast regions. Additionally, the Central Southwest region was served by subject imports from Brazil and Kazakhstan, and the Mountains region was served by subject imports from Brazil.[80] The record thus establishes that subject imports from all sources and the domestic like product serve overlapping geographic regions.

Simultaneous Presence in Market. The domestic like product was present in the U.S. market throughout the POI.[81] Subject imports from Australia, Brazil, and Norway were present in the U.S. market in every month of the POI. Subject imports from Kazakhstan were not present in the U.S. market during the entirety of 2014 and four months in 2015, but were present for all but one of the last 31 months (entirety of 2016 and interim 2017) of the POI.[82] Consequently, the domestic like product and imports from each subject country were simultaneously present in the U.S. market throughout the bulk of the POI.

Conclusion. As the prior discussion indicates, notwithstanding Respondents' arguments, the record supports a finding that imports from each subject country and the domestic like product are sufficiently fungible, serve overlapping channels of distribution and geographic regions, and were simultaneously present in the market such that they meet the reasonable overlap standard. Accordingly, we cumulate imports from all four subject countries for our analysis of material injury by reason of subject imports.

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[77] *Compare* CR/PR at Table II-1 *with* CR/PR at Table IV-10. *See also* CR/PR at Table IV-7. For this reason, we are not persuaded by Respondents' argument that subject imports from Brazil or Kazakhstan do not share the same channels of distribution with subject imports from Australia or Norway based on the type of end user to which those subject imports are primarily shipped.

[78] CR/PR at Tables V-3 to V-5.

[79] CR/PR at Table V-11.

[80] CR/PR at Table II-2.

[81] CR/PR at Table III-7.

[82] CR/PR at Table IV-8.

V. No Material Injury by Reason of Subject Imports

A. Legal Standards

In the final phase of antidumping and countervailing duty investigations, the Commission determines whether an industry in the United States is materially injured or threatened with material injury by reason of the imports under investigation.[83] In making this determination, the Commission must consider the volume of subject imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product, but only in the context of U.S. production operations.[84] The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant."[85] In assessing whether the domestic industry is materially injured by reason of subject imports, we consider all relevant economic factors that bear on the state of the industry in the United States.[86] No single factor is dispositive, and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[87]

Although the statute requires the Commission to determine whether the domestic industry is "materially injured or threatened with material injury by reason of" unfairly traded imports,[88] it does not define the phrase "by reason of," indicating that this aspect of the injury analysis is left to the Commission's reasonable exercise of its discretion.[89] In identifying a causal link, if any, between subject imports and material injury to the domestic industry, the Commission examines the facts of record that relate to the significance of the volume and price effects of the subject imports and any impact of those imports on the condition of the domestic industry. This evaluation under the "by reason of" standard must ensure that subject imports are more than a minimal or tangential cause of injury and that there is a sufficient causal, not merely a temporal, nexus between subject imports and material injury.[90]

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[83] 19 U.S.C. §§ 1671d(b), 1673d(b). The Trade Preferences Extension Act of 2015, Pub. L. 114-27, amended the provisions of the Tariff Act pertaining to Commission determinations of material injury and threat of material injury by reason of subject imports in certain respects. We have applied these amendments here.

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

[85] 19 U.S.C. § 1677(7)(A).

[86] 19 U.S.C. § 1677(7)(C)(iii).

[87] 19 U.S.C. § 1677(7)(C)(iii).

[88] 19 U.S.C. §§ 1671d(a), 1673d(a).

[89] *Angus Chemical Co. v. United States*, 140 F.3d 1478, 1484-85 (Fed. Cir. 1998) ("{T}he statute does not 'compel the commissioners' to employ {a particular methodology}."), *aff'g,* 944 F. Supp. 943, 951 (Ct. Int'l Trade 1996).

[90] The Federal Circuit, in addressing the causation standard of the statute, observed that "{a}s long as its effects are not merely incidental, tangential, or trivial, the foreign product sold at less than fair value meets the causation requirement*." Nippon Steel Corp. v. USITC*, 345 F.3d 1379, 1384 (Fed. Cir. 2003). This was further ratified in *Mittal Steel Point Lisas Ltd. v. United States*, 542 F.3d 867, 873 (Fed. (Continued...)

In many investigations, there are other economic factors at work, some or all of which may also be having adverse effects on the domestic industry. Such economic factors might include nonsubject imports; changes in technology, demand, or consumer tastes; competition among domestic producers; or management decisions by domestic producers. The legislative history explains that the Commission must examine factors other than subject imports to ensure that it is not attributing injury from other factors to the subject imports, thereby inflating an otherwise tangential cause of injury into one that satisfies the statutory material injury threshold.[91] In performing its examination, however, the Commission need not isolate the injury caused by other factors from injury caused by unfairly traded imports.[92] Nor does the "by reason of" standard require that unfairly traded imports be the "principal" cause of injury or contemplate that injury from unfairly traded imports be weighed against other factors, such as nonsubject imports, which may be contributing to overall injury to an industry.[93] It is clear

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(…Continued)
Cir. 2008), where the Federal Circuit, quoting *Gerald Metals, Inc. v. United States*, 132 F.3d 716, 722 (Fed. Cir. 1997), stated that "this court requires evidence in the record 'to show that the harm occurred "by reason of" the LTFV imports, not by reason of a minimal or tangential contribution to material harm caused by LTFV goods.'" *See also Nippon Steel Corp. v. United States*, 458 F.3d 1345, 1357 (Fed. Cir. 2006); *Taiwan Semiconductor Industry Ass'n v. USITC*, 266 F.3d 1339, 1345 (Fed. Cir. 2001).

[91] SAA at 851-52 ("{T}he Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports."); S. Rep. 96-249 at 75 (1979) (the Commission "will consider information which indicates that harm is caused by factors other than less-than-fair-value imports."); H.R. Rep. 96-317 at 47 (1979) ("in examining the overall injury being experienced by a domestic industry, the ITC will take into account evidence presented to it which demonstrates that the harm attributed by the petitioner to the subsidized or dumped imports is attributable to such other factors;" those factors include "the volume and prices of nonsubsidized imports or imports sold at fair value, contraction in demand or changes in patterns of consumption, trade restrictive practices of and competition between the foreign and domestic producers, developments in technology and the export performance and productivity of the domestic industry"); *accord Mittal Steel*, 542 F.3d at 877.

[92] SAA at 851-52 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports."); *Taiwan Semiconductor Industry Ass'n,* 266 F.3d at 1345 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports ... . Rather, the Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports." (emphasis in original)); *Asociacion de Productores de Salmon y Trucha de Chile AG v. United States*, 180 F. Supp. 2d 1360, 1375 (Ct. Int'l Trade 2002) ("{t}he Commission is not required to isolate the effects of subject imports from other factors contributing to injury" or make "bright-line distinctions" between the effects of subject imports and other causes.); *see also Softwood Lumber from Canada*, Inv. Nos. 701-TA-414 and 731-TA-928 (Remand), USITC Pub. 3658 at 100-01 (Dec. 2003) (Commission recognized that "{i}f an alleged other factor is found not to have or threaten to have injurious effects to the domestic industry, *i.e*., it is not an 'other causal factor,' then there is nothing to further examine regarding attribution to injury"), *citing Gerald Metals,* 132 F.3d at 722 (the statute "does not suggest that an importer of LTFV goods can escape countervailing duties by finding some tangential or minor cause unrelated to the LTFV goods that contributed to the harmful effects on domestic market prices.").

[93] S. Rep. 96-249 at 74-75; H.R. Rep. 96-317 at 47.

that the existence of injury caused by other factors does not compel a negative determination.[94]

Assessment of whether material injury to the domestic industry is "by reason of" subject imports "does not require the Commission to address the causation issue in any particular way" as long as "the injury to the domestic industry can reasonably be attributed to the subject imports" and the Commission "ensure{s} that it is not attributing injury from other sources to the subject imports."[95] Indeed, the Federal Circuit has examined and affirmed various Commission methodologies and has disavowed "rigid adherence to a specific formula."[96]

The Federal Circuit's decisions in *Gerald Metals, Bratsk*, and *Mittal Steel* all involved cases where the relevant "other factor" was the presence in the market of significant volumes of price-competitive nonsubject imports. The Commission interpreted the Federal Circuit's guidance in *Bratsk* as requiring it to apply a particular additional methodology following its finding of material injury in cases involving commodity products and a significant market presence of price-competitive nonsubject imports.[97] The additional "replacement/benefit" test looked at whether nonsubject imports might have replaced subject imports without any benefit to the U.S. industry. The Commission applied that specific additional test in subsequent cases, including the *Carbon and Certain Alloy Steel Wire Rod from Trinidad and Tobago* determination that underlies the *Mittal Steel* litigation.

Mittal Steel clarifies that the Commission's interpretation of *Bratsk* was too rigid and makes clear that the Federal Circuit does not require the Commission to apply an additional test nor any one specific methodology; instead, the court requires the Commission to have "evidence in the record" to "show that the harm occurred 'by reason of' the LTFV imports," and requires that the Commission not attribute injury from nonsubject imports or other factors to subject imports.[98] Accordingly, we do not consider ourselves required to apply the replacement/benefit test that was included in Commission opinions subsequent to *Bratsk*.

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[94] *See Nippon Steel Corp*., 345 F.3d at 1381 ("an affirmative material-injury determination under the statute requires no more than a substantial-factor showing. That is, the 'dumping' need not be the sole or principal cause of injury.").

[95] *Mittal Steel*, 542 F.3d at 877-78; *see also id.* at 873 ("While the Commission may not enter an affirmative determination unless it finds that a domestic industry is materially injured 'by reason of' subject imports, the Commission is not required to follow a single methodology for making that determination ... {and has} broad discretion with respect to its choice of methodology.") *citing United States Steel Group v. United States*, 96 F.3d 1352, 1362 (Fed. Cir. 1996) and S. Rep. 96-249 at 75. In its decision in *Swiff-Train v. United States*, 793 F.3d 1355 (Fed. Cir. 2015), the Federal Circuit affirmed the Commission's causation analysis as comporting with the Court's guidance in *Mittal*.

[96] *Nucor Corp. v. United States*, 414 F.3d 1331, 1336, 1341 (Fed. Cir. 2005); *see also Mittal Steel*, 542 F.3d at 879 ("*Bratsk* did not read into the antidumping statute a Procrustean formula for determining whether a domestic injury was 'by reason' of subject imports.").

[97] *Mittal Steel*, 542 F.3d at 875-79.

[98] *Mittal Steel*, 542 F.3d at 873 (quoting from *Gerald Metals*, 132 F.3d at 722), 875-79 & n.2 (recognizing the Commission's alternative interpretation of *Bratsk* as a reminder to conduct a non-attribution analysis).

The progression of *Gerald Metals, Bratsk*, and *Mittal Steel* clarifies that, in cases involving commodity products where price-competitive nonsubject imports are a significant factor in the U.S. market, the Court will require the Commission to give full consideration, with adequate explanation, to non-attribution issues when it performs its causation analysis.[99]

The question of whether the material injury threshold for subject imports is satisfied notwithstanding any injury from other factors is factual, subject to review under the substantial evidence standard.[100] Congress has delegated this factual finding to the Commission because of the agency's institutional expertise in resolving injury issues.[101]

B. Conditions of Competition and the Business Cycle

The following conditions of competition inform our analysis of whether there is material injury by reason of subject imports.[102]

[99] To that end, after the Federal Circuit issued its decision in *Bratsk*, the Commission began to present published information or send out information requests in the final phase of investigations to producers in nonsubject countries that accounted for substantial shares of U.S. imports of subject merchandise (if, in fact, there were large nonsubject import suppliers). In order to provide a more complete record for the Commission's causation analysis, these requests typically seek information on capacity, production, and shipments of the product under investigation in the major source countries that export to the United States. The Commission plans to continue utilizing published or requested information in the final phase of investigations in which there are substantial levels of nonsubject imports.

[100] We provide in our discussion below a full analysis of other factors alleged to have caused any material injury experienced by the domestic industry.

[101] *Mittal Steel*, 542 F.3d at 873; *Nippon Steel Corp*., 458 F.3d at 1350, *citing U.S. Steel Group*, 96 F.3d at 1357; S. Rep. 96-249 at 75 ("The determination of the ITC with respect to causation is ... complex and difficult, and is a matter for the judgment of the ITC.").

[102] We find that the captive production provision at 19 U.S.C. § 1677(7)(C)(iv) does not apply in these investigations in the context of transfers from ***. Both the Petitioner and Respondents state that the captive production provision does not apply on the bases that the transfers are not internal transfers and silicon metal is not a predominant material input in downstream production. Hearing Tr. at 97 (Schaefermeir), 174 (Bay). We agree with the parties' contentions. Notwithstanding the issue of whether the transfer between *** is an internal transfer, the second statutory criterion is not met. Silicon metal is used in a wide array of products and silicon metal accounts for a wide—and frequently low—range of the share of cost of the end use products. *See* CR at III-19, PR at III-9 (silicon metal accounts for approximately five percent of the finished cost in a wide range of end-use products, including electronics, solar panels, adhesives, resins, lubricants, plastomers, anti-foaming agents, and water-repellent compounds), CR at II-15, PR at II- 7 (reported cost shares for producers of downstream products); ***'s U.S. Purchasers' Questionnaire at III-3 (***). Therefore, the record does not contain sufficient information to support a conclusion that silicon metal is the "predominant" material input in the downstream products in which it is used.

1. Demand Conditions

Demand for silicon metal is a function of the demand for the downstream products that use silicon metal as an input for production. The primary users of silicon metal are chemical and polysilicon producers, and primary and secondary aluminum producers. Chemical end uses include chlorosilanes, polysilicon, sealants, silicones, and silicone adhesive sealants. Aluminum end uses include aluminum alloys, aluminum castings, and various foundry ingots.[103]

Market participants had mixed perspectives on demand trends during the POI. A *** of U.S. producers reported that U.S. demand for silicon metal decreased, while a plurality of importers and purchasers reported U.S. demand increased.[104] Apparent U.S. consumption of silicon metal declined overall by *** percent from 2014 to 2016. It declined by *** percent between 2014 and 2015, from *** short tons in 2014 to *** short tons in 2015, and increased *** in 2016 to *** short tons. Apparent U.S. consumption was *** higher in interim 2017 (*** short tons) than in interim 2016 (*** short tons).[105]

2. Supply Conditions

The U.S. market is supplied by the domestic industry, the excluded U.S. producer DC Alabama, subject imports, and nonsubject imports.

The domestic industry was the largest source of supply to the U.S. market during the POI. Its share of apparent U.S. consumption, as measured by quantity, increased in every year during the POI and was relatively stable between interim periods. It increased from *** percent in 2014 to *** percent in 2015 and *** percent in 2016; it was *** percent in interim 2016 and *** percent in interim 2017. DC Alabama's market share increased overall during the POI, it was *** percent in 2014, *** percent in 2015, *** percent in 2016, *** percent in interim 2016, and *** percent in interim 2017.[106]

The domestic industry consists of two producers, Globe and MS Silicon. MS Silicon is a recent entrant to the U.S. market. Its decision to enter the market was made prior to the beginning of the POI, as it closed on its financial commitments on ***. The Mississippi facility began production on *** and it started a ***.[107] In December 2015, Globe merged with Spain-based Grupo FerroAtlántica to form Ferroglobe PLC.[108] As indicated in Section III, Dow and Globe entered into a joint venture agreement in 2009 to form WVA.[109]

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[103] CR at II-15, PR at II-7.

[104] CR/PR at Table II-4. Almost as many importers stated U.S. demand was unchanged or had decreased as stated it had increased. *Id*.

[105] CR/PR at Table IV-10.

[106] CR/PR at Table C-3.

[107] CR/PR at Tables III-1 and III-4. MS Silicon's production spiked from *** short tons in 2015 to *** short tons in 2016; its production was *** short tons in interim 2017 and *** short tons in 2016. CR/PR at Table III-5.

[108] CR/PR at Table III-1.

[109] Dow's Prehearing Brief at 14; Wacker's Prehearing Brief at 15.

The domestic industry's production capacity increased from *** short tons in 2014 to *** short tons in 2015 and *** short tons in 2016.[110] Petitioner asserts that silicon metal production is capital intensive and domestic producers must maintain high levels of capacity utilization.[111] In addition to the changes in MS Silicon's capacity described above, Globe shut down its ***.[112]

Cumulated subject imports' share of apparent U.S. consumption fluctuated from 2014 to 2016 with little overall change and was higher in interim 2017 than interim 2016. The subject imports' share of the market declined from *** percent of apparent U.S. consumption in 2014 to *** percent in 2015, and subsequently increased to *** percent in 2016. It was *** percent in interim 2016 and *** percent in interim 2017.[113] As mentioned in Section III, certain subject producers are affiliated with domestic producers.[114]

Nonsubject imports' share of apparent U.S. consumption declined overall during the POI. It increased from *** percent in 2014 to *** percent in 2015 and subsequently declined to *** percent in 2016. It was *** percent in interim 2016 and lower, at *** percent, in interim 2017. South Africa and Canada were the leading nonsubject sources of U.S. silicon metal imports in 2016.[115] Global producer FerroGlobe has subsidiary producers in Canada, China, France, South Africa, and Spain.[116] We also observe that there are two outstanding U.S. antidumping duty orders against silicon metal imports from China and Russia.[117]

3. Substitutability and Other Conditions

The record indicates a high degree of substitutability between domestically produced silicon metal and subject imports, but chemical characteristics and supplier reliability may affect

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[110] CR/PR at Table C-3. Capacity was *** short tons in interim 2016, and higher, at *** short tons, in interim 2017. *Id*.

[111] Hearing Tr. at 23 (Huck); Globe's Prehearing Brief at 16; Globe's Posthearing Brief at 4.

[112] CR/PR at Table III-4. Several purchasers reported that Globe's closure of production sites and *** conversion to ferrosilicon production reduced supplies and sometimes disrupted deliveries that had been contractually agreed upon. *** reported that Globe was unable to fulfill contracted volumes in 2015 and that deliveries were delayed until 2016. U.S. purchasers *** reported that U.S. producer MS Silicon either missed shipments in 2017 or was unable to supply silicon metal in required volumes. CR at II-13, PR at II-6.

[113] CR/PR at Table C-3.

[114] CR/PR at Table III-3. Subject producer in Brazil *** shares common ownership with MS Silicon, and subject producer in Brazil *** is wholly owned by Dow. *Id*.

[115] CR at VII-49 to VII-50, VII-52, PR at VII-31 to VII-32, VII-34. The market share of nonsubject imports from South Africa increased from *** percent in 2014 to *** percent in 2015, and subsequently declined to *** percent in 2016, and *** percent in interim 2017; and nonsubject imports from Canada increased from *** percent in 2014 to *** percent in 2015 and *** percent in 2016, and it was *** percent in interim 2017. CR/PR at Table C-1.

[116] CR/PR at Table III-3.

[117] CR at I-8, PR at I-6. The order on silicon metal from China is currently the subject of a five-year review. *See Silicon Metal from China*, Inv. No. 731-TA-472 (Fourth Review).

the level of substitutability.[118] Generally speaking, the majority of market participants reported that domestically produced silicon metal and imports from each of the subject countries are "always" or "frequently" interchangeable.[119]

The record indicates that price was the factor most frequently ranked as one of the top three purchasing factors, and over half of reporting purchasers rated price as a "very important" factor. Nevertheless, quality was the factor most frequently named as the most important purchasing factor and more purchasers rated availability, product consistency, quality meets industry standards, and reliability of supply than price as "very important" factors.[120] Consequently, while price is an important factor in purchasing decisions, other factors are important as well.

Silicon metal is produced from mined quartz with other inputs including coal or charcoal, woodchips, and electrodes.[121] From 2015 to 2016, reported unit raw material costs declined for the domestic industry; these costs were higher in interim 2017 than in interim 2016.[122] Nevertheless, *** in the domestic industry stated that raw material price changes did not affect silicon metal prices.[123]

Electricity is also a significant input cost.[124] Retail electricity prices decreased overall (when compared to the same month in the prior year) during 2014 to 2016, but increased in interim 2017.[125]

A *** of the domestic industry's U.S. commercial shipments and the *** of U.S. commercial shipments of subject imports in 2016 were based on annual contracts; *** percent of the domestic industry's U.S. commercial shipments and 18.2 percent of subject import U.S. commercial shipments were spot sales.[126] Contracts are generally negotiated or competitively bid during a "mating season" that occurs in the fourth quarter of the calendar year for shipments in the following year.[127] Contract prices are sometimes determined based on a formula that accounts for data from published price indices, which are readily available to purchasers.[128] While these published indexes primarily reflect product sold to secondary aluminum producers, purchasers in all sectors reference these indices.[129]

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[118] CR at II-19, PR at II-9.

[119] CR/PR at Table II-10. The two reporting U.S. producers were evenly divided between finding the domestic like product and subject imports from Kazakhstan as "always" and "sometimes" interchangeable. *Id.*

[120] CR/PR at Table II-6, II-7.

[121] CR/PR at V-1.

[122] CR/PR at Table VI-3.

[123] CR at V-2, PR at V-1.

[124] *See* CR/PR at Table VI-3.

[125] CR at V-2, PR at V-1.

[126] CR/PR at Table V-2.

[127] Hearing Tr. at 35 (Perkins).

[128] CR/PR at V-4. *** and seven out of 13 responding importers reported that some of their contract prices are based on silicon price indexes published by Platts or CRU. CR at V-7, PR at V-5.

[129] CR at V-5, PR at V-4.

C. Volume of Subject Imports

Section 771(7)(C)(i) of the Tariff Act provides that the "Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States, is significant."[130]

The absolute volume of cumulated subject imports decreased overall from 2014 to 2016. The volume decreased from 118,454 short tons in 2014 to 91,381 short tons in 2015, and subsequently increased to 111,597 short tons in 2016; the volume was 80,866 short tons in interim 2016 and 101,253 short tons in interim 2017.[131]

Subject import market share fluctuated from 2014 to 2016 with little overall change and was higher in interim 2017 than interim 2016. The market penetration of cumulated subject imports declined from *** percent of apparent U.S. consumption in 2014 to *** percent in 2015 before increasing to *** percent in 2016, and their market share was *** percent and *** percent in interim 2016 and interim 2017, respectively.[132] Although subject imports gained market share over the POI, particularly later in the period, the domestic industry's market share increased from 2014 to 2016 and showed relatively minor fluctuations between the interim periods. Therefore, the subject imports' market share gains in 2016 and interim 2017 came overwhelmingly at the expense of nonsubject imports.[133]

In light of the above, we find the volume of subject imports to be significant in absolute terms and relative to consumption in the United States. However, for the reasons we discuss below, we do not find that the subject imports caused significant price effects or had a significant impact on the domestic industry.

D. Price Effects of the Subject Imports

Section 771(7)(C)(ii) of the Tariff Act provides that, in evaluating the price effects of the subject imports, the Commission shall consider whether

> (I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and

[130] 19 U.S.C. § 1677(7)(C)(i).

[131] CR/PR at Table IV-2.

[132] CR/PR at Table C-3.

[133] *See* CR/PR at Table C-3. Nonsubject import market share was *** percent in 2014, *** percent in 2015, and *** percent in 2016; it was *** percent and *** percent in interim 2016 and interim 2017, respectively. The domestic industry's market share was *** percent in 2014, *** percent in 2015, and *** percent in 2016; it was *** percent and *** percent in interim 2016 and interim 2017, respectively.

> (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.[134]

As explained above, there is a high degree of substitutability between domestically produced silicon metal and the subject imports, but chemical characteristics and supplier reliability may affect the level of interchangeability.[135] Additionally, price is one of several important factors in purchasing decisions.[136]

The Commission collected quarterly pricing data from U.S. producers and importers for three silicon metal products.[137] The pricing data accounted for approximately *** percent of U.S. producers' U.S. commercial shipments of silicon metal in 2016. Pricing data reported by importers accounted for approximately *** percent of U.S. commercial shipments of subject imports from Australia, *** percent of U.S. commercial shipments of subject imports from Brazil, *** U.S. commercial shipments of subject imports from Kazakhstan, and *** percent of U.S. commercial shipments of subject imports from Norway in 2016.[138] Pricing Product 2, the product sold to secondary aluminum producers, had the largest number of importer pricing observations and accounted for the vast majority of shipments reported in connection with such pricing observations.[139] By contrast, pricing Product 3, the product sold to chemical and polysilicon producers, had the largest quantity of shipments of domestic product reported in connection with pricing observations. There were few reported pricing observations for imported Product 3; the record, however, contains landed duty-paid values and quantities for direct imports used for internal consumption for Product 3 that encompass substantial quantities for every quarter of the POI.[140]

The record as a whole indicates mixed instances of overselling and underselling by the cumulated subject imports. Comparisons based on the available importer pricing data indicate predominant underselling. Cumulated subject imports undersold the domestic like product in 66 of 88 quarterly price comparisons (98,913 short tons) at margins ranging from *** to ***

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[134] 19 U.S.C. § 1677(7)(C)(ii).

[135] CR at II-19, PR at II-9.

[136] CR/PR at Tables II-6 to II-7.

[137] The Commission requested U.S. producers and importers to provide quarterly pricing data for the following product types: Product 1—Sold to primary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 98.5% silicon, a maximum of 1.00% iron, a maximum of 0.07% calcium, and no restriction of the aluminum content. Product 2—Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content. Product 3—Sold to chemical and/or polysilicon manufacturers; silicon metal less than 99.99% pure that contains a minimum of 98.0% silicon, a maximum of 1.50% iron, a maximum of 0.2% calcium, and a maximum of 0.4% aluminum. CR at V-9, PR at V-6.

[138] CR at V-10, PR at V-7.

[139] *See* CR/PR at Table V-8.

[140] *See* CR/PR at Tables V-3 to V-6. Only *** quantities of direct imports of Products 1 and 2 were reported. CR at V-19 n.15, PR at V-8 n.15.

percent, and oversold the domestic product in the remaining 22 comparisons (31,316 short tons), with margins ranging from *** percent. By volume, most of the underselling was in Product 2, the product with the largest volume of subject import shipments reported in pricing comparisons.[141]

Given the significant volume of subject imports accounted for in the direct import data, we also examined direct imports of Product 3 in our pricing analysis.[142] Among 33 quarterly comparisons between Product 3 direct import costs and Product 3 prices for the domestic like product, the direct import purchase costs were higher in 24 quarters (*** short tons), and were lower in 9 quarters (*** short tons).[143] We recognize that the direct import purchase cost data and U.S. producer pricing data may not be directly comparable because the direct import purchase cost data do not necessarily capture the total cost associated with importing; thus, if anything, direct import purchase cost data may understate the total cost to the purchaser.[144] In light of this, we find that the data indicating that direct import costs were more frequently higher than U.S. producer prices for Product 3—the pricing product that accounts for the *** of shipments of both subject imports and the domestic like product—militate against any finding of predominant underselling based solely on the pricing data and instead the record supports a finding of mixed overselling and underselling.[145] This finding is also supported by information in the record that most purchasers reported that the domestic like product and imports from each

[141] CR/PR at Table V-8. Subject imports undersold the domestic like product for Product 1 in all 29 quarterly comparisons (25,050 short tons). Subject imports undersold the domestic like product for Product 2 in 32 out of 53 quarterly comparisons (72,325 short tons). Subject imports undersold the domestic like product for Product 3 in five out of six quarterly comparisons (1,538 short tons). *Id*.

[142] In prior investigations, we have examined direct import data in our underselling analysis when we find it important to understanding pricing in the market as a whole. *See, e.g.*, *Tool Chests and Cabinets from China*, Inv. No. 701-TA-575 (Final), USITC Pub. 4753 at 40 n.149 (Jan. 2018).

[143] Derived from CR/PR at Table V-6.

[144] *See Tool Chests and Cabinets*, USITC Pub. 4753 at 40 n.149. Consequently, we are not persuaded by Dow's argument that direct imports and sales to unrelated parties are not comparable due to any differences in the level of trade. As is our customary practice, we asked the importer to provide additional costs that would be associated with importing but may not be reflected in direct import costs. We observe that costs associated with Dow's direct imports were relatively small, at *** percent of landed duty-paid value. *See* Dow's U.S. Importers' Questionnaire at III-3f(i).

[145] Petitioner argues that Dow's reported direct import cost data is based on its own purchase price from unrelated suppliers during the prior year, and therefore, due to a decline in prices from 2015 to 2016, as reflected in the published price index, the reported purchase cost data for 2016 into 2017 are overvalued when comparing same quarterly prices. Globe's Posthearing Brief, Attachment A at 37-39.

We are not persuaded that Dow's direct import cost is overvalued for 2016 and 2017. We observe that the prices for the direct imports from Brazil show a similar trend as most of the other pricing products—with price declines starting in 2015 and a prominent drop in the first quarter of 2016. *See generally* CR/PR at Tables V-3 to V-6. Thus, the quarterly direct import costs of subject imports from Brazil do not deviate from prices for those products. Moreover, there is no indication in the record that the reported values are inaccurate or misreported. Therefore, we find that direct import pricing data from Dow are probative for our analysis.

of the four subject countries are comparable in terms of price.[146] Hence, we do not find that the underselling by subject imports was significant.

We also examined pricing trends, including the extent to which they correlated with subject import volumes. Prices for the domestic like product generally increased in 2014, began to decline in 2015, sustained particularly steep declines in 2016, and generally increased in interim 2017.[147] In 2015, when prices for the domestic like product started to decline, the volume of cumulated subject imports declined by *** percent.[148] Declines in subject import shipments during 2015 were largely a function of declining shipments of direct imports of Product 3 from Brazil, which were valued lower than domestic Product 3 prices in all quarters of that year.[149] In 2016, when prices for the domestic like product fell to their lowest levels, cumulated subject imports increased in volume and market share.[150] Similar to the decline in subject import volume in 2015, the increase in cumulated subject import volume in 2016 was largely a function of shipments of direct imports of Product 3 from Brazil, which increased in 2016 and had higher purchase costs than U.S. producer prices in the last three quarters of that year.[151] Consequently, the record does not indicate any correlation between subject import volumes or price levels and the declines in prices for the domestic like product during 2015 and 2016. Moreover, only *** reported that U.S. producers reduced prices in order to compete with subject imports.[152] We therefore find that the cumulated imports did not depress prices of the domestic like product to a significant degree.

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[146] CR/PR at Table II-9.

[147] Domestic Product 1 prices peaked in the first quarter of 2016 at $*** per short ton, declined sharply in the third quarter of that year at $*** per short ton and continued to decline to a period low of $*** per short ton in the first quarter of 2017. Domestic Product 2 prices peaked in the third quarter of 2014 at $*** per short ton, with consistent declines until the fourth quarter of 2015 at $*** per short ton, declined sharply in the first quarter of 2016 at $*** per short tons, and continued to decline to a period low of $*** per short ton in the fourth quarter of 2016. Similar to Product 2, domestic Product 3 prices peaked in the fourth quarter of 2014 at $*** per short ton, with consistent declines until the fourth quarter of 2015 at $*** per short ton, declined sharply in the first quarter of 2016 at $*** per short ton, and continued to decline to a period-low of $*** per short ton in the first quarter of 2017. Prices for all three products increased in interim 2017. CR/PR at Tables V-3 to V-5.

[148] CR/PR at Table IV-9.

[149] CR/PR at Tables IV-9 and V-6. The cumulated volume of subject imports decreased in 2015 by *** short tons while direct imports of Product 3 from Brazil decreased by *** short tons.

[150] CR/PR at Table C-3. As explained above, however, the subject imports' gain in market share did not come at the expense of the domestic industry, which also increased its market share during this time.

[151] CR/PR at Table V-6. In 2016, direct imports from Brazil of Product 3 increased by *** short tons while the cumulated volume of subject imports increased by *** short tons. *See* CR/PR at Tables V-6 and IV-11.

[152] CR/PR at Table V-13. Seven purchasers reported that U.S. producers did not reduce prices to compete with subject imports while the majority of reporting purchasers reported that they did not know whether U.S. producers had reduced prices to compete with subject imports. CR at V-33, PR at V-11.

Instead, other conditions of competition in the market correspond more closely with the price declines that occurred during the POI. Initially, apparent U.S. consumption declined by *** percent in 2015 and remained relatively flat in 2016.[153] Moreover, the steep declines in prices for the domestic like product during 2016 came during a period of increased intra-industry competition in the U.S. market. MS Silicon had not started production in 2014 when U.S. prices, as well as the volume of subject imports, were generally at their highest levels.[154] MS Silicon began making U.S. commercial shipments when it entered the U.S. market in the fourth quarter of 2015, which was right before the sharp U.S price declines that generally started in the first quarter of 2016.[155] MS Silicon's U.S. commercial shipments also substantially increased in the first quarter of 2016 and remained at substantial levels for the remaining quarters in that year.[156] During 2016, MS Silicon also cut prices from previous levels, and specifically offered products at lower prices than Globe.[157] As MS Silicon cut prices, so did Globe.[158] Consequently, the record indicates that that there is a correlation between: (a) MS Silicon's entry into the U.S. market in 2015 and its increased presence in 2016, and (b) the decline in prices for the domestic like product during that period, particularly in 2016.[159]

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[153] CR/PR at Table C-1.

[154] CR/PR at Tables III-4, III-5, and IV-9. While U.S. producer prices for Product 1 peaked in the first quarter of 2016, U.S. producer prices for both Product 2 and Product 3 peaked in the fourth quarter of 2014. Product 1 by far had the least quantity of shipments of the domestic product among the three pricing products. *See generally* CR/PR at Tables V-3 to V-5.

[155] Data Spreadsheets with Summation and Company-Specific Data, Tab 102 at 31, EDIS Doc. No. 639254. U.S. producer prices for Product 2 and Product 3 started to decline sharply in the first quarter of 2016 while U.S. producer prices for Product 1 started to decline sharply in the third quarter of 2016. CR/PR at Tables V-3 to V-5. As indicated in section V.B.2., the market was aware of MS Silicon's entry into the U.S. market because the decision was made prior to the beginning of the POI and the construction of its production facility started in ***. *See* CR/PR at Tables III-1 and III-4.

[156] Data Spreadsheets with Summation and Company-Specific Data, Tab 102 at 31, EDIS Doc. No. 639254; CR/PR at Table VI-6. MS Silicon's net sales, by quantity, were *** short tons in 2015 and *** short tons in 2016. CR/PR at Table VI-6. MS Silicon overall had very minimal shipments of Product 1. For Product 2, MS Silicon had *** short tons of shipments in the fourth quarter of 2015 and *** short tons in the first quarter of 2016, which increased to *** short tons by the fourth quarter of 2016. For Product 3, MS Silicon had *** short tons of shipments in the fourth quarter of 2015 and *** short tons in the first quarter of 2016, which declined to *** short tons by the fourth quarter of 2016. EDIS Doc. No. 639254, Tab 102 at 31.

[157] In 2016, MS Silicon offered lower prices than Globe in *** quarters for Product 2 and *** quarters for Product 3. Derived from Data Spreadsheets with Summation and Company-Specific Data, Tab 102 at 31 and Tab 101 at 13, EDIS Doc. No. 639254. There were very minimal shipments of subject imports of Product 3 in 2016. CR/PR at Table V-5.

[158] Data Spreadsheets with Summation and Company-Specific Data, Tab 102 at 31 and Tab 101 at 13, EDIS Doc. No. 639254.

[159] While we acknowledge Petitioner's contention that prices were already declining prior to MS Silicon's entry in 2015, the degree of decline was not as sharp as that in 2016. Prices declined precipitously in 2016 when MS Silicon substantially increased its shipments. *See* Globe's Posthearing Brief at 17-18; EDIS Doc. No. 639254, Tab 102 at 31. In addition, apparent U.S. consumption decreased (Continued...)

With regard to price suppression, we acknowledge that the domestic industry's ratio of cost of goods sold ("COGS") to net sales increased from *** percent in 2014 to *** percent in 2015 and *** percent in 2016.[160] The domestic industry's unit COGS, however, declined in 2016, when domestic producers experienced the most significant increase in the COGS-to-net-sales ratio.[161] Additionally, demand for silicon metal declined after 2014, so the industry could not realistically expect to institute price increases over this period.[162] Therefore, we find that subject imports did not have the effect of preventing price increases that would otherwise have occurred to a significant degree.

In view of the foregoing, we find that the subject imports did not have the effect of depressing prices or preventing price increases for the domestic like product that would otherwise have occurred to a significant degree. While there was mixed underselling and some confirmed lost sales,[163] the domestic industry gained or maintained market share throughout the POI. Accordingly, we do not find that the subject imports caused significant price effects.

(…Continued)
significantly in 2015, which likely contributed to the price declines that occurred in that year. CR/PR at Table IV-9. Furthermore, Petitioner's argument does not establish a causal link between subject imports and price depression in 2015, as subject imports declined in 2015 while instances of subject import underselling were no more pervasive than in 2014, when U.S. prices were high. CR/PR at Tables IV-9 and V-3 to V-5.

Petitioner also argues that Globe changed its pricing practice for a few sales to be based on index pricing to avoid losing business to subject imports in 2016 because subject producers were offering prices at below benchmark by including discounts on the index price in their annual contracts. Hearing Tr. at 36-37 (Perkins); Globe's Prehearing Brief at 43. While we do not dispute that Globe may have offered discounts on the index price for certain sales, *see* Wacker's Posthearing Brief, Exh. 6. (Globe CEO, Pedro Larrea, statements at Globe's third quarter 2016 earnings call), the record does not suggest that subject producers offered such discounts. Furthermore, the record indicates that all U.S. producers and all but *** reported having no discount policy. CR at V-8 to V-9, PR at V-6. Moreover, while purchasers in all sectors may reference these indices, the published index prices pertain only to secondary aluminum while the majority of domestic industry and subject imports' sales and shipments are to chemical and/or polysilicon producers. *See* CR at V-5, PR at V-4; CR/PR at Tables IV-7, V-3 to V-6.

[160] CR/PR at Table C-3.

[161] Unit COGS declined from $*** per short ton in 2015 to $*** per short ton in 2016, a *** percent decline, while the COGS-to-net-sales ratio increased by *** percentage points. CR/PR at Table C-3.

[162] CR/PR at Table C-3.

[163] CR/PR at Table V-12. Twenty-five out of 31 responding purchasers reported that they purchased subject imports instead of the domestic like product on at least one occasion for a total quantity of *** short tons. Fifteen reported that imports were priced lower and 11 reported that price was a primary reason for purchasing subject imports instead of the domestic like product. *Id*.

E. Impact of the Subject Imports[164]

Section 771(7)(C)(iii) of the Tariff Act provides that examining the impact of subject imports, the Commission "shall evaluate all relevant economic factors which have a bearing on the state of the industry."[165] These factors include output, sales, inventories, capacity utilization, market share, employment, wages, productivity, gross profits, net profits, operating profits, cash flow, return on investment, return on capital, ability to raise capital, ability to service debts, research and development, and factors affecting domestic prices. No single factor is dispositive and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[166]

Most of the domestic industry's trade and employment figures increased or remained neutral over the POI. By contrast, the domestic industry's financial indicators deteriorated.[167]

The domestic industry's capacity and production increased during the POI, while capacity utilization fluctuated within a relatively narrow range.[168] Its U.S. shipments increased

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[164] The statute instructs the Commission to consider the "magnitude of the dumping margin" in an antidumping proceeding as part of its consideration of the impact of imports. 19 U.S.C. § 1677(7)(C)(iii)(V). In its final antidumping duty determinations, Commerce found weighted-average dumping margins of 41.73 percent to 51.28 percent for subject imports from Australia, 68.97 percent to 134.92 percent for subject imports from Brazil, and 3.22 percent for all subject imports from Norway. *Silicon Metal from Australia: Affirmative Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances in Part*, 83 Fed. Reg. 9839 (Mar. 8, 2018); *Silicon Metal From Brazil: Affirmative Final Determination of Sales at Less Than Fair Value*, 83 Fed. Reg. 9835 (Mar. 8, 2018); *Silicon Metal From Norway: Affirmative Final Determination of Sales at Less Than Fair Value, Final Determination of No Sales, and Final Negative Determination of Critical Circumstances*, 83 Fed. Reg. 9829 (Mar. 8, 2018). We take into account in our analysis the fact that Commerce has made final findings that all subject producers in Australia, Brazil, and Norway are selling subject imports in the United States at less than fair value. In addition to this consideration, our impact analysis has considered other factors affecting domestic prices. Our analysis of the lack of significant underselling and price effects of subject imports, described in both the price effects discussion and below, is particularly probative to an assessment of the impact of the subject imports.

[165] 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851 and 885 ("In material injury determinations, the Commission considers, in addition to imports, other factors that may be contributing to overall injury. While these factors, in some cases, may account for the injury to the domestic industry, they also may demonstrate that an industry is facing difficulties from a variety of sources and is vulnerable to dumped or subsidized imports.").

[166] 19 U.S.C. § 1677(7)(C)(iii). This provision was amended by the Trade Preferences Extension Act of 2015, Pub. L. 114-27.

[167] Petitioner contends that Globe and MS Silicon were impacted in different ways. Therefore, Petitioner argues that the Commission should take into account the context of each individual U.S. producer when assessing the condition of the domestic industry. Hearing Tr. at 69-70 (Lutz); Globe's Posthearing Brief at 17-18. However, as summarized above, Petitioner did not object to MS Silicon's inclusion in the domestic industry. Moreover, the Commission is required to focus on injury incurred by the domestic industry "as a whole," and not on injury to specific firms. *See Comm. for Fair Coke Trade v. United States*, 28 CIT 1140, 1167-68 (2004). Therefore, we do not analyze the impact of subject imports on a firm-specific basis.

overall during the POI, and its market share also increased, notwithstanding that its market share was *** lower in interim 2017 than interim 2016.[169] Its inventories increased from 2014 to 2016, and were lower in interim 2017 than interim 2016.[170]

The number of production related workers, hours worked, and wages paid increased overall from 2014 to 2016 and were *** lower in interim 2017 than interim 2016.[171] By contrast, productivity declined from 2014 to 2016 and was higher in interim 2017 than interim 2016.[172]

The domestic industry's financial indicators deteriorated overall during the POI and declined sharply in 2016 coincident with the price declines that year. The quantity of net sales increased overall throughout the POI.[173] Sales revenues rose in 2015, declined in 2016, and were lower in interim 2017 than interim 2016 on an aggregate basis; average unit sales values followed the same trend.[174] Average unit COGS showed the same trends as unit sales values, but increased more rapidly from 2014 to 2015 and declined more sharply from 2015 to 2016.[175]

(…Continued)

[168] The domestic industry's capacity was *** short tons in 2014, *** short tons in 2015, and *** short tons in 2016; it was *** short tons in interim 2016 and *** short tons in interim 2017. Its production was *** short tons in 2014, *** short tons in 2015, and *** short tons in 2016; it was *** short tons in interim 2016 and *** short tons in interim 2017. The domestic industry's capacity utilization rate was *** percent in 2014, *** percent in 2015, *** percent in 2016; it was *** percent in interim 2016 and *** percent in interim 2017. CR/PR at Table C-3.

[169] U.S. shipments declined from *** short tons in 2014 to *** short tons in 2015, and subsequently increased to *** short tons in 2016; they were *** short tons in interim 2016 and *** short tons in interim 2017. The domestic industry's share of apparent U.S. consumption increased from *** percent in 2014 to *** percent in 2015 to *** percent in 2016; it was *** percent in interim 2016 and *** percent in interim 2017. CR/PR at Table C-3.

[170] Ending inventories were *** short tons in 2014, *** short tons in 2015, and *** short tons in 2016; they were *** short tons in interim 2016 and *** short tons in interim 2017. CR/PR at Table C-3.

[171] The number of production related workers was *** in 2014, *** in 2015, and *** in 2016; it was *** in interim 2016 and *** in interim 2017. Total hours worked was *** hours in 2014, *** hours in 2015, and *** hours in 2016; these were *** hours in interim 2016 and *** hours in interim 2017. Wages paid was $*** in 2014, $*** in 2015, $*** in 2016, $*** in interim 2016, and $*** in interim 2017. CR/PR at Table C-3.

[172] Productivity declined from *** short tons per 1,000 hours in 2014 to *** short tons per 1,000 hours in 2015, and increased to *** short tons per 1,000 hours in 2016; it was *** short tons per 1,000 hours in interim 2016 and *** short tons per 1,000 hours in interim 2017. CR/PR at Table C-3.

[173] The quantity of net sales was *** short tons in 2014, *** short tons in 2015, and *** short tons in 2016; it was *** short tons in interim 2016 and *** short tons in interim 2017. CR/PR at Table C-3.

[174] Sales revenues were $*** in 2014, $*** in 2015, and $*** in 2016; they were $*** and $*** in interim 2016 and interim 2017, respectively. Average unit sales values were *** in 2014, *** in 2015, *** in 2016, *** in interim 2016, and *** in interim 2017. CR/PR at Table C-3.

[175] Unit COGS increased from $*** in 2014 to $*** in 2015, and declined to $*** in 2016; it was $*** in interim 2016 and $*** in interim 2017. The domestic industry's COGS to net sales ratio (Continued...)

The domestic industry had yearly declines in gross profit, operating income, and net income, and losses in each of these indicators in 2016 and interim 2017.[176] Operating margins declined throughout the POI.[177] [178] Capital expenses rose in 2015, when MS Silicon was opening its new production facility, fell in 2016, and were *** lower in interim 2017 than in interim 2016.[179]

During a period of overall falling demand, the domestic industry increased its production and shipments throughout the POI, and its market share and employment were higher at the conclusion of the POI than at its beginning. By contrast, the industry's financial results declined, most notably during 2016 when sales revenues fell more quickly than costs and remained poor in interim 2017 when average unit sales values remained well below those earlier in the period. As we explained above, however, the price declines that began in in 2015 and accelerated in 2016 were not due to subject imports. Consequently, the decline in the industry's financial performance during the latter portion of the POI, when its shipments and market share were rising or essentially stable was also not a function of the subject imports.

In view of the foregoing, we find that subject imports have not had a significant impact on the domestic industry.

(…Continued)
increased over the POI, particularly with respect to the period from 2015 to 2016 when it increased from *** percent in 2015 to *** percent in 2016. CR/PR at Table C-3.

[176] Gross profit declined from $*** in 2014 to $*** in 2015, and then fell to a loss of $*** in 2016; the industry reported gross losses of $*** and $*** in interim 2016 and interim 2017, respectively. Operating income fell from $*** in 2014 to $*** in 2015, and then fell to an operating loss of $*** in 2016. The industry sustained an operating loss of $*** in both interim 2016 and interim 2017. Net income fell from $*** in 2014 to $*** in 2015, and then fell to a net loss of $*** in 2016; the industry reported net losses of $*** and $*** in interim 2016 and interim 2017, respectively. CR/PR at Table C-3.

[177] The industry's ratio of operating income to net sales declined from *** percent in 2014 to *** percent in 2015, and then subsequently to *** percent in 2016. The ratio was *** percent in interim 2016 and *** percent in interim 2017. CR/PR at Table C-3.

[178] While Respondents have questioned the accuracy of the financial data provided by Globe, *see* Dow's Prehearing Brief at 40-45; Dow's Posthearing Brief at 9; Wacker's Posthearing Brief at 12, Exhibit 1 at 19-20, 28, the firm's data were independently verified by Commission staff. CR/PR at VI-1 n.1. Moreover, Respondents' reservations about the data do not affect the underlying trends with respect to the data.

[179] *See* CR/PR at Table VI-7. While *** reported that the subject imports had negative effects on investment, growth, and development, *** did not. CR/PR at Tables VI-9 to VI-10. Moreover, *** indicated that these negative effects were due to *** which we found above were not a function of the subject imports. We also observe that ***, indicated that Globe ***. Nearly all of Globe's reported ***. CR/PR at Table III-4.

VI. No Threat of Material Injury by Reason of Subject Imports

A. Legal Standard

Section 771(7)(F) of the Tariff Act directs the Commission to determine whether the U.S. industry is threatened with material injury by reason of the subject imports by analyzing whether "further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted."[180] The Commission may not make such a determination "on the basis of mere conjecture or supposition," and considers the threat factors "as a whole" in making its determination whether dumped or subsidized imports are imminent and whether material injury by reason of subject imports would occur unless an order is issued.[181] In making our determination, we consider all statutory threat factors that are relevant to these investigations.[182]

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[180] 19 U.S.C. § 1677(7)(F)(ii).

[181] 19 U.S.C. § 1677(7)(F)(ii).

[182] These factors are as follows:

(I) if a countervailable 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 countervailable subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement) and whether imports of the subject merchandise are likely to increase,

(II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,

(III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,

(IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices and are likely to increase demand for further imports,

(V) inventories of the subject merchandise,

(VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,

…

(VIII) 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 domestic like product, and

(IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).

19 U.S.C. § 1677(7)(F)(i). To organize our analysis, we discuss the applicable statutory threat factors using the same volume/price/impact framework that applies to our material injury analysis. Statutory threat factors (I), (II), (III), (V), and (VI) are discussed in the analysis of likely subject import volume. Statutory threat factor (IV) is discussed in the analysis of likely subject import price effects. (Continued...)

B. Cumulation for Threat

Under section 771(7)(H) of the Tariff Act, the Commission may "to the extent practicable" cumulatively assess the volume and price effects of subject imports from all countries as to which petitions were filed on the same day if the requirements for cumulation in the material injury context are satisfied.[183]

Respondents contend that the Commission should exercise its discretion not to cumulate subject imports from Norway for purposes of threat analysis.[184] Elkem argues that subject imports from Norway show volume and pricing trends distinct from those of the other subject countries.[185]

We found in our discussion of cumulation above that there is a reasonable overlap of competition among subject imports from all four countries and between subject imports from each country and the domestic like product. The considerations discussed above apply to our decision to cumulate subject imports for the purposes of our threat analysis.

The record does not indicate that there would likely be any significant difference in the conditions of competition between subject imports from the four countries. We recognize that some potential differences exist between the import trends from and industries in these subject countries, particularly with respect to Brazil and Norway,[186] but after examining these differences, we find that they do not warrant a determination to not cumulate all subject imports. Therefore, we conclude that it is appropriate to exercise our discretion to cumulate subject imports from Australia, Brazil, Kazakhstan, and Norway for the purposes of our threat analysis.

(…Continued)
Statutory factors (VIII) and (IX) are discussed in the analysis of impact. Statutory factor (VII) concerning agricultural products is inapplicable to these investigations.

[183] 19 U.S.C. § 1677(7)(H).

[184] Wacker's Prehearing Brief at 102. Respondents also contend that the Commission should exercise its discretion not to cumulate subject imports from Australia for threat analysis but do not make specific arguments to support the contention. *Id*. As summarized above, Respondents argues against cumulation of subject imports from Brazil and Kazakhstan for present material injury analysis, which we would also consider with respect to threat.

[185] Elkem's Prehearing Brief at 8-9. Petitioner's threat arguments assume cumulation. Nevertheless, petitioner asserted no arguments specifically addressing why the Commission should exercise its discretion to cumulate imports from all four subject countries for purposes of any threat analysis.

[186] We observe that the volume of subject imports from Norway during interim 2017 was 9.1 percent lower than interim 2016 while the volume of subject imports from the other subject countries in interim 2017 were 28.3 percent to 36.7 percent higher than interim 2016. CR/PR at C-3. Additionally, in section V.D. above, we found that the decrease in subject import volume in 2015 and the subsequent increase in 2016 was largely a function of subject imports from Brazil. *See* CR/PR at Tables IV-9 and V-6.

C. Analysis

1. Likely Volume

In section V.C. above, we found the volume of cumulated subject imports to be significant during the POI absolutely and relative to consumption in the United States. We did not find a significant increase in subject import volume during the POI. Indeed, the absolute volume of cumulated subject imports was lower in 2016 than in 2014.[187] While subject imports' market share increased during the latter portion of the POI, these gains came at the expense of nonsubject imports as the domestic industry increased its market share over the POI.[188]

The record indicates that the capacity of the subject industries is high both absolutely and relative to apparent U.S. consumption.[189] However, producers in the subject countries increased their capacity utilization to a very high level over the POI, particularly in 2016 when there was an increase in the volume of cumulated subject imports.[190] Thus, subject producers have limited ability to increase production.[191]

While the record indicates that subject producers are highly export oriented, export shipments to the United States as a ratio of all export shipments declined over the POI, and the ratio is projected to increase *** in 2017 from the 2016 level but to decline *** in 2018.[192] This is consistent with the response by a majority of market participants reporting that demand outside the United States is increasing; by contrast, the market participants had mixed perceptions regarding U.S. demand as well as the fluctuations in apparent U.S. consumption during the POI.[193] Consequently, the record does not indicate that any efforts by subject

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[187] CR/PR at Table IV-9.

[188] CR/PR at Table C-3.

[189] *Compare* CR/PR at Table VII-21 *with* CR/PR at Table IV-9. Subject producers' capacity was *** short tons in 2014, *** short tons in 2015, and *** short tons in 2016; the capacity was *** short tons and *** short tons in interim 2016 and interim 2017, respectively. CR/PR at Table VII-21.

[190] CR/PR at Table VII-21. Subject producers' capacity utilization was *** percent in 2014, *** percent in 2015, *** percent in 2016, and it was *** percent in interim 2016 and *** percent in interim 2017. Subject producers' capacity utilization is projected to remain at high levels at *** percent in 2017 and *** percent in 2018. *Id*.

Additionally, the potential for product shifting is limited. Only the producer *** reported production of out-of-scope products on the same equipment used to produce silicon metal. This production was ***. CR/PR at Tables VII-4, VII-9, VII-14, and VII-19.

[191] Subject producers' production was *** short tons in 2014, *** short tons in 2015, and *** short tons in 2016; it was *** short tons and *** short tons in interim 2016 and interim 2017, respectively. Their production is projected to be *** and *** short tons in 2017 and 2018, respectively. CR/PR at Table VII-21.

[192] CR/PR at Table VII-21. The ratio of export shipment to total shipments was *** percent in 2014, *** percent in 2015, *** percent in 2016, *** percent in interim 2016, and *** percent in interim 2017. The ratio of export shipments to the U.S. market to total shipments was *** percent in 2014, *** percent in 2015, *** percent in 2016, *** percent in interim 2016, and *** percent in interim 2017. This ratio is projected to increase *** to *** percent in 2017 but decline *** to *** percent in 2018. *Id*.

[193] CR/PR at Table II-4; *see also* CR/PR at Table IV-3.

producers to utilize excess capacity and increase export shipments will focus on the U.S. market. Indeed, subject producers' home market shipments and shipments to other export markets are both projected to increase in 2017 and 2018, while export shipments to the United States are expected to decline.[194] Moreover, the record also indicates that there are no outstanding antidumping or countervailing duty orders in other countries.[195]

U.S. importer inventories were relatively flat from 2014 to 2016 and the inventory level in interim 2017 was lower than interim 2016.[196] Inventories in the subject countries declined in both absolute and relative terms from 2014 to 2016 and were lower in interim 2017 than interim 2016.[197]

As stated above, the record does not indicate that there has been a significant rate of increase of the volume or market penetration of imports of the subject merchandise during the POI. Nor are substantially increased imports likely in the imminent future in light of the lack of existing excess capacity with which to increase production, the likely growth and availability of other export markets, lack of growth in inventories, and lack of potential for product shifting. Additionally, in light of the experience during the POI, any potential increase in subject import volume is unlikely to cause any appreciable decline in the market share of the domestic industry given that increases in subject import volumes came at the expense of nonsubject imports.[198]

2. Likely Price Effects

In section V.D. above, we found mixed instances of underselling and overselling by the subject imports. We also found that notwithstanding the increasing volume of subject imports during the latter part of the POI, the subject imports did not have significant effects on prices for the domestic like product.

With respect to likely price levels during the imminent future, we observe that Petitioner has been publicly optimistic about rising silicon metal prices going into 2017 as Globe

[194] CR/PR at Tables VII-21, VII-22 and VII-23. Arranged imports of subject merchandise are *** short tons in the fourth quarter of 2017, *** short tons in the first quarter of 2018, *** short tons in the second quarter of 2018, and *** short tons in the third quarter of 2018. CR/PR at Table VII-24.

[195] CR at VII-39 to VII-41, PR at VII-24 to VII-25. We observe that there is an ongoing antidumping investigation in the European Union on imports of silicon metal from Brazil and Bosnia and Herzegovina. *Id*.

[196] U.S. importer inventories of subject imports were *** short tons in 2014, *** short tons in 2015, *** short tons in 2016s *** short tons in interim 2016 and *** short tons in interim 2017. CR/PR at Table VII-23.

[197] CR/PR at Table VII-21.

[198] In our analysis, we have considered the nature of the subsidies Commerce has found to be countervailable, particularly whether the countervailable subsidies are ones described in Articles 3 or 6.1 of the Agreement on Subsidies and Countervailing Measures, and whether imports of the subject merchandise are likely to increase. 19 U.S.C. § 1677(7)(F)(i)(I). We observe that Commerce found one export subsidy program in the form of tax forgiveness provided by the government of Brazil. *See* Silicon Metal from Brazil: Issues and Decision Memorandum for the Final Affirmative Determination of the Countervailing Duty Investigation (Feb. 27, 2018); Decision Memorandum for the Preliminary Affirmative Determination: Countervailing Duty Investigation of Silicon Metal from Brazil (August 7, 2017) at 14-17.

will no longer be discounting prices based on index prices.[199] Therefore, even if there is some increase in the volume of cumulated subject imports entering the U.S. market in the imminent future, in light of the forecasted improving prices and the lack of causal relationship between increasing subject import volumes and prices of the domestic like product during the POI, nothing in the record indicates that subject imports will likely depress or suppress domestic prices. We consequently find that imports of the subject merchandise are unlikely to enter at prices that would be likely to have a significant depressing or suppressing effect on domestic prices or that would be likely to increase demand for further subject imports.

3. Likely Impact

We found in section V.E. above that during the POI the domestic industry increased output and shipments, but experienced declines in financial performance. We further found that the declines in financial performance were not a result of the subject imports. In light of our findings that there is not likely to be a significant increase in subject import volume during the imminent future that will result in an appreciable decline in the domestic industry's market share and that subject imports will not likely have significant price effects, the record does not indicate a probability that material injury by reason of subject imports is imminent.[200]

VII. Conclusion

For the reasons stated above, we determine that an industry in the United States is not materially injured or threatened with material injury by reason of subject imports of silicon metal from Australia, Brazil, and Norway that are sold in the United States at less than fair value and subject imports of silicon metal that are subsidized by the governments of Australia, Brazil, and Kazakhstan.

[199] Wacker's Posthearing Brief, Exh. 6. Globe CEO Pedro Larrea stated during Globe's third quarter 2016 earnings call that Globe is "beginning to see indications of meaningful price improvements for 2017 negotiations . . . there is overall consensus in the market that {Globe} products are set for significant price recovery in 2017 . . . ." Lerrea further stated that Globe will no longer be offering or accepting discounts for 2017 prices. *See id*. We are thus not persuaded by Petitioner's contention that prices rose as a result of the filing of the petition because Globe publicly stated that prices had been improving in November 2016 before it filed the petition. Globe's Posthearing Brief, Attachment A at 51; CR/PR at Figure V-3.

[200] Given that the domestic industry reported *** research and development expenses during the POI, CR/PR at Table VI-7, the record contains no indication that subject imports will have negative effect on the development and production efforts of the domestic industry.

PART I: INTRODUCTION

BACKGROUND

These investigations result from petitions filed with the U.S. Department of Commerce ("Commerce") and the U.S. International Trade Commission ("USITC" or "Commission") by Globe Specialty Metals, Inc. ("GSM"), Beverly, Ohio, on March 8, 2017, alleging that an industry in the United States is materially injured and threatened with material injury by reason of subsidized silicon metal[1] from Australia, Brazil, and Kazakhstan and less-than-fair-value ("LTFV") imports of silicon metal from Australia, Brazil, and Norway. The following tabulation provides information relating to the background of these investigations.[2] [3]

[1] See the section entitled "The Subject Merchandise" in *Part I* of this report for a complete description of the merchandise subject in this proceeding.

[2] Pertinent *Federal Register* notices are referenced in appendix A, and may be found at the Commission's website (www.usitc.gov).

[3] A list of witnesses that appeared at the hearing is presented in appendix B of this report.

Effective date	Action
March 8, 2017	Petitions filed with Commerce and the Commission; institution of the Commission's investigations (82 FR 13653, March 14, 2017)
March 28, 2017	Commerce's notice of initiation of antidumping duty investigations (82 FR 16352, April 4, 2017) and countervailing duty investigations (82 FR 16356, April 4, 2017)
April 24, 2017	Commission's preliminary determinations (82 FR 19383, April 27, 2017)
August 14, 2017	Commerce's preliminary affirmative countervailing duty determinations and alignment of final determinations with final antidumping duty determinations concerning silicon metal from Australia, Brazil, and Kazakhstan (82 FR 37841-37844 and 37847-37849, August 14, 2017)
October 12, 2017	Commerce's preliminary affirmative determinations of sales at LTFV, postponement of final determinations, and extension of provisional measures concerning silicon metal from Australia, Brazil, and Norway; preliminary negative determination of critical circumstances and preliminary no shipments concerning Norway; preliminary affirmative determination of critical circumstances concerning Australia (82 FR 47466-47469, 47471-47473, and 47475-47477, October 12, 2017); Scheduling of final phase of Commission investigations (82 FR 49848, October 27, 2017)
February 15, 2018	Commission's hearing
March 8, 2018	Commerce's final affirmative countervailing duty determinations concerning silicon metal from Australia, Brazil, and Kazakhstan; (83 FR 9834-9835, 9838-9839, and 9831-9833, March 8, 2018); final affirmative determinations of sales at LTFV concerning silicon metal from Australia, Brazil, and Norway; final affirmative determination of critical circumstances in part concerning silicon metal from Australia; final determination of no sales, and final negative determination of critical circumstances concerning silicon metal from Norway (83 FR 9839-9842, 9835-9838, and 9829-9831, March 8, 2018)
March 23, 2018	Commission's vote
April 10, 2018	Commission's views

STATUTORY CRITERIA AND ORGANIZATION OF THE REPORT

Statutory criteria

Section 771(7)(B) of the Tariff Act of 1930 (the "Act") (19 U.S.C. § 1677(7)(B)) provides that in making its determinations of injury to an industry in the United States, the Commission--

shall consider (I) the volume of imports of the subject merchandise, (II) the effect of imports of that merchandise on prices in the United States for domestic like products, and (III) the impact of imports of such merchandise on domestic producers of domestic like products, but only in the context of production operations within the United States; and. . . may consider such other economic factors as are relevant to the determination regarding whether there is material injury by reason of imports.

Section 771(7)(C) of the Act (19 U.S.C. § 1677(7)(C)) further provides that--[4]

In evaluating the volume of imports of merchandise, the Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States is significant.. . .In evaluating the effect of imports of such merchandise on prices, the Commission shall consider whether. . .(I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.. . . In examining the impact required to be considered under subparagraph (B)(i)(III), the Commission shall evaluate (within the context of the business cycle and conditions of competition that are distinctive to the affected industry) all relevant economic factors which have a bearing on the state of the industry in the United States, including, but not limited to. . . (I) actual and potential decline in output, sales, market share, gross profits, operating profits, net profits, ability to service debt, productivity, return on investments, return on assets, and utilization of capacity, (II) factors affecting domestic prices, (III) actual and potential negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment, (IV) 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 domestic like product, and (V) in {an antidumping investigation}, the magnitude of the margin of dumping.

In addition, Section 771(7)(J) of the Act (19 U.S.C. § 1677(7)(J)) provides that—[5]

[4] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.
[5] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.

(J) EFFECT OF PROFITABILITY.—The Commission may not determine that there is no material injury or threat of material injury to an industry in the United States merely because that industry is profitable or because the performance of that industry has recently improved.

Organization of report

Part I of this report presents information on the subject merchandise, subsidy and dumping margins, and domestic like product. *Part II* of this report presents information on conditions of competition and other relevant economic factors. *Part III* presents information on the condition of the U.S. industry, including data on capacity, production, shipments, inventories, and employment. *Parts IV* and *V* present the volume of subject imports and pricing of domestic and imported products, respectively. *Part VI* presents information on the financial experience of U.S. producers. *Part VII* presents the statutory requirements and information obtained for use in the Commission's consideration of the question of threat of material injury as well as information regarding nonsubject countries.

MARKET SUMMARY

Silicon metal is composed almost exclusively of elemental silicon with a small amount of impurities such as iron, calcium, and aluminum.[6] It is generally used as an alloying agent in aluminum production and by the chemical industry as an input in the production of silicones and polysilicon. Silicon metal is also used in a variety of applications which include aluminum (auto/commercial), chemicals (silicones), and polysilicon (solar and electronics).[7] The three U.S. producers of silicon metal are Globe Metallurgical Inc. ("Globe"),[8] Dow Corning Alabama ("DC Alabama"), [9] and Mississippi Silicon LLC ("Mississippi Silicon").

Leading producers of silicon metal in countries subject to this proceeding include *** of Australia, *** of Brazil, *** of Kazakhstan, and *** of Norway. Leading producers of silicon metal in other nonsubject countries include *** of South Africa, *** of Canada, and *** of Spain.[10]

The leading U.S. importer of silicon metal from Australia includes ***. The leading importers of silicon metal from Brazil include ***. The leading importer of silicon metal from Kazakhstan includes ***. The leading importers of silicon metal from Norway include ***.

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[6] Conference transcript, pp. 10 (Kramer), 18 (Perkins).

[7] Staff field trip and interview notes ***.

[8] Globe Metallurgical Inc. is 100 percent wholly owned by Globe Specialty Metals, Inc. and Ferroglobe PLC is the direct parent company of Globe Specialty Metals, Inc. Petitions, Exhibit I-1.

[9] Dow Corning Corporation became a wholly-owned subsidiary of Dow Chemical in 2016. Dow Chemical and DuPont subsequently merged to form DowDuPont on September 1, 2017. Dow Corning Corporation changed its name to the Dow Silicones Corporation, effective February 1, 2018. Dow Corning Alabama is a subsidiary of the Dow Silicones Corporation.

[10] The leading nonsubject producers are ***. *** U.S. producer questionnaire, section I-6.

Leading importers of silicon metal from nonsubject nountries (primarily South Africa, Canada, and Thailand) include ***. Purchasers of silicon metal include primary and secondary aluminum producers and silicon-based chemical producers. Leading purchasers, include ***.

Apparent U.S. consumption of silicon metal totaled approximately *** short tons contained silicon[11] ($***) in 2016. Currently, three firms are known to produce silicon metal in the United States. U.S. producers' U.S. shipments of silicon metal totaled *** short tons contained silicon ($***) in 2016, and accounted for *** percent of apparent U.S. consumption in 2016 by quantity and *** percent by value. U.S. imports from subject sources totaled 111,597 short tons contained silicon ($240.7 million) in 2016 and accounted for *** percent of apparent U.S. consumption in 2016 by quantity and *** percent by value. U.S. imports from nonsubject sources totaled 55,090 short tons contained silicon ($126.8 million) in 2016 and accounted for *** percent of apparent U.S. consumption in 2016 by quantity and *** percent by value.

SUMMARY DATA AND DATA SOURCES

A summary of data collected in these investigations is presented in appendix C, table C-1. Except as noted, U.S. industry data are based on questionnaire responses of three firms that accounted for all known U.S. production of silicon metal during 2016. U.S. imports are based on official import statistics[12] and on questionnaire responses from 24 U.S. importers that are believed to account for virtually all subject imports from Australia, virtually all subject imports from Brazil, virtually all subject imports from Kazakhstan, 96.7 percent of subject imports from Norway, and virtually all imports of silicon metal from nonsubject sources in 2016. Foreign industry data are based on questionnaire responses of one firm in Australia whose exports accounted for *** U.S. imports of silicon metal from Australia, four firms in Brazil whose exports accounted for *** U.S. imports of silicon metal from Brazil, two firms in Kazakhstan whose exports accounted for *** percent of U.S. imports of silicon metal from Kazakhstan, and two firms in Norway whose exports accounted for *** percent of U.S. imports of silicon metal from Norway in 2016.

[11] In general, quantities of silicon metal in this report are stated in terms of contained weight rather than gross weight. For example, 50,000 short tons of silicon metal with a 98 percent silicon content would be described as 49,000 short tons of silicon metal. Under the scope of this proceeding, silicon metal contains at least 85.00 percent but less than 99.99 percent silicon, and less than 4.00 percent iron, by actual weight. Petitions, Vol. I, p. 1, n.2.

[12] Official import statistics are based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, which measure the total physical arrivals of merchandise from foreign countries, whether such merchandise enters the U.S. customs territory immediately or is entered into bonded warehouses or free trade zones ("FTZs") under Customs custody.

PREVIOUS AND RELATED INVESTIGATIONS

Silicon metal has been the subject of several prior import injury proceedings in the United States. The following tabulation presents information regarding previous antidumping and countervailing duty investigations. A detailed discussion of these proceedings appears in Appendix F.

Year petition filed	Inv. number	Country	Current status
1990	731-TA-470	Argentina[1]	ITA revoked effective 1/1/01 (66 FR 10669, 2/16/2001)
1990	731-TA-471	Brazil[1]	ITA revoked effective 2/16/06 (71 FR 76635, 12/21/2006)
1990	731-TA-472	China	ITC fourth review ongoing
2002	731-TA-991	Russia	Continuation of order effective 7/2/2014 (79 FR 37718, 7/2/2014)
2004	701-TA-441	Brazil	Petitions withdrawn on 4/16/2004 (69 FR 23213, 4/28/2004)
2004	731-TA-1081	South Africa	Petitions withdrawn on 4/16/2004 (69 FR 23213, 4/28/2004)
2017	731-TA-1343 and 701-TA-567	Australia[2]	Final phase investigations ongoing
2017	731-TA-1344 and 701-TA-568	Brazil[2]	Final phase investigations ongoing
2017	701-TA-569	Kazakhstan[2]	Final phase investigation ongoing
2017	731-TA-1345	Norway[2]	Final phase investigation ongoing

[1] Petitions were filed concurrently with the underlying petition related to the current fourth review concerning China (731-TA-472).

[2] Commerce made its final determinations on March 8, 2018.

Source: *Silicon Metal From Russia: Investigation No. 731-TA-991 (Second Review)*, USITC Publication 4471, June 2014 and cited FR notices.

NATURE AND EXTENT OF SUBSIDIES AND SALES AT LTFV

Subsidies

On March 8, 2018, Commerce published a notice in the Federal Register the final determinations of its countervailing duty investigations on silicon metal from Australia, Brazil, and Kazakhstan.[13] Commerce determined the following subsidy programs in Australia: [14]

A. Payments Under the Ancillary Service (Spinning Reserve) Scheme
B. Payments Under the Demand Side Management Scheme
C. Renewable Energy Target Program
D. Research and Development Tax Incentive
E. State Agreement and Loan Grant

Commerce determined the following subsidy programs in Brazil:[15]

A. Domestic Programs
    1. Tax Incentives Provided By The Amazon Region Development Authority and Northeast Region Development Authority (SUDAM and SUDENE)
    2. Tax Incentives in the State of Para for Dow Corning Brazil
    3. Forest Fee Reductions in Minas Gerais
B. Export Subsidies
    1. Reintegra

Commerce determined the following subsidy programs in Kazakhstan:[16]

A. Provision of Electricity for LTAR
B. Corporate Income Tax Exemption
C. Property Tax Exemption
D. Land Tax and Land Use Fee Exemption
E. Customs Duty Exemption

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[13] *Silicon Metal From Australia: Final Affirmative Countervailing Duty Determination,* 83 FR 9834, March 8, 2018; *Silicon Metal From Brazil: Final Affirmative Countervailing Duty Determination,* 83 FR 9838, March 8, 2018; *Silicon Metal From Kazakhstan: Final Affirmative Countervailing Duty Determination,* 83 FR 9831, March 8, 2018.

[14] *Silicon Metal from Australia: Issues and Decision Memorandum for the Final Determination in the Countervailing Duty Investigation,* February 27, 2018.

[15] *Silicon Metal from Brazil: Issues and Decision Memorandum for the Final Determination in the Countervailing Duty Investigation,* February 27, 2018.

[16] *Silicon Metal from Kazakhstan: Issues and Decision Memorandum for the Final Determination in the Countervailing Duty Investigation,* February 27, 2018.

On March 8, 2018, Commerce published a notice in the *Federal Register* of its final affirmative determinations of countervailable subsidies for producers and exporters of silicon metal from Australia,[17] Brazil, [18] and Kazakhstan.[19] Tables I-1, I-2, and I-3 present Commerce's final findings of subsidization of silicon metal from Australia, Brazil, and Kazakhstan.

Table I-1
Silicon metal: Commerce's final subsidy determination with respect to imports from Australia

Entity	Final countervailable subsidy rate (*percent*)
Simcoa Operations Pty Ltd.[1]	14.78
All others	14.78

[1]The following companies are cross-owned with Simcoa: Silicon Metal Co. of Australia Pty Ltd., Microsilica Pty Ltd., and Simcoa International Pty Ltd.

Source: 83 FR 9834, March 8, 2018.

Table I-2
Silicon metal: Commerce's final subsidy determination with respect to imports from Brazil

Entity	Final countervailable subsidy rate (*percent*)
Palmyra do Brasil Indústria e Comércio de Silício Metálico e Recursos Naturais Ltda. (formerly known as Dow Corning Silício do Brasil Indústria e Comércio Ltda.) ("Dow Corning Brazil")[1]	2.44
Ligas de Aluminio S.A. ("LIASA")	52.51
All others	2.44

[1] The following companies are cross-owned with Dow Corning Brazil: Palmyra Recursos Naturais Exploracão e Comerciao Ltda. and Dow Corning Metais do Para IND. Dow Corning Brazil changed its name to Palmyra do Brasil Indústria e Comércio de Silício Metálico e Recursos Naturais Ltda. on June 30, 2017.

Source: 83 FR 9838, March 8, 2018.

[17] *Silicon Metal From Australia: Final Affirmative Countervailing Duty Determination,* 83 FR 9834, March 8, 2018.

[18] *Silicon Metal From Brazil: Final Affirmative Countervailing Duty Determination,* 83 FR 9838, March 8, 2018.

[19] *Silicon Metal From Kazakhstan: Final Affirmative Countervailing Duty Determination,* 83 FR 9831, March 8, 2018.

Table I-3
Silicon metal: Commerce's final subsidy determination with respect to imports from Kazakhstan

Entity	Final countervailable subsidy rate (*percent*)
Tau-Ken Temir LLP[1]	100.0
All others	100.0

[1] The following companies are cross-owned with Tau-Ken Temir LLP: JSC NMC Tau-Ken Samruk and LLP Silicon Mining.

Source: 83 FR 9831, March 8, 2018.

Sales at LTFV

On April 4, 2017, Commerce published a notice in the *Federal Register* of the initiation of its antidumping duty investigations on silicon metal from Australia, Brazil, and Norway.[20] On March 8, 2018, Commerce published notices in the *Federal Register* of its final determinations of sales at LTFV with respect to imports from Australia,[21] Brazil,[22] and Norway.[23] Tables I-4, I-5, and I-6 present Commerce's final dumping margins with respect to imports of silicon metal from Australia, Brazil, and Norway.

Table I-4
Silicon metal: Commerce's final weighted-average LTFV margins with respect to imports from Australia

Exporter/producer	Final weighted-average dumping margin (*percent*)
Simcoa Operations Pty Ltd.	51.28
All others	41.73

Source: 83 FR 9839, March 8, 2018.

[20] *Silicon Metal from Australia, Brazil and Norway: Initiation of Less-Than-Fair-Value Investigations*, 82 FR 16352, April 4, 2017.

[21] *Silicon Metal From Australia: Affirmative Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances in Part,* 83 FR 9839, March 8, 2018.

[22] *Silicon Metal From Brazil: Affirmative Final Determination of Sales at Less Than Fair Value,* 83 FR 9835, March 8, 2018.

[23] *Silicon Metal From Norway: Affirmative Final Determination of Sales at Less Than Fair Value, Final Determination of No Sales, and Final Negative Determination of Critical Circumstances,* 83 FR 9829, March 8, 2018.

Table I-5
Silicon metal: Commerce's final weighted-average LTFV margins with respect to imports from Brazil

Exporter/producer	Final weighted-average dumping margin (*percent*)	Cash deposit rate (*percent*)
Palmyra do Brasil Indústria e Comércio de Silício Metálico e Recursos Naturais Ltda. (formerly known as Dow Corning Silício do Brasil Indústria e Comércio Ltda.) ("Dow Corning Brazil")	68.97	68.87
Ligas de Aluminio S.A.—LIASA	134.92	133.49
All others	68.97	68.87

Source: 83 FR 9835, March 8, 2018.

Table I-6
Silicon metal: Commerce's final weighted-average LTFV margins with respect to imports from Norway

Exporter/producer	Final weighted-average dumping margin (*percent*)
Elkem AS	3.22
All others	3.22

Source: 83 FR 9829, March 8, 2018.

THE SUBJECT MERCHANDISE

Commerce's scope

In the current proceeding, Commerce has defined the scope as follows:[24]

> *…all forms and sizes of silicon metal, including silicon metal powder. Silicon metal contains at least 85.00 percent but less than 99.99 percent silicon, and less than 4.00 percent iron, by actual weight. Semiconductor grade silicon (merchandise containing at least 99.99 percent silicon by actual weight and classified under Harmonized Tariff Schedule of the*

[24] *Silicon Metal From Australia: Affirmative Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances in Part,* 83 FR 9839, March 8, 2018; *Silicon Metal From Brazil: Affirmative Final Determination of Sales at Less Than Fair Value,* 83 FR 9835, March 8, 2018; *Silicon Metal From Norway: Affirmative Final Determination of Sales at Less Than Fair Value, Final Determination of No Sales, and Final Negative Determination of Critical Circumstances,* 83 FR 9829, March 8, 2018; *Silicon Metal From Australia: Final Affirmative Countervailing Duty Determination* 83 FR 9834, March 8, 2018; *Silicon Metal From Brazil: Final Affirmative Countervailing Duty Determination,* 83 FR 9838, March 8, 2018; *Silicon Metal From Kazakhstan: Final Affirmative Countervailing Duty Determination,* 83 FR 9831, March 8, 2018.

United States ("HTSUS") {statistical reporting number} 2804.61.0000) is excluded from the scope of these investigations. Silicon metal is currently classifiable under {statistical reporting numbers} 2804.69.1000 and 2804.69.5000 of the HTSUS. While HTSUS numbers are provided for convenience and customs purposes, the written description of the scope remains dispositive.

Tariff treatment

Based upon the scope set forth by Commerce, information available to the Commission indicates that the merchandise subject to these investigations is imported under subheadings 2804.69.10 (covering shipments of silicon containing, by weight, less than 99.99 percent silicon but not less than 99 percent silicon) and 2804.69.50 (for other silicon, not including high-silicon-content shipments of subheading 2804.61.00). The column 1-general rates of duty are 5.3 percent and 5.5 percent *ad valorem*, respectively. Silicon metal that is the product of Kazakhstan and classified in HTS subheading 2804.69.10 is eligible for duty-free entry under the Generalized System of Preferences, but not under subheading 2804.69.50.[25] Decisions on the tariff classification and treatment of imported goods are within the authority of U.S. Customs and Border Protection.

THE PRODUCT

Description and applications[26]

Silicon is a light chemical element with metallic and nonmetallic characteristics. It is a semiconductor, meaning it does not conduct electricity at room temperature, but does so when it is heated. Silicon is rarely found free in nature; it combines with oxygen and other elements to form silicates, which compose more than 25 percent of the Earth's crust. Silica in the form of quartz[27] or quartzite is used to produce silicon ferroalloys for the iron and steel industries, while silicon metal is primarily used by the aluminum and chemical industries.[28] Silicon metal is a product normally composed almost entirely of elemental silicon, along with small amounts of

[25] USITC, "General Notes, Products of Countries Designated Beneficiary Developing Countries for Purposes of the Generalized System of Preferences (GSP)," HTSUS (2018) Basic Edition, January 2018, pp. GN 15-GN 16. See HTS general note 4.

[26] Unless otherwise indicated, information in this section was taken from the Petitions, Vol. I, pp. 6–9; and *Silicon Metal From Russia: Investigation No. 731-TA-991 (Second Review)*, USITC Publication 4471, June 2014, pp. I-18-21.

[27] Quartz is a chemical compound consisting of one part silicon and two parts oxygen, also known as silicon dioxide (SiO_2).

[28] *USGS, 2015 Minerals Yearbook, Silicon Chapter*, p. 67.1, https://minerals.usgs.gov/minerals/pubs/commodity/silicon/myb1-2015-simet.pdf, retrieved January 11, 2018.

other elements, such as iron, aluminum, and calcium.[29] It is manufactured and sold in various degrees of purity. Whether domestic or imported, it is usually sold in lump form, typically ranging from 6 inches x ½ inch to 4 inches x ¼ inch, or in powder form.[30]

Silicon metal is principally used as an alloying agent in aluminum production by the aluminum industry, as an input in the production of silicones, and to produce polycrystalline silicon ("polysilicon"). According to Ferroglobe, the petitioner's parent company, the global distribution of silicon metal consumption in 2017, by major product categories was: metallurgical (primarily aluminum), 43 percent; chemical (silicones), 37 percent; and polysilicon (solar and semiconductors), 20 percent.[31] According to Roskill Information Service LLC ("Roskill"), global silicon consumption was 3.1 million tons in 2016, and during 2010-16, silicon consumption increased at an average annual rate of 5.8 percent.[32]

As an alloying agent, silicon metal is used in the production of both primary aluminum (produced from ore) and secondary aluminum (produced from scrap). Silicon is a necessary ingredient in aluminum casting alloys, where it improves fluidity, castability, strength, and weldability when added to aluminum.[33] Aluminum producers add silicon in lump form to aluminum during the smelting process. Primary aluminum typically contains between 8-12 percent silicon and is used in applications where appearance is important, such as wheels for automobiles. Secondary aluminum typically contains less silicon than primary and is used for internal automobile parts and applications where appearance is not significant. Roskill expects the amount of silicon metal used in aluminum to increase by an average annual rate of 3.4 percent from 2016 to 2026 owing to anticipated growth in aluminum consumption by the automotive sector.[34] Other applications for silicon metal include the production of brass and bronzes, die casting, steel, copper alloys, ceramic powders, and refractory coatings.

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[29] Silicon metal can be further processed into ultra-high-purity semiconductor or solar grades whose silicon content is 99.99 percent or greater. Semiconductor-grade silicon metal is not included within the scope of these investigations. However, subject silicon metal may be used as a starting material for the manufacture of semiconductor-grade silicon metal.

[30] These dimensions refer to the maximum and minimum sizes of the silicon metal lumps.

[31] *Investor Day Presentation*, Ferroglobe PLC, p. 30, http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=959959&filekey=DA15BBEE-47D1-4E92-9FEF-EB22B3852278&filename=Ferroglobe_Investor_Day_Presentation_17_Oct_2017.pdf, retrieved January 11, 2018.

[32] *Outlook for silicon metal diverges sharply from that for ferrosilicon*, Roskill Information Services Ltd., https://roskill.com/news/outlook-silicon-metal-diverges-sharply-ferrosilicon/, retrieved January 11, 2018.

[33] Many aluminum alloys are used by the transportation sector as a substitute for heavy metals to reduce weight and improve the efficiency of vehicles and aircraft.

[34] *Outlook for silicon metal diverges sharply from that for ferrosilicon*, Roskill Information Services Ltd., https://roskill.com/news/outlook-silicon-metal-diverges-sharply-ferrosilicon/, retrieved January 11, 2018.

Chemical manufacturers consume silicon metal in powder form to produce silicones and polysilicon. The chemical manufacturers that have their own grinding facilities purchase silicon metal in lump form and grind it into powder themselves. Firms that do not have grinding facilities purchase silicon metal as a powder.[35] A lower grade of powder called fines, a by-product of the crushing and sizing process, is sold for ceramic and refractory applications. In the chemical industry, silicon metal is used as the basis for the production of silanes, which are used to produce a family of organic compounds known as silicones. Silicones are used for a variety of applications, including adhesives, resins, lubricants, plastomers, anti-foaming agents, and water-repellent compounds.[36] According to Roskill, there are an estimated 10,000 individual applications for silicones and many are in sectors that are driven by consumer spending and disposable income. As a consequence, the larger markets for silicone products are mature economies, such as North America, Western Europe, and Japan, although developing economies will drive future demand.[37]

Silicon metal that is included in these investigations is consumed as the base material for making polysilicon, a high-purity form of silicon manufactured by chemical producers that is primarily used in semiconductors and solar cells.[38] Polysilicon producers purchase in-scope silicon metal and then further refine it into higher-purity polysilicon that is not in the scope of these investigations.[39] Polysilicon producers typically have very stringent quality standards for silicon and sometimes require low-boron silicon metal. [40] [41] [42] According to Roskill, silicon

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[35] Size consistency is important to chemical producers that purchase silicon metal in powder form. Suppliers to such customers must qualify their product before bidding to supply the chemical manufacturer. For that reason, there is no difference in terms of size consistency between qualified imports and domestic products.

[36] The silicones production process involves reacting silicon metal with methyl chloride in the presence of a copper catalyst to produce a mixture of methylchlorosilanes. Certain of these silanes are then hydrolyzed to produce the basic methylsilicone building block for the various silicone products.

[37] *Outlook for silicon metal diverges sharply from that for ferrosilicon*, Roskill Information Services Ltd., https://roskill.com/news/outlook-silicon-metal-diverges-sharply-ferrosilicon/, retrieved January 11, 2018.

[38] Polysilicon, which is not within the scope of these investigations, generally contains over 99.999 percent silicon and is made by reacting high purity metallurgical silicon with hydrogen chloride gas in the presence of catalysts, producing silicon tetrachloride, which is then purified by fractional distillation. The purified distillate is pyrotically decomposed to produce hyperpure metal and hydrochloric acid.

[39] Hearing transcript, p. 204 (Orava).

[40] ***. Staff fieldwork and interview with ***.

[41] According to the Dow Silicones Corporation, although there is no "industry specification" for boron in many segments of the silicon metal market, there are boron specifications used specifically in the polysilicon segment. Within that segment, Dow Silicones has a "customer specification" with a specific boron requirement. Dow Silicones achieves this polysilicon customer specification by blending low-boron content silicon metal from Brazil with other sources of silicon metal produced in the United States and Canada to achieve the polysilicon specification of ***. The other sources of silicon metal from the United States and Canada used by Dow Silicones in this process also have a boron requirement, which allows Dow Silicones to make supply plans in order to have the appropriate amount of low-boron

(*continued*...)

consumption for use in solar cells has experienced the fastest growth of any market for silicon metal during the past decade and is expected to continue to grow, especially in Asia.

According to the petitioner, although silicon metal is often described in terms of different grades, there is no uniformly accepted grade classification system. Silicon metal "grades" refer to ranges of specifications that are typically sold to particular types of customers.[43] These specifications establish the minimum amounts of silicon and the maximum amounts of other elements, such as boron, iron, calcium, and aluminum that the silicon metal may contain. The ranges of specifications vary depending on the type of end use of the silicon metal and the differences between these ranges of specifications can be relatively small but important.[44] [45]There are four broadly defined categories, or grades, of silicon metal, which are generally ranked in descending order of purity as: (1) semiconductor grade;[46] (2) chemical grade; (3) metallurgical grade used to produce primary aluminum; and (4) metallurgical grade used to produce secondary aluminum. U.S. producer Globe lists its silicon metal product specifications as:[47] [48]

- Chemical grade: silicon 98.50 percent min., iron 0.50 percent max., calcium 0.07 percent max., aluminum 0.20 percent max.
- Primary aluminum grade: silicon 98.50 percent min., iron 0.35 percent max., calcium 0.07 percent max.

(…*continued*)
product for blending. Currently, Dow Silicones requires *** of silicon metal per year from Brazil to meet its requirements for blending. ***. Dow Silicones Corporation's prehearing brief, p. 8, Dow Silicones Corporation's posthearing brief, pp. 16–17.

[42] ***. Staff fieldwork and interview with ***.

[43] Some suppliers, customers, and publications refer to numerical grade designations such as "Grade 553." "Grade 553" is silicon metal with a maximum iron content of 0.5 percent, a maximum aluminum content of 0.5 percent, and a maximum calcium content of 0.3 percent. Such silicon metal normally has a minimum silicon content of 98.5 percent.

[44] In some cases, higher grade silicon metal is shipped to a purchaser with a lower specification requirement.

[45] According to respondent Wacker, chemical and polysilicon producers cannot tolerate high levels of aluminum, and primary aluminum producers cannot tolerate high levels of calcium in their products. Differences in ranges of specifications are not small, and differences in purity and the fineness of silicon metal powder can have an enormous impact on performance. Respondent Wacker's prehearing brief, p. 25.

[46] Semiconductor grade silicon, used in the electronics industry, is not covered by the scope of these investigations. It is a high-purity product generally containing over 99.99 percent silicon.

[47] *Globe Chemical and Metallurgical Grade Silicon product information sheets,* Globe Specialty Metals Inc., http://www.glbsm.com/product-information/Globe-Silicon-Metal.pdf, retrieved March 22, 2017.

[48] The type and level of impurities and the silicon content are the principal factors that determine if the silicon metal product can be used in a given application. As such, it is not possible to assume that silicon metal imported under HTS subheading 2804.69.10 (silicon containing by weight less than 99.99 percent but not less than 99.00 percent silicon) is necessarily better quality than silicon metal imported under HTS subheading 2804.69.50 (silicon containing by weight less than 99.00 percent silicon), even though the silicon content of the former is higher.

- Secondary aluminum grade: silicon 98.50 percent min., iron 1.00 percent max., calcium 0.40 percent max.
- High purity grade: silicon 98.50 percent min., iron 0.10 percent max., calcium 0.07 percent max., aluminum 0.20 percent max.

Silicon specifications can be customer specific and some customers, such as certain polysilicon producers, require higher grades of silicon than the ones listed by Globe.[49] Some chemical and polysilicon producers require their suppliers to go through a qualification process and undergo subsequent monitoring of their manufacturing facilities to ensure that their products are consistent in size and grade and there are no changes to manufacturing location, process conditions, or raw materials [50] [51] [52]

Manufacturing Process[53]

The basic process for producing silicon has been essentially unchanged for decades.[54] With one exception,[55] all silicon metal, regardless of specification, is produced using essentially the same process and inputs. Silica in the form of high purity quartz[56] [57] is combined in a "charge" with a carbon source such as low-ash coal,[58] charcoal, or petroleum coke, and a

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[49] Joint Respondents' postconference brief, pp. 9-10.

[50] Joint Respondents' postconference brief, pp. 9-10.

[51] Hearing transcript, p. 128 (Hudson).

[52] ***. Staff fieldwork and interview with ***.

[53] Unless otherwise indicated, information in this section was taken from the Petitions, Vol. I, pp. 9-10.

[54] *Mississippi Silicon LLC website*, http://www.missilicon.com/our-process, retrieved March 22, 2017.

[55] Elkem manufactures Silgrain –a high purity silicon powder produced by refining 90-94 percent ferrosilicon using a proprietary chemical leaching process. Like silicon metal produced using the standard process, Silgrain is used in the production of polysilicon, silicones, and other specialized materials.

[56] Silicon is one of the most common elements on the earth's surface. Silicon appears abundantly in combination with oxygen as "silica" - a compound composed almost entirely of silicon dioxide ($Si0_2$) - and as a component of many silicate minerals, such as quartzite (a rock composed principally of quartz), sand, and sandstone. These forms of silica are ubiquitous in the United States and throughout the world. However, only silica with silicon dioxide content in excess of 99 percent and a low iron content (less than one percent) can be used effectively in the production of silicon metal.

[57] Some domestic silicon producers are vertically integrated and own suppliers of input materials. GSM owns Alabama Sand and Gravel Inc., a company that operates quarries in Alabama and produces metallurgical grade quartz gravel that is used for silicon production. *Ferroglobe website*, http://www.ferroglobe.com/business-areas/mining/alabama-sand-gravel-inc/?lang=en, retrieved January 11, 2018.

[58] In the United States, silicon producers predominantly use a low-ash bituminous coal for silicon production. The coal needs to be very low in ash because the compounds in the ash are co-smelted into the silicon as impurities. GSM owns Alden Resources, LLC, a company that operates coal mines in

(*continued*...)

bulking agent, usually wood chips made from hardwood trees. The charge is placed in a submerged electric arc furnace.[59] A transformer system delivers high-current, low-voltage electricity to the furnace by electrodes made from pre-baked or self-baking amorphous carbon. The electrodes are slowly consumed during the production process. The charge is heated to approximately 3,000 degrees Fahrenheit, at which point the oxygen in the silica separates from the silicon and combines with the carbon in the reductant to form carbon monoxide gas. The simplified chemical reaction is summarized as SiO_2 (silica) + 2C (carbon) → Si (silicon metal) + 2CO (carbon monoxide). This reaction requires substantial electricity, giving the transformation process its name of electrometallurgy.[60] The off-gas (primarily carbon dioxide and silicon dioxide) escapes from the furnace and into a baghouse for collection, leaving molten silicon.

The liquid silicon is removed or "tapped" from the bottom of the furnace on either a continuous or an intermittent basis and collected in a refractory lined ladle. In the molten state, the silicon metal is often refined by oxygen injection to remove impurities, principally aluminum and calcium. Some impurities cannot be removed from the liquid silicon and, therefore, must be controlled by raw material selection.[61] After tapping (or refining), the silicon metal is poured from the ladle into large flat iron molds or onto beds of silicon metal fines.[62] The resulting ingot or billet is subsequently crushed to the desired size specification. It can be further ground into powder for some customers in the chemicals industry.[63] The silicon is typically delivered to end users in 2,000 to 3,000 pound super sacks, wooden boxes, or

(…*continued*)
Kentucky and Tennessee and produces low-ash coal for silicon production. GSM website, http://www.glbsm.com/aldenresources/, accessed January 11, 2018.

[59] Smelting in an electric arc furnace is accomplished by the conversion of electrical energy to heat. An alternating current applied to the electrodes causes current to flow through the charge between the electrode tips. This provides a reaction zone at temperatures up to 3,632 degrees Fahrenheit. The tip of each electrode changes polarity continuously as the alternating current flows between the tips. To maintain a uniform electric load, electrode depth is continuously varied automatically by mechanical or hydraulic means. In a submerged arc electric furnace, metal is smelted in a refractory-lined cup-shaped steel shell by submerged graphite electrodes. The United States Environmental Protection Agency, pp. 12.4.1–12.4.3, https://www3.epa.gov/ttn/chief/ap42/ch12/final/c12s04.pdf, retrieved March 24, 2017.

[60] *Silicon metal and ferrosilicon production,* The European Association of Industrial Silica Producers, http://www.eurosil.eu/silicon-metal-and-ferrosilicon-production, retrieved March 23, 2017.

[61] The quality of silicon metal is a function of the quality of the raw materials, production and furnace expertise, and refining processes. Silicon metal producers therefore generally specialize and aim to produce specific qualities for specific customers, and the production cost of each producer therefore depends also on the quality aimed to be produced by them. Joint Respondents' postconference brief, p. 13. ***. Staff fieldwork and interview with ***.

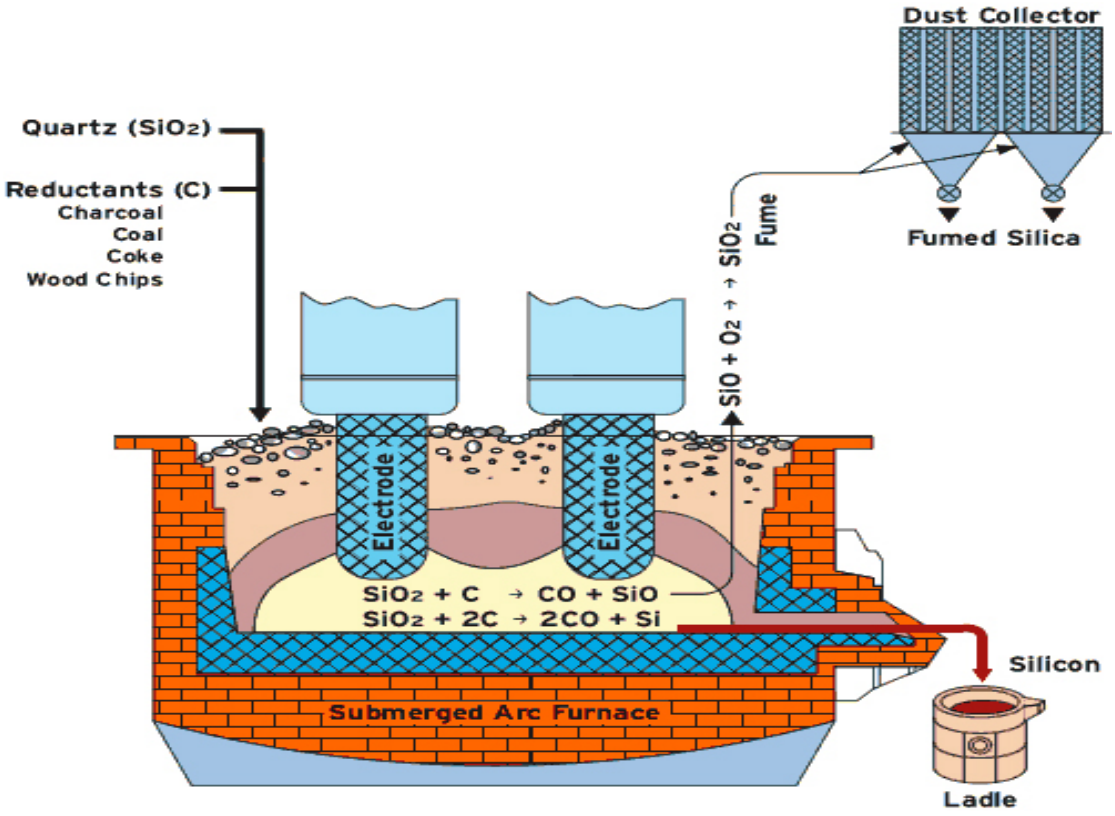
[62] ***. Staff fieldwork and interview with ***.

[63] Conference transcript, p. 26 (Huck).

customer specific packaging.[64] [65] Some customers elect to send their own trucks to the plant to take the silicon in bulk form.[66]

Figure I-1 depicts the silicon metal production process (does not show steps after tapping molten silicon):

Figure I-1
Silicon metal: Production process



Source: Simcoa Operations Pty. Ltd website, http://www.simcoa.com.au/process-diagram.html.

Silica fume (microsilica) are small particles of unreduced silicon dioxide recovered from the off-gases of silicon metal furnaces and are an important by-product of silicon metal production. Silica fume is used in making concrete, oil well grouts, cementitious repair products, refractories and ceramics, and other products.

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[64] *Globe Chemical and Metallurgical Grade Silicon product information sheets*, Globe Specialty Metals Inc., http://www.glbsm.com/product-information/Globe-Silicon-Metal.pdf, retrieved March 22, 2017.

[65] ***. Staff fieldwork and interview with ***.

[66] Staff fieldwork and interview with ***.

Silicon metal plants are typically located at sites that have access to a competitively priced and reliable source of electricity, an ample supply of raw materials, and an adequate labor pool. Given the large amounts of quartz required to produce silicon metal, plants are normally located near quartz sources. Silicon plants typically operate furnaces 24 hours per day, 7 days per week, to maximize efficiency,[67] so they constantly consume raw materials. ***.[68] Forty-nine percent of the cost of silicon metal production is attributable to raw materials (coal, woodchips, quartz, and carbon electrodes),[69] 21 percent to energy, 18 percent to labor, and 12 percent to other costs.[70]

Submerged arc furnaces used for silicon production are relatively similar worldwide, but there are some physical differences in furnace designs and the electrodes. In some cases, newer furnaces are more energy efficient. Reportedly, Globe requires about 13,000 to 14,000 kilowatt hours of electricity to produce one short ton of silicon metal,[71] but some plants with newer furnaces, like Mississippi Silicon, are able to produce the same quantity of silicon metal using only 9,500 to 10,000 kilowatt hours of electricity.[72] Purities of the raw materials and the carbon sources used can vary widely. Some producers of silicon metal also produce ferrosilicon, for use in the production of steel (especially stainless and heat-resisting steel) and cast iron.[73] Ferrosilicon can be produced at lower temperatures than silicon because of the iron, resulting in less power consumed to produce ferrosilicon than silicon. In the United States, Globe produced both silicon metal and ferrosilicon, but did not use the same furnaces for both. Producers can switch production on a furnace between ferrosilicon and silicon metal with varying degrees of cost, downtime, and efficiency loss. It is generally easier for firms to switch from silicon metal production to ferrosilicon production than the reverse. Iron and other elements that may be contained in ferrosilicon tend to remain in a furnace lining and result in impurities intolerable in silicon metal production.[74] In addition, certain furnace designs are more efficient at producing one product than another, leading to possible efficiency loss when switching production. According to Globe, incentives for converting ferrosilicon furnaces to silicon metal furnaces may exist if the profit margins for silicon metal are sufficiently better than the profit margins for ferrosilicon. Globe indicated that conversion from ferrosilicon to silicon production can be conducted relatively quickly, easily, and "at a relatively moderate cost." Such a conversion

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[67] Hearing transcript, p. 40 (Huck).

[68] Staff fieldwork and interview with ***.

[69] ***. Staff fieldwork and interview with ***.

[70] *Investor Day Presentation*, Ferroglobe PLC, p. 40, http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=959959&filekey=DA15BBEE-47D1-4E92-9FEF-EB22B3852278&filename=Ferroglobe_Investor_Day_Presentation_17_Oct_2017.pdf, retrieved January 11, 2018.

[71] Conference transcript, p. 26 (Huck).

[72] Conference transcript, p. 125 (Majumdar).

[73] Ferrosilicon is a product used by the steel industry as an alloying agent. Ferrosilicon differs from silicon metal in that it has much lower silicon content and contains 4 percent or more of iron.

[74] Conference transcript, pp. 40-41 (Huck and Perkins).

would require removal of the material from the furnace, replacement of the electrodes and possibly the ceramic refractory lining in the furnace, and changing the raw materials used for production.[75]

DOMESTIC LIKE PRODUCT ISSUES

Previous and related proceedings

In its original determinations concerning silicon metal from Argentina, Brazil, and China, the Commission found the appropriate domestic like product to be all silicon metal, regardless of grade, having a silicon content of at least 96.00 percent but less than 99.99 percent of silicon by weight, and excluding semiconductor grade silicon; it found one domestic industry consistent with its domestic like product finding. In the first, second, and third five-year review determinations, the Commission defined the domestic like product as all silicon metal, regardless of grade and corresponding to the scope of the orders, and it found the domestic industry to be all domestic producers of silicon metal.[76]

In its original determinations concerning silicon metal from Russia, the Commission found that there was one domestic like product consisting of all silicon metal, regardless of grade, based on shared physical characteristics, some overlapping uses, similar channels of distribution, some interchangeability, the same production processes and employees, and relatively minor difference in prices between the grade of silicon metal. In the first and second five-year review determinations, the Commission determined that no new facts existed to warrant a conclusion different from that in the original investigation and again found one domestic like product consisting of all silicon metal, regardless of grade.[77]

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[75] Conference transcript, pp. 40-41 (Huck and Perkins).

[76] *Silicon Metal From Brazil and China: Investigation Nos. 731-TA-471 and 472 (Second Review)*, USITC Publication 3892, December 2006, pp. 4-5; *Silicon Metal From Brazil and China: Investigation Nos. 731-TA-471 and 472 (Second Review)*, USITC Publication 3892, December 2006, pp. 4-5. In 1993, in a response to a request by domestic interested parties for clarification of the scope of the antidumping duty order concerning China, Commerce determined that silicon metal containing between 89.00 percent and 99.00 percent silicon by weight, but which contains a higher aluminum content than the silicon metal containing at least 96.00 percent, but less than 99.99 percent silicon by weight, is the same class or kind of merchandise as the silicon metal described in the original order concerning China. *Scope* Rulings, 58 FR 27542, May 10, 1993.

[77] *Silicon Metal From Russia: Investigation No. 731-TA-991 (Second Review)*, USITC Publication 4471, June 2014, p. 7.

Current investigations

Preliminary phase

During the preliminary phase of these current investigations, the petitioner contended that silicon metal is a single domestic like product[78] and the respondents did not contest a single domestic like product that is coextensive with the scope of these investigations.[79] In its preliminary determinations, the Commission found that there does not appear to be any clear dividing line between domestically produced silicon metal products and defined a single domestic like product that is coextensive with the scope, consisting of silicon metal.[80]

Final phase

The Commission reminded parties to identify in their comments on the draft questionnaires for the final phase of these investigations any arguments that would implicate data collection, such as requests to define the domestic like product in a different manner than was defined in the preliminary phase of these investigations.[81] No party requested in their comments on the Commission's draft questionnaires in these final phase investigations that the Commission collect specific and comprehensive data from U.S. market participants concerning other possible domestic like products.[82] Therefore, the Commission collected data and other information based on a single domestic like product coextensive with Commerce's scope.

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[78] Petitioner's postconference brief, p. 4. The petitioner notes that Silgrain, a type of silicon metal imported from Norway, is the one type of silicon metal that is not manufactured by U.S. producers. However, the petitioner further explains that Silgrain is like other high purity silicon metal powder with respect to all other domestic like product factors. Conference transcript, p. 27 (Huck); petitioner's postconference brief, p. 6.

[79] Joint Respondents' postconference brief, pp. 6-7, exh. 2.

[80] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway, Inv. Nos. 701-TA-567-569 and 731-TA-1343-1345 (Preliminary)*, USITC Publication 4685, May 2017, p. 8.

[81] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway, Inv. Nos. 701-TA-567-569 and 731-TA-1343-1345 (Preliminary)*, USITC Publication 4685, May 2017, p. 8.

[82] In its comments on the Commission's draft questionnaires, Elkem requested that the Commission collect certain limited information from only purchasers and importers concerning the comparability of certain end uses of silicon metal (i.e. for polysilicon use and all other uses) in order "to determine whether silicon metal used for polysilicon production should be treated as a separate like product from other silicon metal." But Elkem did not request a complete and comprehensive data collection for purposes of a domestic like product analysis. In addition, Elkem provided no clearly defined product specifications or definitions for the separate like products that go into the end uses that they identified, as is required for implementation of any orders. *Elkem's Comments Regarding Draft Questionnaires*, September 29, 2017. Therefore, the Commission questionnaires included limited requests concerning silicon metal based on end use.

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

U.S. MARKET CHARACTERISTICS

Silicon metal has four broadly defined categories, or grades (in generally descending order of purity): semiconductor grade (out-of-scope product);[1] chemical grade that is used in the production of polysilicon and other silicone chemical compounds;[2] metallurgical grade that is used to produce primary aluminum (aluminum produced from ore); and a metallurgical grade that is used to produce secondary aluminum (aluminum that may be produced from scrap).[3] Primary and secondary aluminum producers use silicon metal as an alloying agent.[4] Silicon metal can also be used in the production of trichlorocyline and some gases.[5] Demand for silicon metal is derived from the demand for end uses, and is sold in lump and powder form.[6]

Apparent U.S. consumption declined by *** percent from *** short tons in 2014 to *** short tons in 2016. Apparent consumption was *** percent higher at *** short tons in January-September 2017 compared to *** short tons in January-September 2016.[7]

U.S. PURCHASERS

The Commission received 31 usable questionnaire responses from firms that have purchased silicon metal since 2014.[8] Fourteen responding purchasers are secondary aluminum producers, four are chemical and/or polysilicon producers, two are primary aluminum

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[1] Semiconductor-grade silicon is a high purity product generally containing over 99.99 percent silicon and is used in the electronics industry. However, in-scope silicon metal may be used as a starting material for the manufacture of semiconductor-grade silicon metal.

[2] Polysilicon is used in computer chips, solar panels, etc. Conference transcript, p. 56 (Perkins, Lutz).

[3] There is no uniformly accepted grade classification system. Silicon metal "grades" refer to ranges of specifications that are typically sold to particular groups of customers. These specifications, which exist within narrow bands and are often proprietary, establish the minimum allowable amount of silicon and the maximum allowable amount of impurities such as iron, calcium, aluminum, or titanium. Chemical sector customers each have their own detailed specifications. Requirements may also vary widely among primary aluminum industry and secondary aluminum industry customers. The grade quality of silicon metal is highly dependent on the characteristics of raw material inputs, and can vary over large volumes. Silicon metal may require monitoring and testing to ensure product consistency and quality.

[4] Conference transcript, p. 18 (Perkins).

[5] Conference transcript, p. 56 (Perkins).

[6] U.S. importers of silicon metal from *** reported that they primarily ship silicon metal in lump form, while importers of silicon metal from *** reported selling silicon metal primarily in powder form.

[7] Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics (see table C-1).

[8] Of the 31 responding purchasers, 28 purchased the domestic silicon metal, 27 purchased imports of the subject merchandise from subject countries, and 22 purchased imports of silicon metal from other sources.

producers, two are distributors, and nine firms reported producing other products such as brass and bronze ingots, refractory material, and nickel alloys, among others. In general, most responding U.S. purchasers were located in the Midwest and Eastern United States, with additional firms in the Western United States. The responding purchasers represented firms in a variety of domestic industries, including aluminum and metal alloy industries, chemical industries, and solar and electronic industries. The largest volume purchases of silicon metal are usually in the *** industries.

CHANNELS OF DISTRIBUTION

The vast majority of U.S. producers and importers sold silicon metal primarily to end users (table II-1). In 2016, U.S. producers sold mainly to *** (about *** percent of U.S. commercial shipments) and, as a group, subject importers sold mainly to chemical users (approximately 60 percent of shipments, though shares varied by country).

A large majority of shipments of Brazilian product was to chemical end users (approximately *** percent in 2016). The vast majority of silicon metal from Brazil was directly imported for internal consumption, and was not sold in the U.S. merchant market.[9] Importers of Australian and Kazakh[10] silicon metal sold most of their product to primary and secondary aluminum producers. Most shipments of Norwegian silicon metal were sold to ***. Respondents suggest that since *** are captively consumed, these imports enter a different channel of distribution than domestically produced silicon metal or other subject imports.[11]

Table II-1
Silicon metal: U.S. producers' and importers' U.S. commercial shipments, by sources and channels of distribution, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

GEOGRAPHIC DISTRIBUTION

U.S. producers and importers reported selling silicon metal to all regions in the contiguous United States (table II-2). For U.S. producers, *** percent of sales were within 100 miles of their production facility, *** percent were between 101 and 1,000 miles, and *** percent were over 1,000 miles. Importers sold 13.0 percent within 100 miles of their U.S. point of shipment, 74.1 percent between 101 and 1,000 miles, and 12.9 percent over 1,000 miles.

[9] Respondents LIASA and Minasligas' posthearing brief, pp. 8-9 and 13.

[10] Respondents stated that Kazakh producers use a low-quality coal and do not have access to woodchips and that this precludes these producers from producing silicon metal suitable for chemical or polysilicon use. Joint respondents' postconference brief, pp. 13 and 28.

[11] Dow Corning's postconference brief, p. 8.

Table II-2
Silicon metal: Geographic market areas in the United States served by U.S. producers and importers

Region	U.S. producers	Subject U.S. importers				Subject importers
		Australia	Brazil	Kazakhstan	Norway	
Northeast	2	2	7	4	2	10
Midwest	3	3	12	4	2	14
Southeast	3	1	10	4	3	13
Central Southwest	2	---	2	1	---	2
Mountains	2	---	1	1	---	2
Pacific Coast	3	2	2	2	1	5
Other (AK, HI, PR, VI, etc.)	---	---	1	1	---	1
All regions	2	---	---	---	---	---
Reporting firms	3	4	13	4	6	17

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

SUPPLY AND DEMAND CONSIDERATIONS

U.S. supply

Domestic production

Based on available information, U.S. producers of silicon metal have a limited ability to respond to changes in demand with relatively small-to-moderate changes in the quantity of shipments of U.S.-produced silicon metal to the U.S. market. The factors contributing to this degree of responsiveness include some available capacity (mostly consisting of furnaces that were idled during the period of investigation), limited inventories, and limited production alternatives.

Industry capacity

Domestic capacity utilization decreased slightly from *** percent to *** percent during 2014-16, driven by ***.[12]

Unscheduled downtimes typically result in a loss of production that cannot be compensated for by extra production at a later date. This moderately-high level of capacity utilization suggests that U.S. producers have some ability to increase production of silicon metal in response to an increase in prices. Future production increases would likely require large capital expenditures in the form of additional furnaces.[13]

[12] Overall production capacity of the three U.S. producers in 2016 was approximately *** short tons, and actual production was approximately *** short tons.

[13] Staff field trip report, ***.

Alternative markets

During 2014-16, U.S. producers' export shipments fluctuated between *** percent and *** percent of total shipments, indicating that U.S. producers have a limited ability to shift shipments between the U.S. market and other markets in response to price changes.[14]

Inventory levels

U.S. producers' inventories fluctuated during 2014-16, but remained relatively unchanged overall. Relative to total shipments, U.S. producers' inventories increased from *** percent in 2014 to *** percent in 2015, and fell to *** percent in 2016. These inventory levels suggest that U.S. producers have a limited ability to respond to changes in demand with changes in the quantity shipped from inventories.

Production alternatives

*** responding U.S. producers, ***, stated that they could theoretically switch production from silicon metal to ferrosilicon, but that this production switch has never been made. U.S. producer *** reported having the ability to switch production from silicon metal to ferrosilicon or magnesium ferrosilicon, after equipment modifications have been implemented.[15]

Subject imports[16]

Production capacity, capacity utilization, inventory ratios, and shipments to non-U.S. markets are shown in table II-3.

Table II-3
Silicon metal: Industry factors that affect ability to increase shipments to the United States

* * * * * * *

[14] In questionnaire responses, U.S. producer *** and purchaser *** reported that silicon metal prices outside of the United States are often lower than U.S. prices, making U.S. exports uncompetitive.

[15] Changing products or silicon metal grades may require downtime for extensive cleaning of machinery, and also the testing of products to ensure that impurities have been removed from the production process.

[16] For data on the number of responding foreign firms and their share of U.S. imports from subject sources, please refer to Part I, "Summary Data and Data Sources."

Subject imports from Australia

Based on available information, producers of silicon metal from Australia have the ability to respond to changes in demand with small-to-moderate changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factor to this degree of responsiveness is an ability to shift shipments from alternate markets. The factors reducing responsiveness of supply are a lack of unused capacity and an ***.[17]

Importer *** reported that its ability to supply silicon metal to the U.S. market is constrained by ***.

Subject imports from Brazil

Based on available information, producers of silicon metal from Brazil have the ability to respond to changes in demand with small to moderate changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness of supply are some availability of unused capacity and inventories and an ability to shift shipments from alternate markets.

U.S. producer *** reported that ***.[18]

Subject imports from Kazakhstan[19]

Based on available information, producers of silicon metal from Kazakhstan have the ability to respond to changes in demand with small-to-moderate changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factor to this degree of responsiveness is the ability to shift some shipments from alternate markets. The factors restraining responsiveness of supply are a lack of unused capacity in the latter part of the period of investigation and an inability to shift production from alternate products.

Subject imports from Norway

Based on available information, producers of silicon metal from Norway have the ability to respond to changes in demand with small-to-moderate changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness are some available inventories and an ability to shift shipments from alternate markets. The factors restraining responsiveness of supply are a lack of unused capacity, existing supply commitments to European buyers, and an inability to shift production from alternate products.

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[17] Generally, firms have indicated an ability to switch production from silicon metal to ferrosilicon. See Part I. ***.

[18] ***. Staff field trip report, ***.

[19] ***.

Nonsubject imports

Nonsubject imports accounted for *** percent of total U.S. consumption in 2016, and approximately *** percent of total U.S. imports. The majority of nonsubject imports during 2014-16 were from South Africa and Canada.[20]

Supply constraints

Respondents reported numerous supply constraints, citing producers' failures to deliver silicon metal, and supply disruptions related to these antidumping and countervailing duty investigations.[21] Several purchasers reported that the closure or partial closure of U.S. producer Globe's silicon metal production sites,[22] or *** conversion to ferrosilicon production, reduced supplies and sometimes disrupted deliveries that had been contractually agreed upon. The *** U.S. purchaser, ***, reported that producer Globe was unable to fulfill contracted volumes in 2015, that deliveries were delayed until 2016, and that U.S. producers do not have enough capacity to meet domestic demand for silicon metal.[23] U.S. purchasers *** reported that U.S. producer Mississippi Silicon either missed shipments in 2017 or was unable to supply silicon metal in required volumes. Eight purchasers (***) reported that antidumping and countervailing duty investigations disrupted shipments from subject country suppliers and decreased the number of available suppliers.

Some purchasers reported that in 2017, U.S. producers were said to be less willing to sign purchase agreements until later in the year, and stated that this was presumably in anticipation of higher prices resulting from the antidumping and countervailing duty investigations. U.S. purchasers *** reported that domestic producers were unwilling to negotiate agreements or provide quotes during the usual fourth quarter negotiation period. Purchaser *** reported that producers aim to book the highest spec grades and value contracts in descending order with polysilicon, chemical, primary aluminum, and secondary aluminum producers, and that this resulted in a lack of supply of U.S.-produced high-grade silicon metal for secondary aluminum producers.

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[20] The petitioner shares common ownership with foreign producers from nonsubject country South Africa, and some of the nonsubject country producers in Canada.

[21] Respondent REC silicon's posthearing brief, pp. 2-3. Respondent Wacker's posthearing brief, pp. 2-3.

[22] MPM reported that *** Globe's Niagara Falls plant, and that the plant was partially closed due to *** at ***. MPM further reported that when ***, Globe's Niagara Falls plant resumed full operations. Respondent MPM's posthearing brief, p. 5.

[23] Purchasers *** reported that U.S. producers Mississippi Silicon and Globe and subject producers Elkem (Norway) and Simcoa (Australia) had insufficient quantities to meet purchasers' needs. Purchaser *** reported that U.S. producer Globe and importer Polymet (Brazil) failed to meet timely shipment commitments.

Purchasers *** reported diminished diversity of supply related to the 2015 merger of FerroAtlantica and Globe, and that the market entry of Mississippi Silicon was not enough to mitigate the impact of the merger.[24]

New suppliers

Twenty-one purchasers reported that Mississippi Silicon entered the U.S. market as the third U.S. producer at the end of 2015. Canadian based producer HiTest Silicon has proposed construction of a new silicon metal plant in Washington State; silicon metal production is not expected to begin before ***.[25]

U.S. demand

Based on available information, the overall demand for silicon metal is likely to experience relatively small changes in response to changes in price. Demand for the end-use products is the underlying driver of demand for silicon metal. While silicon metal accounts for a varying share of the total cost of its end-use products, demand responsiveness is constrained by the lack of substitute products.

End uses and cost share

Silicon metal is primarily used by chemical producers in the production of silicones and polysilicon, and by aluminum producers as an alloying agent.[26] Chemical end uses identified by firms include chlorosilanes, polycrystalline silicon, polysilicon, sealants, silicones, and silicone adhesive sealants. Aluminum end uses include aluminum alloys, aluminum castings, and various foundry ingots.

Silicon metal usually accounts for a small-to-moderate share of the cost of the end-use products in which it is used. Reported cost shares for chemical producers ranged from 8 percent to 34 percent of total cost, and polysilicon producers reported silicon metal cost shares between 12 and 36 percent. Reported cost shares for primary and secondary aluminum applications were between 1 and 18 percent.

Business cycles

*** U.S. producers and 10 of 22 responding importers indicated that the market was subject to business cycles and/or changes in conditions of competition since 2014. Specifically, U.S. producers *** reported that the silicon metal market is subject to business cycles that are

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[24] Respondent MPM's posthearing brief, p. 6; Respondent REC Silicon's posthearing brief, pp. 1-2; Hearing transcript, p. 142 (Armstrong).

[25] Respondent Dow Corning's posthearing brief, p. 14, Exhibit 6.

[26] Petitions, p. 7; Conference transcript, p. 86 (Walters); Brazilian producers' postconference brief, p. 11.

driven by the aluminum industry and by the many consumer products that use silicones. U.S. producer *** reported that supply increases tend to be "lumpier" (e.g. new production plants), or less smooth, than increases in demand, leading to a market that may fluctuate between over- and under-supply. Importers mostly cited fluctuating demand for downstream products.

Most responding purchasers (17 of 30) reported that the market was not subject to business cycles and/or changes in conditions of competition since 2014. Purchasers *** indicated that the business cycle can track automotive and/or aerospace demand. Many purchasers reported that the business cycle was influenced by new domestic producers, mergers, and antidumping investigations.

Demand trends

Most U.S. producers reported decreasing U.S. demand since 2014, while most importers and purchasers reported increasing or fluctuating U.S. demand (table II-4).

Table II-4
Silicon metal: Firms' responses regarding U.S. demand and demand outside the United States

Item	Number of firms reporting			
	Increase	No change	Decrease	Fluctuate
Demand inside the United States:				
U.S. producers	***	***	***	***
Importers	8	3	4	6
Purchasers	9	5	4	7
Demand outside the United States:				
U.S. producers	***	***	***	***
Importers	12	3	---	3
Purchasers	12	5	1	4
Demand for purchasers' final products:				
Purchasers	12	1	4	10

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

Demand for silicon metal fluctuates with the demand for downstream products.[27] U.S. producer *** reported that U.S. demand for silicon metal has decreased due to decreased demand from U.S. polysilicon producers. U.S. producer *** attributed decreased demand to the closure of a number of aluminum smelters, as well as "trade conflict" with China hindering the growth of the U.S. polysilicon sector. U.S. producer *** reported that U.S. demand decreased in 2015 due to poor economic conditions, remained at similar levels in 2016, and began to increase in 2017.

Purchaser responses varied regarding demand trends in the silicon metal market. U.S. purchasers attributed increases in demand for silicon metal to increased demand from the auto sector (partly due to manufacturers increasingly substituting aluminum for steel in order to

[27] Conference transcript, p. 96 (Bednarczyk); Petitioner's postconference brief, p. 16; MPM's postconference brief, p. 6.

meet emission requirements), aluminum sector, and chemical sector. Purchasers that reported decreased demand cited the closure of some aluminum facilities and weaker demand for aluminum products.[28]

During the preliminary phase of these investigations, respondents stated that the market composition and demand for silicon metal have changed as the consumption of high quality, pure silicon metal for polysilicon has expanded, and that demand for silicon metal from polysilicon manufacturers is currently viewed as the biggest driver of demand growth in the U.S. market.[29]

Substitute products

Most responding U.S. producers, importers, and purchasers reported that there are no substitutes for silicon metal. However, three purchasers in the metallurgical sector (***) and one purchaser in the chemical sector (***) reported that aluminum scrap containing silicon metal can be recycled into other secondary aluminum products. Scrap aluminum containing silicon metal can thus contribute to the metallurgical-grade silicon metal supply, and reduce the need for additional purchases of metallurgical-grade silicon metal.

SUBSTITUTABILITY ISSUES

The degree of substitution between domestic and imported silicon metal depends upon such factors as relative prices, grade, sizing and packaging, reliability of supply, timeliness of delivery, and conditions of sale. Based on available data, staff believes that there is a high degree of substitutability between domestically produced silicon metal and silicon metal imported from subject sources, although silicon metal chemical characteristics and reliability of supply issues may affect levels of substitutability.

Lead times

U.S. producers *** reported that silicon metal is produced-to-order *** percent and *** percent of the time, respectively, with an average lead time of 30 days. The remaining *** percent and *** percent of their commercial shipments were shipped from inventories, with lead times of two to three days. U.S. producer *** reported that it ***.[30]

Importers of subject merchandise reported that 77.7 percent of their sales of silicon metal were sold from U.S. inventories in 2016, with an average lead time of 75 days. About 15

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[28] According to U.S. purchaser ***, demand increases were due to increased aluminum-related consumption that was bolstered by auto production and strong domestic polysilicon production. However, increased availability of aluminum scrap with high silicon metal content may have been recycled and partly offset the increased demand from auto manufacturers.

[29] ***. Joint respondents' postconference brief, pp. 6, 11, 17, Exhibit 7.

[30] If silicon metal produced for captive consumption does not meet the company's quality standards, *** will occasionally sell low grade silicon metal on the spot market.

percent of shipments were produced-to-order with an average lead time of 70 days. The remaining share of subject imports was sold from foreign inventories with an average lead time of 75 days.

Knowledge of country sources

Twenty-three purchasers indicated they had marketing or pricing knowledge of silicon metal produced in the United States. Many purchasers also reported knowledge of silicon metal from subject sources: Australia (13 purchasers), Brazil (16), Kazakhstan (8), and Norway (5). Seven purchasers reported market knowledge of silicon metal from nonsubject country Canada, and 12 purchasers reported knowledge of silicon metal from nonsubject country South Africa. Eight purchasers reported market knowledge of silicon metal from other nonsubject countries.

As shown in table II-5, relatively few purchasers or their customers make purchasing decisions based on the producer, and fewer make purchasing decisions based on the country of origin. Of the six purchasers that reported that they always make decisions based on the producer, primary reasons cited for doing so included product quality and/or chemical characteristics, shipment reliability, and long standing business relationships.

Table II-5
Silicon metal: Purchasing decisions based on producer and country of origin

Purchaser/Customer Decision	Always	Usually	Sometimes	Never
Purchaser makes decision based on producer	6	2	9	14
Purchaser's customers make decision based on producer	---	---	4	16
Purchaser makes decision based on country	3	2	5	19
Purchaser's customers make decision based on country	---	---	1	16

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

Factors affecting purchasing decisions

The most often cited top three factors firms consider in their purchasing decisions for silicon metal were price (29 firms), quality (27 firms), and availability/supply (23 firms) as shown in table II-6. Quality was the most frequently cited first-most important factor (cited by 13 firms), followed by availability/supply/reliability (8 firms). Price, quality, and availability/supply/reliability were equally likely to be the second-most important factor (9 firms each); and price was the most frequently reported third-most important factor (14 firms).

Table II-6
Silicon metal: Ranking of factors used in purchasing decisions as reported by U.S. purchasers, by factor

Item	Ranking			Total
	1st	2nd	3rd	
	Number of firms (number)			
Price/cost	6	9	14	29
Quality	13	9	5	27
Availability/supply/reliability	8	9	6	23
All other factors[1]	4	4	6	NA

[1] Other factors include supplier relationships, terms of sale, and diversity of suppliers.

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

Factors cited as primary reasons for purchasing subject imports of silicon metal instead of domestic silicon metal included price, quality, diversity of supply, delivery time frame, business relationships, availability, and a lack of sufficient domestic supply to buy from domestic producers.

Importance of specified purchase factors

Purchasers were asked to rate the importance of 17 factors in their purchasing decisions (table II-7). The factors rated as very important by more than half of responding purchasers were availability, reliability of supply, product consistency, quality meets industry standards, price, delivery time, and delivery terms.

Table II-7
Silicon metal: Importance of purchase factors, as reported by U.S. purchasers, by factor

Factor	Very important	Somewhat important	Not important
Availability	30	1	---
Delivery terms	17	10	3
Delivery time	22	9	---
Discounts offered	10	12	9
Diversity of supply sources	8	13	10
Extension of credit	8	16	7
Low boron content	8	9	14
Minimum quantity requirements	5	12	14
Packaging	12	17	2
Price	22	8	1
Product consistency	29	2	---
Product range	5	13	13
Quality meets industry standards	24	5	2
Quality exceeds industry standards	11	13	7
Reliability of supply	30	1	---
Technical support/service	7	18	6
U.S. transportation costs	10	14	7

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

Supplier certification

Most purchasers (22 of 31) require supplier certification, with some purchasers requiring stricter standards, certification processes, and multiple trial loads. Seven purchasers reported that one or more suppliers had failed to certify since 2014; most of these purchasers were chemical/polysilicon or alloy manufacturers. Both U.S. producers and foreign producers failed to certify. Failures were attributed to both chemical characteristics as well as packaging, which tends to be of greater importance for chemical manufacturers that use silicon metal with strict impurity requirements and usually require silicon metal in powder form. Most purchasers reported that the time to qualify a new supplier ranged from 30 to 180 days, although several firms reported less than 10 days and others reported between one to two years to qualify a new supplier.

U.S. purchasers *** reported that U.S. producer *** failed certification standards due to poor quality. U.S. purchasers *** specified that U.S. producer *** either cannot produce the spec silicon metal that the firm requires, or failed in the certification/qualification requirements. U.S. purchasers *** reported that specific purity silicon metal grades or characteristics (***, ***, and ***,[31] respectively), are more or only available from overseas suppliers, and that the specific grades or characteristics are necessary as high quality feedstocks of specialized products. U.S. purchasers *** identified various foreign producers that failed their silicon metal certification standards.[32]

Changes in purchasing patterns

Purchasers were asked about changes in their purchasing patterns from different sources since 2014 (table II-8); reasons reported for changes in sourcing included a need to maintain a diversity of suppliers, problems with failed deliveries or quality standards, the Globe and FerroAtlantica merger, the market entry of U.S. producer Mississippi Silicon, and supply and price pressures resulting from the silicon metal antidumping/countervailing duty investigations. Most responding purchasers (21 of 31) reported that they had changed suppliers since January 1, 2014. Generally, firms dropped or reduced purchases from suppliers because of issues with quality certification and/or reliability of shipment delivery. Firms added or increased purchases from other suppliers in order to maintain or grow their diversity of suppliers, to obtain specific silicon metal grades and/or qualities, to ensure necessary volumes for large orders, and to purchase at lower prices.

[31] Respondent Dow Corning's posthearing brief, Exhibit 5, paragraphs 7-10, Attachment F.
[32] ***.

Table II-8
Silicon metal: Changes in purchase patterns from U.S., subject, and nonsubject countries

Source of purchases	Did not purchase	Decreased	Increased	Constant	Fluctuated
United States	2	9	11	1	5
Australia	10	3	9	2	3
Brazil	7	8	6	2	3
Kazakhstan	14	1	6	1	2
Norway	20	1	3	---	1
All other sources	8	5	8	4	5
Sources unknown	10	---	4	1	2

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

Importance of purchasing domestic product

Most purchasers reported that the country of origin of silicon metal purchases was not important, and some purchasers acknowledged occasions when they did not know the country of origin of their purchases until after the shipment arrived from a distributor or trader. Instead, purchasers more frequently reported the importance of the relationship with the supplier, whether domestic or foreign. Most purchasers reported that purchasing U.S.-produced silicon metal was not required by their customers, regulations, or for any other reason. However, some purchasers did state a preference for domestically produced silicon metal based on factors that included reliable quality, proximity of supply, and timeliness of delivery.

Comparisons of domestic products, subject imports, and nonsubject imports

Purchasers were asked a number of questions comparing silicon metal produced in the United States, subject countries, and nonsubject countries (table II-9). The purchasers were asked for a country-by-country comparison on the same 17 factors for which they were asked to rate the importance.

Most purchasers rated domestically produced silicon metal as comparable or superior to both subject and nonsubject silicon metal in most of the purchase factors with the exception of price and discounts offered, for which U.S. product most often was rated as comparable or inferior. Of the key factors rated as being very important in table II-7 (availability, delivery terms, delivery time, price, product consistency, quality, and reliability of supply), domestically produced product usually rated as comparable or superior in all factors except for price.

Within subject country comparisons and nonsubject country comparisons, most countries were rated as comparable, or had mixed ratings as purchasers provided contrasting answers about the superiority or inferiority of a given country's product. Additionally, fewer firms reported familiarity or knowledge of silicon metal from both Kazakhstan and Norway.

Table II-9
Silicon metal: Purchasers' comparisons between U.S.-produced and imported product

Factor	U.S. vs. Australia			U.S. vs. Brazil			U.S. vs. Kazakhstan			U.S. vs. Norway		
	S	C	I	S	C	I	S	C	I	S	C	I
Availability	7	7	5	9	6	4	6	6	1	2	5	1
Delivery terms	6	9	4	10	7	2	7	5	1	2	4	2
Delivery time	9	8	2	11	8	---	7	5	1	5	2	1
Discounts offered	2	9	7	1	10	6	1	5	6	1	5	2
Diversity of supply sources	5	9	4	4	6	7	4	7	1	2	5	1
Extension of credit	2	10	6	3	10	3	3	8	1	2	2	4
Low boron content	---	12	1	---	12	1	1	9	---	1	4	---
Minimum quantity requirements	3	13	---	2	13	1	3	9	---	2	3	1
Packaging	5	14	---	6	12	1	6	7	---	3	5	---
Price[1]	1	10	8	1	9	9	---	7	6	1	5	2
Product consistency	3	13	1	5	10	2	6	6	---	2	5	---
Product range	2	14	1	3	11	2	4	8	---	1	5	1
Quality meets industry standards	2	15	1	4	11	2	6	7	---	1	6	---
Quality exceeds industry standards	---	9	5	3	8	3	5	5	1	2	2	1
Reliability of supply	4	9	4	4	11	3	7	4	1	2	3	2
Technical support/service	3	10	2	5	9	2	6	4	1	1	2	4
U.S. transportation costs[1]	3	8	5	3	8	5	3	4	4	2	4	2

Factor	U.S. vs. Canada			U.S. vs. South Africa			U.S. vs. All other sources		
	S	C	I	S	C	I	S	C	I
Availability	4	3	2	7	8	3	6	3	2
Delivery terms	3	4	1	6	9	3	6	4	1
Delivery time	3	4	1	9	8	1	7	4	---
Discounts offered	1	6	---	1	11	4	---	3	7
Diversity of supply sources	4	3	1	5	8	3	1	3	5
Extension of credit	2	5	---	1	12	2	3	4	2
Low boron content	1	6	---	---	13	1	2	5	1
Minimum quantity requirements	3	6	---	3	11	1	3	5	1
Packaging	4	5	---	6	11	1	5	5	1
Price[1]	1	7	1	2	12	4	1	6	4
Product consistency	5	4	---	3	13	---	5	4	---
Product range	4	4	---	3	12	---	2	7	---
Quality meets industry standards	4	4	---	4	12	---	4	6	---
Quality exceeds industry standards	2	5	---	3	9	2	3	4	2
Reliability of supply	3	4	2	5	10	2	4	6	---
Technical support/service	4	5	---	4	11	1	4	4	1
U.S. transportation costs[1]	2	6	1	3	8	5	4	3	3

[1] A rating of superior means that price/U.S. transportation cost is generally lower. For example, if a firm reported "U.S. superior," it meant that the U.S. product was generally priced lower than the imported product.

Note.--S=first listed country's product is superior; C=both countries' products are comparable; I=first list country's product is inferior.

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

Comparison of U.S.-produced and imported silicon metal

In order to determine whether U.S.-produced silicon metal can generally be used in the same applications as imported silicon metal, U.S. producers, importers, and purchasers were asked whether the silicon metal products can always, frequently, sometimes, or never be used interchangeably. While U.S. producers' responses varied, importers and purchasers most frequently reported that domestically produced silicon metal is always interchangeable with imported silicon metal from subject countries (table II-10). The extent of interchangeability tends to be greater for metallurgical end uses, and more limited for chemical and polysilicon end uses, which may require relatively specific chemical qualities and purity standards. Interchangeability of silicon metal depends mostly on a customer's chemical requirements, and interchangeability may vary based on the producer within a given country.[33]

[33] Based on data and narratives submitted in response to Commission questionnaires.

Table II-10
Silicon metal: Interchangeability between silicon metal produced in the United States and in other countries, by country pair

Country pair	U.S. Producers				U.S. importers				U.S. purchasers			
	A	F	S	N	A	F	S	N	A	F	S	N
U.S. vs. Australia	2	1	---	---	7	3	3	---	11	6	3	---
U.S. vs. Brazil	1	1	1	---	8	4	6	---	11	7	4	---
U.S. vs. Kazakhstan	1	---	1	---	7	1	2	---	8	3	2	---
U.S. vs. Norway	2	1	---	---	7	4	5	---	4	1	2	---
Australia vs. Brazil	1	1	1	---	7	4	4	---	6	4	4	---
Australia vs. Kazakhstan	1	---	1	---	6	1	3	---	4	3	1	---
Australia vs. Norway	2	1	---	---	7	2	4	---	3	1	1	---
Brazil vs. Kazakhstan	1	---	1	---	6	2	3	---	6	3	2	---
Brazil vs. Norway	1	1	1	---	6	4	5	---	3	---	3	---
Kazakhstan vs. Norway	1	---	1	---	6	3	1	---	2	---	---	---
U.S. vs. Canada	1	1	1	---	6	2	4	---	7	3	2	---
U.S. vs. South Africa	2	1	---	---	5	2	4	---	12	5	2	---
U.S. vs. Other	1	2	---	---	6	2	4	---	7	7	2	1
Australia vs. Canada	1	1	1	---	6	3	3	---	2	2	3	---
Australia vs. South Africa	2	1	---	---	5	3	4	---	6	3	2	---
Australia vs. Other	1	2	---	---	6	3	3	---	4	4	2	1
Brazil vs. Canada	1	1	1	---	6	3	3	---	3	3	2	---
Brazil vs. South Africa	1	1	1	---	6	3	3	---	11	3	2	---
Brazil vs. Other	1	1	1	---	6	2	4	---	6	5	3	1
Kazakhstan vs. Canada	1	---	1	---	6	2	1	---	2	2	1	---
Kazakhstan vs. South Africa	1	---	1	---	5	2	1	---	5	2	---	---
Kazakhstan vs. Other	1	1	---	---	6	1	2	---	3	3	1	1
Norway vs. Canada	1	1	1	---	6	2	3	---	1	2	2	---
Norway vs. South Africa	2	1	---	---	5	2	4	---	4	1	3	---
Norway vs. Other	1	2	---	---	6	2	3	---	1	5	2	1
Canada vs. South Africa	2	1	---	---	5	2	3	---	4	2	4	---
Canada vs. Other	1	1	---	---	6	2	3	---	2	5	2	1
South Africa vs. Other	1	1	---	---	6	---	4	---	5	4	3	1

Note.-- A=Always, F=Frequently, S=Sometimes, N=Never.

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

Most responding purchasers generally reported that domestically produced silicon metal always or usually met minimum quality specifications (table II-11).

Table II-11
Silicon metal: Ability to meet minimum quality specifications, by source[1]

Source	Always	Usually	Sometimes	Rarely or never	Don't know
United States	19	6	2	---	4
Australia	15	2	---	---	13
Brazil	19	2	2	---	5
Kazakhstan	6	5	1	1	14
Norway	5	1	2	---	19
Other	11	4	2	---	8

[1] Purchasers were asked how often domestically produced or imported silicon metal meets minimum quality specifications for their own or their customers' uses.

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

In addition, producers, importers, and purchasers were asked to assess how often differences other than price were significant in sales of silicon metal from the United States, subject, or nonsubject countries. As seen in table II-12, responses varied amongst producers, importers, and purchasers. Significant differences cited by firms included availability, predictability of supply, service, packaging, delivery/timeliness, terms, quality, and consistency.

Table II-12
Silicon metal: Significance of differences other than price between silicon metal produced in the United States and in other countries, by country pair

Country pair	U.S. producers				U.S. importers				U.S. purchasers			
	A	F	S	N	A	F	S	N	A	F	S	N
U.S. vs. Australia	1	---	1	1	5	1	3	3	8	2	6	3
U.S. vs. Brazil	1	---	1	1	7	---	4	4	5	2	8	7
U.S. vs. Kazakhstan	---	---	1	1	3	1	2	4	3	1	6	3
U.S. vs. Norway	1	---	1	1	5	2	3	3	3	1	2	2
Australia vs. Brazil	1	---	1	1	5	---	3	4	4	1	5	3
Australia vs. Kazakhstan	---	---	1	1	3	1	2	4	1	1	4	2
Australia vs. Norway	1	---	1	1	4	---	3	3	2	---	2	1
Brazil vs. Kazakhstan	---	---	1	1	4	1	2	4	2	1	4	4
Brazil vs. Norway	1	---	1	1	6	---	3	3	3	---	2	2
Kazakhstan vs. Norway	---	---	1	1	3	1	2	3	---	---	1	2
U.S. vs. Canada	---	1	1	1	4	1	3	4	2	3	4	4
U.S. vs. South Africa	1	---	1	1	4	---	3	3	3	1	8	6
U.S. vs. Other	1	---	1	1	5	---	3	4	5	1	6	4
Australia vs. Canada	---	1	1	1	3	1	3	4	2	1	3	2
Australia vs. South Africa	---	---	1	2	4	---	3	3	2	---	5	4
Australia vs. Other	1	---	1	1	4	---	3	4	3	---	3	3
Brazil vs. Canada	1	---	1	1	5	---	3	4	3	1	2	4
Brazil vs. South Africa	1	---	1	1	5	---	3	3	4	---	6	6
Brazil vs. Other	1	---	1	1	5	---	3	4	5	---	4	4
Kazakhstan vs. Canada	---	---	1	1	3	1	2	4	---	1	3	2
Kazakhstan vs. South Africa	---	---	1	1	3	1	2	3	1	---	4	3
Kazakhstan vs. Other	---	---	1	1	3	1	2	4	2	---	3	2
Norway vs. Canada	1	---	1	1	4	---	3	4	2	2	2	1
Norway vs. South Africa	---	---	1	2	3	---	3	4	2	1	2	3
Norway vs. Other	1	---	1	1	4	---	3	4	3	1	2	1
Canada vs. South Africa	---	1	1	1	3	1	3	3	2	2	3	3
Canada vs. Other	---	---	2	1	3	---	4	4	3	1	2	2
South Africa vs. Other	---	---	2	1	3	---	3	4	3	1	3	4

Note.--A = Always, F = Frequently, S = Sometimes, N = Never.

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

ELASTICITY ESTIMATES

This section discusses elasticity estimates; no parties suggested changes to these estimates in the prehearing or posthearing briefs.

U.S. supply elasticity

The domestic supply elasticity[34] for silicon metal measures the sensitivity of the quantity supplied by U.S. producers to changes in the U.S. market price of silicon metal. The elasticity of domestic supply depends on several factors including the level of excess capacity, the ease with which producers can alter capacity, producers' ability to shift to production of other products, the existence of inventories, and the availability of alternate markets for U.S.-produced silicon metal. Analysis of these factors above indicates that the U.S. industry has relatively limited ability to increase or decrease shipments to the U.S. market; an estimate in the range of 1 to 3 is suggested.

U.S. demand elasticity

The U.S. demand elasticity for silicon metal measures the sensitivity of the overall quantity demanded to a change in the U.S. market price of silicon metal. This estimate depends on factors discussed above such as the existence, availability, and commercial viability of substitute products, as well as the component share of silicon metal in the production of any downstream products. Based on the available information, the aggregate demand for silicon metal is likely to be highly inelastic; a range of -0.25 to -0.5 is suggested.

Substitution elasticity

The elasticity of substitution depends upon the extent of product differentiation between the domestic and imported products.[35] Product differentiation, in turn, depends upon such factors as quality (e.g., chemistry, appearance, etc.) and conditions of sale (e.g., availability, sales terms/ discounts/ promotions, etc.). Based on available information, the elasticity of substitution between U.S.-produced silicon metal and imported silicon metal is high, and estimated in the range of 4 to 7. However, substitution elasticity is likely to have firm-specific variation, with firms requiring stricter impurity requirements having lower substitution elasticity.

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[34] A supply function is not defined in the case of a non-competitive market.

[35] The substitution elasticity measures the responsiveness of the relative U.S. consumption levels of the subject imports and the domestic like products to changes in their relative prices. This reflects how easily purchasers switch from the U.S. product to the subject products (or vice versa) when prices change.

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

The Commission analyzes a number of factors in making injury determinations (see 19 U.S.C. §§ 1677(7)(B) and 1677(7)(C)). Information on the subsidies and dumping margins was presented in *Part I* of this report and information on the volume and pricing of imports of the subject merchandise is presented in *Part IV* and *Part V*. Information on the other factors specified is presented in this section and/or *Part VI* and (except as noted) is based on the questionnaire responses of three firms that accounted for virtually all of U.S. production of silicon metal during 2016. Important industry events that have occurred in the silicon metal industry since January 1, 2014 are summarized in table III-1.

Table III-1
Silicon metal: Important industry events, since January 1, 2014

Date		Company / Item	Action
Year	Month		
2015	September	Mississippi Silicon	Mississippi Silicon, LLC , a partnership between Rima Holdings USA Inc. and domestic investor group Clean Tech LLC, opened a new $200 million silicon metal plant in Burnsville, Mississippi. It was the first new silicon metal plant built in the United States in 40 years.[1]
2015	December	Ferroglobe PLC	The Spanish firm Grupo FerroAtlántica merged with Globe Specialty Metals ("GSM") (the parent company of Globe Metallurgical) to become Ferroglobe PLC, reportedly the leading producer of silicon metal and silicon-based alloys in the world. Collectively, Ferroglobe's silicon metal production capacity was about 543,000 short tons per year and is distributed as follows: Europe, 40 percent; North America, 40 percent; Africa, 14 percent; and Asia, 7 percent.[2] [3]
2016	January	***	***.[4]
2016	April	Wacker Chemie AG	Wacker Chemie AG opened a new $2.5 billion polysilicon[5] plant in Charleston, Tennessee. Wacker planned to gradually ramp up production and expected to reach full polysilicon production capacity of 22,000 short tons per year by the third quarter of 2016.[6]
2016	October	***	*** [7]

Table continued on next page.

Table III-1--Continued
Silicon metal: Important industry events, since January 1, 2014

Date		Company / Item	Action
Year	Month		
2017	February	The Canadian International Trade Tribunal ("CITT") Issuance of AD/CVD investigation on silicon metal imported to Canada.	CITT initiated a preliminary injury inquiry into a complaint by Québec Silicon Limited Partnership and its affiliate QSIP Canada ULC, of Bécancour, Quebec, that they have suffered injury as a result of the dumping of silicon metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand, and subsidizing of the above-mentioned goods from Brazil, Kazakhstan, Malaysia, Norway and Thailand.[8]
2017	September	Wacker Chemie AG	A "technical defect" caused a chemical release and explosion at Wacker Chemie AG's polysilicon plant in Charleston, Tennessee. The explosion damaged pipes and resulted in the closure of the plant. A spokesman from the company stated that "production will not start until a thorough inspection is completed and it is certain that the facility is safe." The plant was expected to remain closed for several months.[9] [10]
2017	November	Findings in AD/CVD investigation on silicon metal imported to Canada.	The CITT concluded its AD/CVD investigations found that the dumping and/or subsidizing of silicon metal originating in or exported from Brazil, Kazakhstan, Laos, Malaysia, Norway, and Thailand did not cause injury and were not threatening to cause injury to the domestic industry.[11]
2017	December	The European Commission notice of initiation-antidumping proceeding	The European Commission initiated an antidumping proceeding after receiving a complaint by FerroAtlántica and Ferropem alleging that imports of silicon originating from Bosnia and Herzegovina and Brazil, are being dumped and are thereby causing material injury to the Union (European Union) industry.[12]

[1] *Mississippi Silicon opens new facility in Burnsville*, Business Xpansion Journal, October 30, 2015, http://bxjmag.com/mississippi-silicon-opens-new-facility-in-burnsville/, retrieved May 11, 2017.

[2] The other leading global silicon metal producers, in descending order of production capacity, were Dow Corning (228,000 short tons), Elkem (175,000 short tons), and Rima (114,000 short tons). Ferroglobe PLC*, "Investor Presentation, January 2017," p.,4.* http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=890793&filekey=CFE050BE-EFCF-45C5-B36E-E2175021C697&filename=Ferroglobe_-_Investor_Presentation.pdf retrieved March 24, 2017.

[3] Ferroglobe PLC*, "Investor Presentation, January 2017," p.7,* http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=890793&filekey=CFE050BE-EFCF-45C5-B36E-E2175021C697&filename=Ferroglobe_-_Investor_Presentation.pdf retrieved March 24, 2017.

[4] ***.

[5] Polysilicon is a high-purity form of silicon made from subject silicon metal.

[6] *Wacker Chemie AG website,* https://www.wacker.com/cms/en/wacker_group/wacker_facts/sites/charleston/charleston.jsp, retrieved May 11, 2017.

[7] ***.

[8] *Government of Canada news release*,"Tribunal Initiates Injury—Silicon Metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand," February 21, 2017, https://www.canada.ca/en/international-trade-tribunal/news/2017/02/tribunal_initiatesinquirysiliconmetalfrombrazilkazakhstanlaosmal.html, retrieved February 20, 2018.

Table continued on next page.

Table III-1--Continued
Silicon metal: Important industry events, since January 1, 2014

[9] "Technical Defect Caused Chemical Release and Explosion at US Site in Charleston." Wacker Chemie AG, September 8, 2017. https://www.wacker.com/cms/en/press_media/press-releases/pressinformation-detail_84288.jsp?from_all_summary=true., retrieved February 13, 2018.
[10] "Root-cause investigation at Wacker's Charleston plant underway." Wacker Chemie AG, September 20, 2017. https://www.wacker.com/cms/en/press_media/press-releases/pressinformation-detail_84544.jsp?from_all_summary=true., retrieved February 13, 2018.
[11] The Canadian International Trade Tribunal, "Silicon Metal Inquiry No. NQ-2017-001" Anti-Dumping Injury Inquiries Inquiries (section 42) Findings and Reasons, November 17, 2017, http://www.citt.gc.ca/en/node/8185, retrieved February 15, 2018.
[12] Office Journal of the European Union, The European Commission, "Case AD645-Silicon" Notice of initiation of antidumping proceedings for Bosnia and Herzegovina and Brazil, December 19, 2017, http://trade.ec.europa.eu/tdi/case_details.cfm?id=2309, retrieved March 7, 2018.

Source: Various cited articles and websites.

U.S. PRODUCERS

The Commission issued a U.S. producer questionnaire to three firms based on information contained in the petitions, and other available industry resources. Three firms provided usable data on their productive operations, and account for all known domestic production of silicon metal.[1] Table III-2 lists U.S. producers of silicon metal, their production locations, positions on the petitions, and shares of total production.

Table III-2
Silicon metal: U.S. producers of silicon metal, their positions on the petitions, production locations, and shares of reported production, 2016

Firm	Position on petitions	Production locations	Share of production (percent)
Dow Corning	***	Dow Corning Alabama Inc., Mt. Meigs, Alabama; WVA Manufacturing, Alloy, West Virginia (joint venture with Globe)	***
Globe	Petitioner	Beverly, Ohio; Niagara Falls, New York; Selma, Alabama; and Alloy, West Virginia	***
Mississippi Silicon	***[1]	Burnsville, Mississippi	***
Total			***

[1] ***. *** U.S. producer questionnaire response, section I-3.

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

[1] Mississippi Silicon started production in late 2015, and therefore did not provide data for 2014.

Related firms

Table III-3 presents information on U.S. producers' ownership, related and/or affiliated firms of silicon metal. Two U.S. producers, DC Alabama and Mississippi Silicon, are related to foreign producers in subject countries (both are related to Brazilian producers).[2] These U.S. producers are also related to U.S. importers (***) of the subject merchandise. In addition, as discussed in greater detail below, these U.S. producers directly import the subject merchandise and one (***) purchases the subject merchandise from U.S. importers.

Table III-3
Silicon metal: U.S. producers' ownership related and/or affiliated firms

* * * * * * *

Changes in Operations

Table III-4 presents U.S. producers' reported changes in operations since January 1, 2014.

Table III-4
Silicon metal: U.S. producers' reported changes in operations, since January 1, 2014

* * * * * * *

U.S. PRODUCTION, CAPACITY, AND CAPACITY UTILIZATION

Table III-5 and figure III-1 present U.S. producers' production, capacity, and capacity utilization. Domestic producers' capacity (for silicon metal production) increased by *** percent from 2014 to 2016. Total production increased by *** percent from 2014 to 2016.[3] The main reason for these increases in capacity and production is ***. Capacity utilization decreased from *** percent in 2014 to *** percent in 2015, and further decreased to *** percent in 2016.

Table III-5
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

[2] Hearing transcript, pp. 23-24 (Kramer).
[3] Despite this overall increase, ***. Staff field trip report, ***.

Figure III-1
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Alternative products

As shown in table III-6, U.S. producers reported that a majority of their production consisted of silicon metal. Production of in-scope silicon metal accounted for *** percent of total production during 2016. Two firms, ***, reported that they do not produce alternative products on the same equipment or using the same employees, while *** reported producing out-of-scope items on the same equipment as in-scope silicon metal. Production of out-of-scope products accounted for *** percent of total U.S. production during 2016. These out-of-scope products include ***.[4]

Producers were also asked to describe the constraints that set the limits of their production capacity. ***.[5] *** noted production constraints included ***.[6] ***.[7]

Table III-6
Silicon metal: U.S. producers' overall plant capacity and production on the same equipment as subject production, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

U.S. PRODUCERS' U.S. SHIPMENTS AND EXPORTS

Table III-7 presents U.S. producers' U.S. shipments, export shipments, and total shipments. Globe and Mississippi Silicon are merchant market producers while DC Alabama is a captive supplier for use of silicon metal in its own production processes.[8] From 2014 to 2016, the quantity of U.S. producers' total shipments, increased by *** percent. The value of U.S. producers' total shipments increased by *** percent from 2014 to 2015, but then decreased by *** percent from 2015 to 2016. The value of U.S. producers' total shipments decreased overall by *** percent from 2014 to 2016. The average unit value of U.S. producers' total shipments increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016. The average unit value of U.S. producers' total shipments decreased overall by *** percent from 2014 to 2016. During January to September ("interim") 2016 compared to interim 2017,

[4] Between 2014 and 2016, ***. *** U.S. producer questionnaire response, section II-3f.
[5] *** U.S. producer questionnaire response, section II-3d.
[6] *** U.S. producer questionnaire response, section II-3d.
[7] *** U.S. producer questionnaire response, section II-3d.
[8] Hearing transcript, pp. 23-24 (Kramer).

U.S. producers' total shipments based on quantity was *** higher in interim 2017 than in interim 2016, but *** percent lower based on value. [9]

During 2014-16, *** of domestic producers' total shipments of silicon metal were U.S. commercial shipments while *** were transfers to related firms. *** accounted for all reported transfers to related firms.[10] Export shipments fluctuated from 2014 to 2016, but ***. The principal export markets include ***.

Table III-7
Silicon metal: U.S. producers' U.S. shipments, exports shipments, and total shipments, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

U.S. PRODUCERS' INVENTORIES

Table III-8 presents U.S. producers' end-of-period inventories and the ratio of these inventories to U.S. producers' production, U.S. shipments, and total shipments**.** These data show that U.S. producers' inventories increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016. U.S. producers' inventories increased overall by *** percent from 2014 to 2016. U.S. producers' inventories were equivalent to between *** and *** percent of U.S. producers' total shipments during 2014-16. In 2015 and 2016, all domestic producers reported holding end-of-period inventories of silicon metal (Mississippi Silicon did not produce in 2014). *** held lower inventories in December 2016 than in December 2014 and *** held higher inventories in December 2016 than in December 2014.[11] U.S. producers' inventories were *** lower in September 2017 than in September 2016.

Table III-8
Silicon metal: U.S. producers' inventories, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

[9] ***. *** U.S. producer questionnaire response, section II-11.

[10] The vast majority of *** U.S. shipments were transfers to related firms, while the majority of *** U.S. shipments were U.S. commercial shipments. *** U.S. producer questionnaire responses, section II-7.

[11] In response to a Commission question regarding whether the U.S. industry has made a business decision to focus on the polysilicon and chemicals market, Marlin Perkins, Vice President of Sales for Globe indicated that "we supply all sectors of the market. I think right now we're probably holding more inventory than we would like to and if we could sell it, we would sell it." Hearing transcript, pp. 109-110 (Perkins).

U.S. PRODUCERS' IMPORTS AND PURCHASES

Two U.S. producers *** purchased domestic silicon metal during 2014-16. ***.[12] [13]

U.S. producers' imports of silicon metal are presented in table III-9. U.S. producer *** is related to *** through a common parent, ***. This parent imported silicon metal from *** during 2014-16. *** indicated its reason for importing was due to "***." [14] ***.

Table III-9
Silicon metal: U.S. producers' U.S. production and imports, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

U.S. EMPLOYMENT, WAGES, AND PRODUCTIVITY

Table III-10 shows U.S. producers' employment-related data. U.S. producers' employment measured by production and related workers ("PRWs") increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016.[15] U.S. producers' employment measured by PRWs increased overall by *** percent from 2014 to 2016. U.S. producers' total hours worked increased by *** percent from 2014 to 2016. U.S. producers' hourly wages decreased by *** percent from 2014 to 2016.

Unit labor costs increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016. Unit labor costs increased overall by *** percent from 2014 to 2016. Productivity decreased by *** percent from 2014 to 2016. In contrast to the increases with the U.S. producers' employment-related data during 2014-16, the employment-related data in the 2017 interim period (January-September) was lower than the 2016 interim period for all employment-related data, with the exceptions of ***.[16] [17]

Table III-10
Silicon metal: Average number of production and related workers, hours worked, wages paid to such employees, hourly wages, productivity, and unit labor costs, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

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[12] *** U.S. producer questionnaire response, section II-12.

[13] *** U.S. producer questionnaire response, section II-12.

[14] *** added that "***". *** U.S. importer questionnaire response, section II-4.

[15] In its hearing testimony, Globe indicated that "as production fell and plants and furnaces were shut down, employment indicators fell significantly in 2016, with a number of PRWs falling by more than 18 percent." Hearing transcript, p. 61 (Lutz).

[16] *** indicated that "***." ***. *** U.S. producer questionnaire response, section II-10, and Staff field trip report, ***.

[17] *** indicated that the "***. ***." *** U.S. producer questionnaire response, section II-10, and Staff field trip report, ***.

CAPTIVE CONSUMPTION

Section 771(7)(C)(iv) of the Act states that–[18]

> *If domestic producers internally transfer significant production of the domestic like product for the production of a downstream article and sell significant production of the domestic like product in the merchant market, and the Commission finds that–*
>
> *(I) the domestic like product produced that is internally transferred for processing into that downstream article does not enter the merchant market for the domestic like product,*
>
> *(II) the domestic like product is the predominant material input in the production of that downstream article, and*
>
> *then the Commission, in determining market share and the factors affecting financial performance . . ., shall focus primarily on the merchant market for the domestic like product.*

Transfers and sales

As previously reported in table III-7, from 2014-16, transfers to related firms accounted for between *** and *** percent of U.S. producers' U.S. shipments of silicon metal. *** U.S. producers, ***, reported transferring silicon metal to related firms in 2016.[19] In 2016, *** reported that *** silicon metal production was transferred to related firms, while *** indicated that *** percent of its silicon metal production and *** percent of its U.S. shipments were transferred to related firms.[20] [21] Table III-11 presents data on U.S. producers' captive production in 2016.

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[18] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.

[19] ***. *** U.S. producer questionnaire responses, section II-13.

[20] "Dow Corning Alabama was originally a commercial producer, but was purchased by Dow Corning and is now primarily a captive producer for its chemical business. D.C. Alabama is a captive producer and generally is sheltered from import competition." Hearing transcript, pp. 50 and 60 (Lutz).

[21] In response to the Commission's questions regarding captive production, the petitioner argued that "we don't believe that the captive production provision applies because of the case law interpretation of the term 'internal transfers.' Internal transfers, as we read the case law, refers to transfers within the same legal entity and because that doesn't exist in this case we are not arguing for application of the captive production provision." Hearing transcript, p. 97 (Schaefermeier).

Table III-11
Silicon metal: U.S. producers' captive production, 2016

* * * * * * *

First statutory criterion in captive consumption

The first requirement for application of the captive consumption provision is that the domestic like product that is internally transferred for processing into that downstream article not enter the merchant market for the domestic like product. U.S. producers reported no internal consumption of silicon metal. Approximately *** of U.S. producers' transfers to related firms during 2016 was sold as silicon metal and the remainder was processed into other products.

Second statutory criterion in captive consumption

The second criterion of the captive consumption provision concerns whether the domestic like product is the predominant material input in the production of the downstream article that is captively produced. With respect to the downstream articles resulting from captive production, silicon metal reportedly comprises the minority (approximately five percent) of the finished cost of a number of end-use products: electronics, solar panels, adhesives, resins, lubricants, plastomers, anti-foaming agents, and water-repellent compounds.[22] [23]

[22] Ibid.

[23] In response to the Commission's questions regarding the captive production provision, the respondents (Dow) argued that "we agree with the Petitioners that the captive production provision does not apply, but we would like to add, if you were to apply the captive production in this case to the test, it would fail the second prong of the test. In the Commerce investigation, it is publicly on the record that the downstream article has about 95 percent of added value to the silicon metal. So the silicon metal only takes up about five percent, and therefore it would fail the second prong." Hearing transcript, p. 174 (Bay).

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

U.S. IMPORTERS

The Commission issued importer questionnaires to 40 firms believed to be importers of subject silicon metal, as well as to all U.S. producers of silicon metal.[1] Usable questionnaire responses were received from 24 companies, representing virtually all U.S. imports from Australia, virtually all U.S. imports from Brazil, virtually all U.S. imports from Kazakhstan, and 96.7 percent of U.S. imports from Norway for 2016 under HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000.[2] That is, the 24 questionnaire responses represented essentially all U.S. imports from the combined subject sources during 2016. As is generally consistent across previous and related Commission silicon proceedings, public official Commerce statistics are presented throughout this report (as opposed to country-specific confidential questionnaire responses), unless specifically indicated otherwise.[3] Table IV-1 lists all responding U.S. importers of silicon metal from Australia, Brazil, Kazakhstan, Norway, and other sources, their locations, and their shares of U.S. imports, in 2016.

[1] The Commission issued questionnaires to those firms identified in the petitions, along with firms that, based on a review of data provided by U.S. Customs and Border Protection ("Customs"), may have accounted for more than one percent of total imports under HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000 in 2016.

[2] The coverage estimates presented are calculated from official U.S. import statistics based on General Imports. General Imports measure the total physical arrivals of merchandise from foreign countries, whether such merchandise enters the U.S. customs territory immediately or is entered into bonded warehouses or FTZs under Customs custody.

[3] U.S. import statistics presented in this report are based on General U.S. imports (as opposed to imports for consumption) due to issues with country of origin reporting and product classification reporting that result from certain U.S. importers' use of foreign trade zones (FTZs) for their importation of silicon metal. Since U.S. import statistics are presented on the basis of General U.S. Imports, values are reported on a CIF basis as opposed to a LDPV basis.

Table IV-1
Silicon metal: U.S. importers, their headquarters, and share of imports by source, 2016

Firm	Headquarters	Share of imports by source (percent)						
		Aust-ralia	Brazil	Kazakh-stan	Norway	Subject sources	Non-subject sources	All import sources
BIT Fondel	Amstelveen, Netherlands	***	***	***	***	***	***	***
CBC Americas	Cary, NC	***	***	***	***	***	***	***
CCMA[1]	Amherst, NY	***	***	***	***	***	***	***
Dow Corning[2]	Midland, MI	***	***	***	***	***	***	***
Elkem[3]	Moon Township, PA	***	***	***	***	***	***	***
FerroAtlantica[4]	Madrid, Spain	***	***	***	***	***	***	***
Greenwich	Greenwich, CT	***	***	***	***	***	***	***
GTAT	Merrimack, NH	***	***	***	***	***	***	***
Itochu	Tokyo, Japan	***	***	***	***	***	***	***
Laurand	Great Neck, NY	***	***	***	***	***	***	***
Medima	Clarence, NY	***	***	***	***	***	***	***
MPM[5]	Waterford, NY	***	***	***	***	***	***	***
MPSAC[6]	Theodore, AL	***	***	***	***	***	***	***
MTALX/Derby[7]	London, UK	***	***	***	***	***	***	***
Ni-Met	West Palm Beach, FL	***	***	***	***	***	***	***
Panadyne	Montgomeryville, PA	***	***	***	***	***	***	***
Polymet[8]	Birmingham, AL	***	---	***	***	***	***	***
REC Silicon	Moses Lake, WA	***	***	***	***	***	***	***
S&A Alloys	Mineola, NY	***	***	***	***	***	***	***
Simcoa[9]	Wellesley, Australia	***	***	***	***	***	***	***
Standard Resources	Cherry Hill, NJ	***	***	***	***	***	***	***
Tennant[10]	Sheffield, UK	***	***	***	***	***	***	***
Traxys	New York, NY	***	***	***	***	***	***	***
Wacker	Charleston, TN	***	***	***	***	***	***	***
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] CCMA is ***.
[2] Dow Corning is ***.
[3] Elkem Materials Inc. is ***.
[4] FerroAtlántica is ***.
[5] MPM is ***.
[6] MPSAC is ***.
[7] Derby Trading Limited is ***.
[8] Polymet is ***.
[9] Simcoa is ***.
[10] Tennant Metallurgical Group Ltd. Is ***.

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

U.S. IMPORTS

Table IV-2 and figure IV-1 present data for U.S. imports of silicon metal from Australia, Brazil, Kazakhstan, Norway, and all other sources. The quantity of silicon metal imports from the subject countries decreased by 22.9 percent from 2014 to 2015,[4] but increased by 22.1 percent from 2015 to 2016. The quantity of silicon metal imports from the subject countries decreased overall by 5.8 percent during 2014-16, but was higher in January to September ("interim") 2017 than in interim 2016 by 25.2 percent. The value of silicon metal imports from the subject countries decreased by 23.4 percent from 2014 to 2016, but was higher in interim 2017 than in interim 2016 by 24.0 percent. As a share of total imports, subject imports decreased from 56.0 percent in 2014 to 50.8 percent in 2015, but increased to 67.0 percent in 2016. The average unit values of silicon metal imports from the subject countries, which were higher than those reported for nonsubject imports in 2014 but lower than those reported for nonsubject imports in 2015 and 2016, increased by 0.5 percent from 2014 to 2015 but decreased by 19.1 percent from 2015 to 2016.

The quantity of silicon metal imports from all nonsubject countries decreased by 40.8 percent from 2014 to 2016, and was 30.8 percent lower in interim 2017 than in interim 2016. The CIF value of silicon metal imports from all nonsubject countries followed a similar trend, decreasing by 46.9 percent from 2014 to 2016, and was 34.3 percent lower in interim 2017 than in interim 2016. The average unit value of silicon metal imports from nonsubject countries increased by 4.3 percent from 2014 to 2015, but decreased by 13.9 percent from 2015 to 2016. The average unit value of silicon metal imports from nonsubject countries decreased overall by 10.2 percent during 2014-16, and was 5.1 percent lower in interim 2017 than in interim 2016.

The ratio of subject import volume to U.S. production decreased from *** percent in 2014 to *** percent in 2015, but increased to *** percent in 2016. The ratio was *** percent in interim 2016 and *** percent in interim 2017.

The ratio of total import volume to U.S. production decreased from *** percent in 2014 to *** in 2015, and further decreased to *** percent in 2016 but was higher in interim 2017 than in interim 2016.

[4] Globe noted that the decline in imports was due to Brazil in 2015 as a result of severe energy shortages that restricted silicon metal production in Brazil that year. Petitioner's postconference brief, p. 32.

Table IV-2
Silicon metal: U.S. imports by source, 2014-16, January to September 2016, and January to September 2017

Item	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Quantity (short tons contained silicon)				
U.S. imports from.--					
Australia	19,977	22,045	18,458	14,674	20,053
Brazil	83,724	51,888	68,340	47,123	60,449
Kazakhstan	---	3,006	10,367	7,640	10,359
Norway	14,753	14,441	14,432	11,429	10,392
Subject sources	118,454	91,381	111,597	80,866	101,253
Canada	20,932	23,470	21,542	17,195	21,023
South Africa	44,100	42,886	24,196	20,749	1,624
All other sources	28,072	22,057	9,353	7,884	9,071
Non subject sources	93,104	88,413	55,090	45,829	31,718
All import sources	211,558	179,793	166,687	126,695	132,971
	Value (1,000 dollars)				
U.S. imports from.--					
Australia	52,516	58,984	34,601	28,158	39,793
Brazil	219,760	140,482	158,897	109,522	140,085
Kazakhstan	---	6,691	17,441	13,279	17,466
Norway	42,151	37,507	29,806	23,778	19,349
Subject sources	314,427	243,664	240,745	174,737	216,694
Canada	49,973	60,261	52,122	41,668	50,171
South Africa	116,321	117,442	56,427	48,036	3,001
All other sources	72,488	58,752	18,285	15,896	16,198
Non subject sources	238,782	236,455	126,834	105,600	69,371
All import sources	553,210	480,118	367,580	280,337	286,064
	Unit value (dollars per STCS)				
U.S. imports from.--					
Australia	2,629	2,676	1,875	1,919	1,984
Brazil	2,625	2,707	2,325	2,324	2,317
Kazakhstan	---	2,226	1,682	1,738	1,686
Norway	2,857	2,597	2,065	2,080	1,862
Subject sources	2,654	2,666	2,157	2,161	2,140
Canada	2,387	2,568	2,420	2,423	2,387
South Africa	2,638	2,739	2,332	2,315	1,848
All other sources	2,582	2,664	1,955	2,016	1,786
Non subject sources	2,565	2,674	2,302	2,304	2,187
All import sources	2,615	2,670	2,205	2,213	2,151

Table continued on next page.

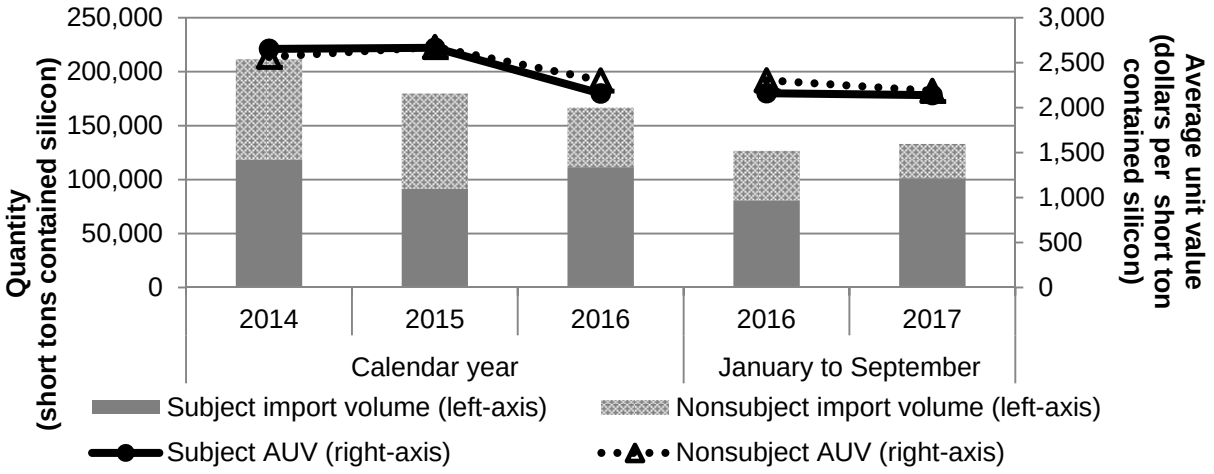
Table IV-2--Continued
Silicon metal: U.S. imports by source, 2014-16, January to September 2016, and January to September 2017

Item	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Share of quantity (percent)				
U.S. imports from.--					
Australia	9.4	12.3	11.1	11.6	15.1
Brazil	39.6	28.9	41.0	37.2	45.5
Kazakhstan	---	1.7	6.2	6.0	7.8
Norway	7.0	8.0	8.7	9.0	7.8
Subject sources	56.0	50.8	67.0	63.8	76.1
Canada	9.9	13.1	12.9	13.6	15.8
South Africa	20.8	23.9	14.5	16.4	1.2
All other sources	13.3	12.3	5.6	6.2	6.8
Non subject sources	44.0	49.2	33.0	36.2	23.9
All import sources	100.0	100.0	100.0	100.0	100.0
	Share of value (percent)				
U.S. imports from.--					
Australia	9.5	12.3	9.4	10.0	13.9
Brazil	39.7	29.3	43.2	39.1	49.0
Kazakhstan	---	1.4	4.7	4.7	6.1
Norway	7.6	7.8	8.1	8.5	6.8
Subject sources	56.8	50.8	65.5	62.3	75.8
Canada	9.0	12.6	14.2	14.9	17.5
South Africa	21.0	24.5	15.4	17.1	1.0
All other sources	13.1	12.2	5.0	5.7	5.7
Non subject sources	43.2	49.2	34.5	37.7	24.2
All import sources	100.0	100.0	100.0	100.0	100.0
	Ratio to U.S. production				
U.S. imports from.--					
Australia	***	***	***	***	***
Brazil	***	***	***	***	***
Kazakhstan	***	***	***	***	***
Norway	***	***	***	***	***
Subject sources	***	***	***	***	***
Canada	***	***	***	***	***
South Africa	***	***	***	***	***
All other sources	***	***	***	***	***
Non subject sources	***	***	***	***	***
All import sources	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.
STCS= Short tons contained silicon.

Source: Official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

Figure IV-1
Silicon metal: U.S. import volumes and average unit values, 2014-16, January to September 2016, and January to September 2017



Source: Official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

CRITICAL CIRCUMSTANCES

On March 8, 2018, Commerce issued its final affirmative determination (in part) that "critical circumstances" exist with regard to imports from Australia (Simcoa) of silicon metal.[5] In this investigation, if the Commission also makes affirmative final critical circumstances determinations, certain subject imports may be subject to antidumping duties retroactive by 90 days from October 12, 2017, the effective date of Commerce's preliminary affirmative LTFV determination. In assessing critical circumstances, the Commission shall consider, among other factors it considers relevant,

> (I) the timing and the volume of the imports,
> (II) a rapid increase in inventories of the imports, and
> (III) any other circumstances indicating that the remedial effect of the {order} will be seriously undermined.[6]

Information regarding the timing and volume of imports subject to Commerce's affirmative critical circumstances determination, as well as the volume of inventories of such imports, is presented below.

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[5] *Silicon Metal From Australia: Affirmative Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances in Part,* 83 FR 9839, March 8, 2018, referenced in app. A.

[6] 19 U.S.C. §§ 1671d(b)(4)(A)(ii), 1673d(b)(4)(A)(ii).

Timing and volume of imports

Table IV-3 and figure IV-2 present data concerning timing and volume of imports. Simcoa is the only known producer of silicon metal in Australia and the U.S. import data are believed to be representative of exclusively Simcoa silicon metal imports from Australia.

Table IV-3
Silicon metal: U.S. importers' U.S. imports from Australia subject to Commerce's final critical circumstances finding, September 2016 through August 2017

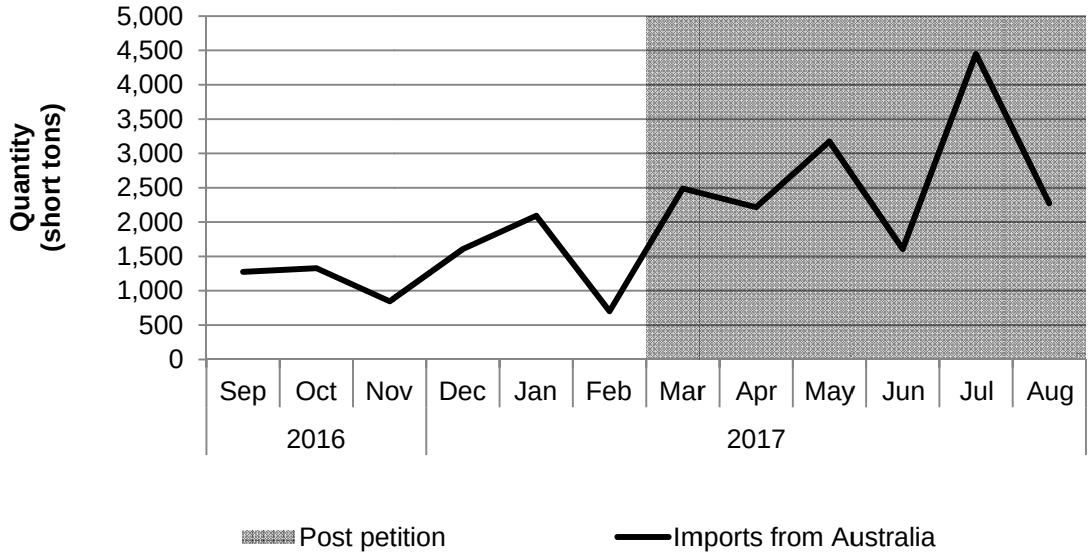
Period	Actual monthly quantity (short tons)	Outwardly cumulative subtotals (short tons)	Percentage change from comparable period (percent)[1]
2016.-- September	1,276	7,854	
October	1,329	6,579	
November	847	5,250	
December	1,609	4,403	
2017.-- January	2,093	2,794	
February	701	701	
Petition file date: March 7, 2017.			
March	2,490	2,490	255.2
April	2,216	4,706	68.4
May	3,174	7,880	79.0
June	1,608	9,488	80.7
July	4,449	13,937	111.9
August	2,274	16,211	106.4

Note.--The running totals represent the total imports summing both sides of the petition file date. The six months after the petition file date represents 6 months of data for the March 2017 through August 2017 period, while the six months prior to the petition file date represents six months of data for the September 2016 through February 2017 period.

[1] The percentage increase or (decrease) over the comparable pre-petition period.

Source: Official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

Figure IV-2
Silicon metal: U.S. importers' U.S. imports from Australia subject to Commerce's preliminary critical circumstances finding, September 2016 through August 2017



Source: Compiled from official U.S. import statistics based on General Imports and CIF value using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed November 27, 2017.

Inventories of imports

Since Simcoa is the only known producer of silicon metal in Australia, the volume of U.S. inventories of merchandise imported from Australia are believed to be representative of exclusively Simcoa product. These inventory data are presented in the section of this report entitled "U.S. Inventories of Imported Merchandise" at table VII-22. Inventory data compiled from U.S. importer questionnaire responses indicate that U.S. inventories of imported merchandise from Australia were *** short tons of contained silicon on September 30, 2016, *** short tons of contained silicon at yearend 2016, and *** short tons of contained silicon on September 30, 2017.

NEGLIGIBILITY

The statute requires that an investigation be terminated without an injury determination if imports of the subject merchandise are found to be negligible.[7] Negligible imports are generally defined in the Act, as amended, as imports from a country of merchandise corresponding to a domestic like product where such imports account for less than 3 percent of the volume of all such merchandise imported into the United States in the

[7] Sections 703(a)(1), 705(b)(1), 733(a)(1), and 735(b)(1) of the Act (19 U.S.C. §§ 1671b(a)(1), 1671d(b)(1), 1673b(a)(1), and 1673d(b)(1)).

most recent 12-month period for which data are available that precedes the filing of the petitions or the initiation of the investigations. However, if there are imports of such merchandise from a number of countries subject to investigations initiated on the same day that individually account for less than 3 percent of the total volume of the subject merchandise, and if the imports from those countries collectively account for more than 7 percent of the volume of all such merchandise imported into the United States during the applicable 12-month period, then imports from such countries are deemed not to be negligible.[8] In the case of countervailing duty investigations involving developing countries, the negligibility limits are 4 percent and 9 percent rather than 3 percent and 7 percent.[9] Although the petitions in these investigations include countervailing duty allegations on three countries (Australia, Brazil, and Kazakhstan), only Brazil has been designated as a developing country by the U.S. Trade Representative.

The quantity of U.S. imports in the twelve month period preceding the filing of the petitions (March 2016 to February 2017) and the share of quantity of total U.S. imports for which each accounted are presented in table IV-4. Based on official import statistics, U.S. imports from Australia, Brazil, Kazakhstan, and Norway accounted for 10.6 percent (17,877 short tons), 46.0 percent (77,489 short tons), 5.9 percent (10,027 short tons), and 8.5 percent (14,250 short tons), respectively, of total imports of silicon metal by quantity during March 2016 to February 2017. Based on official import statistics, U.S. imports from the three combined CVD subject countries (Australia, Brazil, and Kazakhstan), accounted for 62.5 percent of total imports during March 2016 to February 2017, while U.S. imports from the three combined AD subject countries (Australia, Brazil, and Norway) accounted for 65.1 percent of total imports during March 2016 to February 2017.[10]

Based on questionnaire data, imports from Australia, Brazil, Kazakhstan, and Norway accounted for *** percent (*** short tons), *** percent (*** short tons), *** percent (*** short tons), and *** percent (*** short tons), respectively, of total imports of silicon metal by quantity during March 2016 to February 2017.[11] Based on questionnaire data, U.S. imports from the three combined CVD subject countries (Australia, Brazil, and Kazakhstan), accounted for *** percent of total imports during March 2016 to February 2017, while U.S. imports from the three combined AD subject countries (Australia, Brazil, and Norway) accounted for *** percent of total imports during March 2016 to February 2017.

[8] Section 771 (24) of the Act (19 U.S.C § 1677(24)).

[9] Section 771 (24) of the Act (19 U.S.C § 1677(24)(B)).

[10] Based on official import statistics, imports from all four subject countries combined accounted for 71.0 percent of total imports during March 2016 to February 2017.

[11] Based on questionnaire data, U.S. imports from all four subject countries combined accounted for *** percent of total imports during March 2016 to February 2017.

Table IV-4
Silicon metal: U.S. imports in the twelve months preceding the filing of the petitions, March 2016 through February 2017

Source	March 2016 through February 2017			
	Official U.S. statistics		Questionnaire data	
	Quantity (short tons contained silicon)	Share of quantity (percent)	Quantity (short tons contained silicon)	Share of quantity (percent)
Australia[1 2]	17,877	10.6	***	***
Brazil[1 2]	77,489	46.0	***	***
Kazakhstan[1]	10,027	5.9	***	***
Norway[2]	14,250	8.5	***	***
Subject sources	119,642	71.0	***	***
Canada	22,343	13.3	***	***
South Africa	16,422	9.7	***	***
All other sources	10,153	6.0	***	***
Nonsubject sources	48,918	29.0	***	***
All imports sources	168,560	100.0	***	***

[1] Subject to countervailing duty investigations.

[2] Subject to antidumping duty investigations.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

CUMULATION CONSIDERATIONS

In assessing whether imports should be cumulated, the Commission determines whether U.S. imports from the subject countries compete with each other and with the domestic like product and has generally considered four factors: (1) fungibility, (2) presence of sales or offers to sell in the same geographical markets, (3) common or similar channels of distribution, and (4) simultaneous presence in the market.

Fungibility

Table IV-5 and figure IV-3 present data for U.S producers' and U.S. importers' U.S. shipments by product type for 2016. U.S. shipments by product type data are categorized by low boron content silicon metal, high purity silicon metal, metallurgical grade silicon metal, and all other product types of silicon metal. For U.S. producers and U.S. importers from Australia, Kazakhstan, Norway, and nonsubject countries, metallurgical grade silicon metal was the largest for shipments by type. For U.S. importers from Brazil (and almost half of subject

imports), low boron content silicon metal was the largest for shipments by type.[12] In its posthearing brief, Brazilian producers Liagas de Aluminio S/A ("LIASA") and Companhia Ferroligas Minas Gerais ("Minasligas") contend that the bulk of the products that are not low boron content silicon metal from Brazil are primarily unique *** products that are sold by ***, and that these products are not fungible with other subject imports or the domestic like product.[13]

For U.S. producers and U.S. importers combined, metallurgical grade silicon metal was the largest (by *** percent) for shipments by type in 2016. Further detailed information pertaining to U.S. producers' and U.S. importers' commercial U.S. shipments (by product type) for 2014-16, January to September 2016, and January to September 2017 is presented in appendix D.

Table IV-5
Silicon metal: U.S. producers' and U.S. importers' commercial U.S. shipments by product type, 2016

* * * * * * *

Figure IV-3
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments by product type, 2016

* * * * * * *

[12] In their combined posthearing brief, Brazilian producers LIASA and Minasligas indicated that low boron content silicon metal is not fungible with the domestic like product because they do not share common channels of distribution, there is no reasonable overlap in competition, there is limited interchangeability, and because low boron content silicon metal is not sourced domestically. LIASA and Minasligas joint respondents posthearing brief, pp. 1-2.

[13] Joint Respondents' (LIASA and Minasligas) posthearing brief, p. 5.

Geographical markets

According to Commission questionnaire responses, silicon metal production occurs in the Eastern and Southern geographic regions of the United States. Silicon metal is generally shipped nationwide, with the exception of geographic market areas served by U.S. importers from Australia, which do not ship to the Central Southwest and Mountains geographic U.S. market areas.

As illustrated in table IV-6, U.S. Customs districts located in the North[14] accounted (by share of quantity, across) for 35.0 percent, the largest share of the imports of silicon metal from the subject countries during 2016, whereas U.S. Customs districts located in the East,[15] South,[16] and West[17] accounted for smaller shares (28.3 percent, 22.0 percent, and 14.6 percent of imports from the subject countries, respectively).

[14] The "North" includes the following Customs entry districts: Chicago, Illinois; Cleveland, Ohio; Detroit, Michigan; Duluth, Minnesota; Great Falls, Montana; Milwaukee, Wisconsin; Minneapolis, Minnesota; and Pembina, North Dakota.The "South" includes the following Customs entry districts: Dallas-Fort Worth, Texas; El Paso, Texas; Houston-Galveston, Texas; Laredo, Texas; Miami, Florida; Mobile, Alabama; New Orleans, Louisiana; and Tampa, Florida.

[15] The "East" includes the following Customs entry districts: Baltimore, Maryland; Boston, Massachusetts; Buffalo, New York; Charleston, South Carolina; Charlotte, North Carolina; New York, New York; Norfolk, Virginia; Ogdensburg, New York; Philadelphia, Pennsylvania; Portland, Maine; San Juan, Puerto Rico; Savannah, Georgia; St. Albans, Vermont; and Washington, District of Columbia.

[16] The "South" includes the following Customs entry districts: Dallas-Fort Worth, Texas; El Paso, Texas; Houston-Galveston, Texas; Laredo, Texas; Miami, Florida; Mobile, Alabama; New Orleans, Louisiana; and Tampa, Florida.

[17] The "West" includes the following Customs entry districts: Columbia-Snake, Oregon; Honolulu, Hawaii; Los Angeles, California; Nogales, Arizona; San Diego, California; San Francisco, California; and Seattle, Washington.

Table IV-6
Silicon metal: U.S. imports, by source and border of entry, 2016

Source	Border of entry				
	East	North	South	West	All borders
	Quantity (short tons contained silicon)				
Australia	12,525	---	---	5,933	18,458
Brazil	4,947	38,899	16,619	7,875	68,340
Kazakhstan	6,839	104	1,890	1,535	10,367
Norway	7,273	101	6,053	1,005	14,432
Subject sources	31,584	39,104	24,563	16,347	111,597
Canada	1,792	19,750	---	---	21,542
South Africa	18,895	---	5,301	---	24,196
All other sources	6,863	1,938	158	394	9,353
Nonsubject sources	27,549	21,687	5,459	394	55,090
All imports sources	59,133	60,791	30,022	16,742	166,687
	Share of quantity across (percent)				
Australia	67.9	---	---	32.1	100.0
Brazil	7.2	56.9	24.3	11.5	100.0
Kazakhstan	66.0	1.0	18.2	14.8	100.0
Norway	50.4	0.7	41.9	7.0	100.0
Subject sources	28.3	35.0	22.0	14.6	100.0
Canada	8.3	91.7	---	---	100.0
South Africa	78.1	---	21.9	---	100.0
All other sources	73.4	20.7	1.7	4.2	100.0
Nonsubject sources	50.0	39.4	9.9	0.7	100.0
All imports sources	35.5	36.5	18.0	10.0	100.0
	Share of quantity down (percent)				
Australia	21.2	---	---	35.4	11.1
Brazil	8.4	64.0	55.4	47.0	41.0
Kazakhstan	11.6	0.2	6.3	9.2	6.2
Norway	12.3	0.2	20.2	6.0	8.7
Subject sources	53.4	64.3	81.8	97.6	67.0
Canada	3.0	32.5	---	---	12.9
South Africa	32.0	---	17.7	---	14.5
All other sources	11.6	3.2	0.5	2.4	5.6
Nonsubject sources	46.6	35.7	18.2	2.4	33.0
All imports sources	100.0	100.0	100.0	100.0	100.0

Source: Official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

Channels of distribution

Table IV-7 and figure IV-4 present data for U.S producers' and U.S. importers' commercial shipments by channels of distribution for 2016. Channels of distribution data are categorized by polysilicon and other chemical producers, primary aluminum producers, secondary aluminum producers, various other end users, end users, and distributors. For U.S. producers and U.S. importers from Brazil and nonsubject countries, polysilicon and other

chemical producers were the largest channels of distribution.[18] For U.S. importers from Australia and Kazakhstan, secondary aluminum producers were the largest channel. For U.S. importers from Norway, secondary aluminum producers and other end users were the largest channel.

Table IV-7
Silicon metal: U.S. producers' and U.S. importers' commercial U.S. shipments by channels of distribution, 2016

* * * * * * *

Figure IV-4
Silicon metal: U.S. producers' and U.S. importers' commercial U.S. shipments by channels of distribution, 2016

* * * * * * *

Presence in the market

Table IV-8 presents monthly U.S. imports during January 2014 to September 2017. These data show that imports of silicon metal were present in the U.S. market in every month during the period examined from January 2014 to September 2017 for every subject country except Kazakhstan. With respect to Kazakhstan, there were zero imports present in the U.S. market in 2014. Imports of silicon metal from Kazakhstan were present in 8 months in 2015, 12 months in 2016, and 8 of the first 9 months of 2017.

[18] In the Commission's hearing, Dow argued that "there is limited head to head competition between imports from Brazil and domestic product due to product differences and differing channels of distribution." Hearing transcript, p. 126 (Brown).

Table IV-8
Silicon metal: U.S. imports by month, January 2014 through September 2017

Year / month	U.S. importers						
	Australia	Brazil	Kazakhstan	Norway	Subject sources	Nonsubject sources	All import sources
2014:							
January	2,161	9,384	---	783	12,328	5,620	17,948
February	1,653	9,306	---	344	11,302	3,938	15,240
March	751	8,150	---	873	9,774	10,540	20,314
April	2,015	5,093	---	862	7,970	6,552	14,522
May	1,669	5,666	---	1,209	8,544	8,862	17,406
June	1,499	7,472	---	615	9,586	6,770	16,355
July	2,182	8,985	---	765	11,932	7,847	19,779
August	1,722	4,930	---	1,752	8,404	7,637	16,041
September	1,681	6,420	---	1,344	9,444	11,381	20,825
October	1,785	8,358	---	948	11,090	4,890	15,980
November	1,312	4,168	---	3,488	8,967	7,841	16,809
December	1,547	5,793	---	1,771	9,112	11,226	20,338
2015:							
January	1,680	5,257	482	2,040	9,459	7,820	17,278
February	1,183	5,076	---	951	7,210	8,312	15,523
March	2,519	2,926	300	2,053	7,799	8,808	16,607
April	1,645	7,182	---	740	9,567	7,373	16,940
May	1,909	3,704	---	1,143	6,755	7,193	13,949
June	2,114	5,421	437	982	8,954	8,306	17,260
July	1,663	5,668	---	1,419	8,750	7,562	16,312
August	3,191	3,571	329	940	8,030	7,294	15,324
September	1,145	1,888	84	1,044	4,160	5,274	9,434
October	1,587	2,562	219	1,064	5,431	5,367	10,798
November	2,076	5,090	219	978	8,363	7,339	15,701
December	1,333	3,543	937	1,089	6,902	7,765	14,668

Table continued on next page.

Table IV-8--Continued
Silicon metal: U.S. imports by month, January 2014 through September 2017

Year / month	U.S. importers						
	Australia	Brazil	Kazakhstan	Norway	Subject sources	Nonsubject sources	All import sources
2016:							
January	1,975	2,123	1,641	906	6,645	7,563	14,208
February	1,401	1,057	982	1,034	4,474	5,943	10,416
March	2,513	6,538	678	649	10,377	7,572	17,949
April	1,324	3,411	836	1,633	7,205	4,501	11,705
May	1,110	3,133	770	904	5,916	8,510	14,426
June	1,382	8,954	766	1,309	12,411	2,799	15,210
July	1,498	7,421	871	1,572	11,363	3,817	15,180
August	2,196	8,964	771	1,845	13,776	2,577	16,353
September	1,276	5,522	325	1,577	8,699	2,548	11,247
October	1,329	5,895	1,082	1,190	9,496	4,499	13,994
November	847	9,485	1,101	772	12,204	2,842	15,046
December	1,609	5,836	545	1,041	9,032	1,920	10,951
2017:							
January	2,093	5,392	925	1,110	9,519	4,237	13,756
February	701	6,937	1,358	648	9,644	3,097	12,741
March	2,490	6,901	858	1,633	11,882	2,749	14,631
April	2,216	5,261	285	1,910	9,672	3,976	13,648
May	3,174	3,822	1,277	1,504	9,776	3,402	13,178
June	1,608	5,646	2,985	670	10,909	2,852	13,761
July	4,449	8,037	1,912	1,076	15,475	4,227	19,702
August	2,274	11,522	759	592	15,148	2,859	18,007
September	1,048	6,930	---	1,249	9,227	4,320	13,547

Source: Official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

APPARENT U.S. CONSUMPTION (TOTAL MARKET)

Table IV-9 and figure IV-6 present data on total market, apparent U.S. consumption for silicon metal during 2014-16, January-September 2016, and January-September 2017. Apparent U.S. consumption based on quantity decreased by *** percent from 2014 to 2015, but increased by *** percent from 2015 to 2016. Apparent U.S. consumption based on quantity decreased overall by *** percent from 2014 to 2016, but was higher in interim 2017 than in interim 2016. Apparent U.S. consumption based on value decreased by *** percent from 2014 to 2016 and was lower in interim 2017 than in interim 2016. U.S. imports based on quantity from subject sources decreased by 22.9 percent from 2014 to 2015, but increased by 22.1

percent from 2015 to 2016. U.S. imports from subject sources decreased by 5.8 percent from 2014 to 2016, but were higher in interim 2017 than in interim 2016.[19]

Table IV-9
Silicon metal: Apparent U.S. consumption (total market), 2014-16, January to September 2016, and January to September 2017

Item	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. imports from.--					
Australia	19,977	22,045	18,458	14,674	20,053
Brazil	83,724	51,888	68,340	47,123	60,449
Kazakhstan	---	3,006	10,367	7,640	10,359
Norway	14,753	14,441	14,432	11,429	10,392
Subject sources	118,454	91,381	111,597	80,866	101,253
Canada	20,932	23,470	21,542	17,195	21,023
South Africa	44,100	42,886	24,196	20,749	1,624
All other sources	28,072	22,057	9,353	7,884	9,071
Non subject sources	93,104	88,413	55,090	45,829	31,718
All import sources	211,558	179,793	166,687	126,695	132,971
Apparent U.S. consumption	***	***	***	***	***
	Value (1,000 dollars)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. imports from.--					
Australia	52,516	58,984	34,601	28,158	39,793
Brazil	219,760	140,482	158,897	109,522	140,085
Kazakhstan	---	6,691	17,441	13,279	17,466
Norway	42,151	37,507	29,806	23,778	19,349
Subject sources	314,427	243,664	240,745	174,737	216,694
Canada	49,973	60,261	52,122	41,668	50,171
South Africa	116,321	117,442	56,427	48,036	3,001
All other sources	72,488	58,752	18,285	15,896	16,198
Non subject sources	238,782	236,455	126,834	105,600	69,371
All import sources	553,210	480,118	367,580	280,337	286,064
Apparent U.S. consumption	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires and from official U.S. import statistics using General Imports and CIF value under HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed November 27, 2017.

[19] In the Commission's hearing, the respondents (Dow Corning) stated that they were not a threat to the U.S. total market, because "Dow Silicones accounts for a large portion of imports from Brazil and all of these imports are consumed internally by Dow Silicones to produce downstream intermediate products. We do not participate in the merchant market." Hearing transcript, p. 125 (Brown).

Figure IV-6
Silicon metal: Apparent U.S. consumption (total market), 2014-16, January to September 2016, and January to September 2017

* * * * * * *

U.S. MARKET SHARES (TOTAL MARKET)

U.S. market share data (based on the total market) are presented in table IV-10 during 2014-16, January-September 2016, and January-September 2017. These data show that U.S. producers' market share based on quantity increased by *** percentage points from 2014 to 2016, but was lower in interim 2017 than in interim 2016. U.S. producers' market share, based on value, increased by *** percentage points from 2014 to 2016, but was lower in interim 2017 than in interim 2016. The market share based on quantity of imports of silicon metal from the subject countries decreased by *** percentage points from 2014 to 2015, but increased by *** percentage points from 2015 to 2016. The market share based on quantity of imports of silicon metal from subject countries, based on quantity increased by *** percentage points from 2014 to 2016, and was *** percentage points higher in interim 2017 than in interim 2016.

Table IV-10
Silicon metal: Market shares (total market), 2014-16, January to September 2016, and January to September 2017

* * * * * * *

APPARENT U.S. CONSUMPTION (MERCHANT MARKET)

Table IV-11 and figure IV-7 present data on merchant market apparent U.S. consumption for silicon metal during 2014-16, January-September 2016, and January-September 2017. Apparent U.S. consumption based on quantity decreased overall by *** percent from 2014 to 2016, but was higher in interim 2017 than in interim 2016. Apparent U.S. consumption based on value decreased by *** percent from 2014 to 2016, but was higher in in interim 2017 than in interim 2016. U.S. imports based on quantity from subject sources decreased by 22.9 percent from 2014 to 2015, but increased by 22.1 percent from 2015 to 2016. U.S. imports from subject sources decreased by 5.8 percent from 2014 to 2016, but were higher in interim 2017 than in interim 2016.

Table IV-11
Silicon metal: Apparent U.S. consumption (merchant market), 2014-16, January to September 2016, and January to September 2017

Item	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Quantity (short tons contained silicon)				
U.S. producers' commercial U.S. shipments	***	***	***	***	***
U.S. imports from.--					
Australia	19,977	22,045	18,458	14,674	20,053
Brazil	83,724	51,888	68,340	47,123	60,449
Kazakhstan	---	3,006	10,367	7,640	10,359
Norway	14,753	14,441	14,432	11,429	10,392
Subject sources	118,454	91,381	111,597	80,866	101,253
Canada	20,932	23,470	21,542	17,195	21,023
South Africa	44,100	42,886	24,196	20,749	1,624
All other sources	28,072	22,057	9,353	7,884	9,071
Non subject sources	93,104	88,413	55,090	45,829	31,718
All import sources	211,558	179,793	166,687	126,695	132,971
Apparent U.S. consumption	***	***	***	***	***
	Value (1,000 dollars)				
U.S. producers' commercial U.S. shipments	***	***	***	***	***
U.S. imports from.--					
Australia	52,516	58,984	34,601	28,158	39,793
Brazil	219,760	140,482	158,897	109,522	140,085
Kazakhstan	---	6,691	17,441	13,279	17,466
Norway	42,151	37,507	29,806	23,778	19,349
Subject sources	314,427	243,664	240,745	174,737	216,694
Canada	49,973	60,261	52,122	41,668	50,171
South Africa	116,321	117,442	56,427	48,036	3,001
All other sources	72,488	58,752	18,285	15,896	16,198
Non subject sources	238,782	236,455	126,834	105,600	69,371
All import sources	553,210	480,118	367,580	280,337	286,064
Apparent U.S. consumption	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires and from official U.S. imports based on General Imports and CIF value using statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed on December 13, 2017.

Figure IV-7
Silicon metal: Apparent U.S. consumption (merchant market), 2014-16, January to September 2016, and January to September 2017

* * * * * * *

U.S. MARKET SHARES (MERCHANT MARKET)

U.S. market share data (based on the merchant market) are presented in table IV-12. These data show that U.S. producers' market share based on quantity increased by ***

percentage points from 2014 to 2016, and were higher in interim 2017 than in interim 2016. U.S. producers' market share, based on value, increased by *** percentage points from 2014 to 2016 and were higher in interim 2017 than in interim 2016. The market share based on quantity of imports of silicon metal from the subject countries decreased by *** percentage points from 2014 to 2015, but increased by *** percentage points from 2015 to 2016. U.S. imports from subject sources held a *** percentage points from higher market share in 2016 than in 2014, and were higher in interim 2017 than in interim 2016.

Table IV-12
Silicon metal: Market shares: (merchant market), 2014-16, January to September 2016, and January to September 2017

* * * * * * *

PART V: PRICING DATA

FACTORS AFFECTING PRICES

Raw material costs

Silicon metal is composed almost entirely of elemental silicon with very small amounts of impurities, such as iron, calcium, and aluminum. Silicon metal is produced from mined quartz. Other inputs to the production process include coal or charcoal, woodchips, and electrodes.[1] Electricity is a significant input cost in the production process. The quality of raw materials used in the production of silicon metal determines the quality of silicon metal, and thus whether silicon metal meets specific end-user requirements.[2] Grade quality can vary over large volumes, and may require monitoring and testing to ensure product consistency and quality.

*** of three U.S. producers reported that raw material prices had fluctuated and that electricity prices had decreased since 2014. U.S. producer *** reported that total raw material costs have increased approximately 4 percent since 2014, with increases in the cost of quartz and coal being partly offset by declines in electrode, woodchip, and electricity costs.[3] U.S. producer *** reported that quartz costs have increased slightly while coal costs have decreased significantly, and stated that the decrease in the cost of electricity has contributed to a lower cost of production. U.S. producers *** stated that raw material price changes did not affect silicon metal prices.

During the preliminary phase of these investigations, respondents stated that electricity is often the most significant cost in silicon metal production, and that U.S. industrial electricity prices generally peak during the summer and trough during the winter. Overall, electricity prices decreased (when compared to the same month in the prior year) during 2014-2016, but electricity prices increased in 2017 (figure V-1).

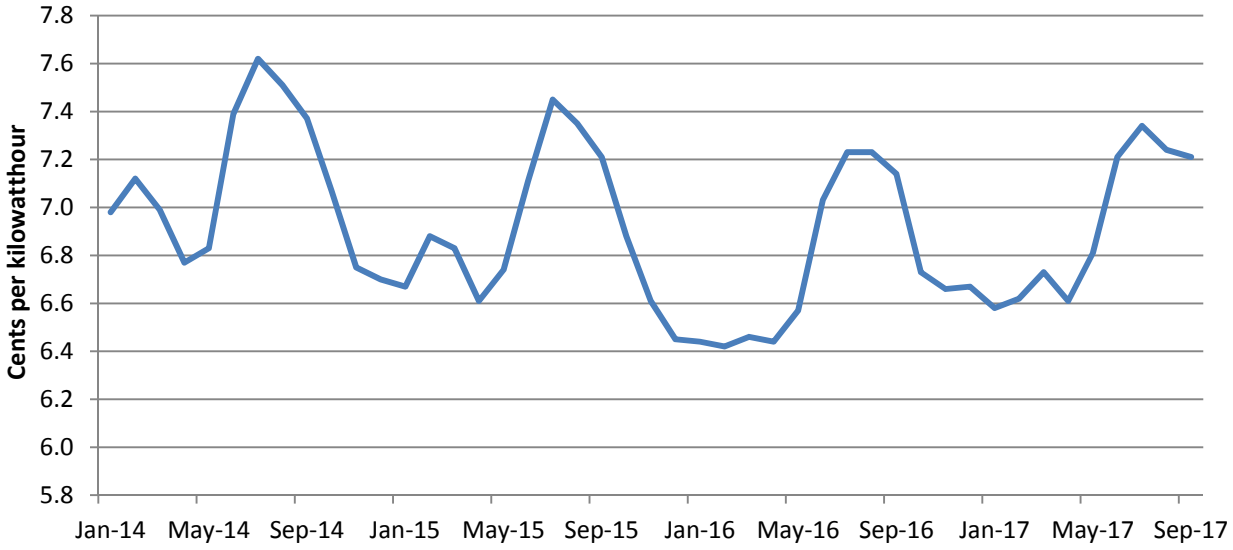
[1] Petitioner's postconference brief, Appendix A, p. 12.

[2] Conference transcript, pp. 76-77 (Hudson). See Parts I and II for further discussion of raw material quality.

[3] Respondent ***. Respondent Wacker's posthearing brief, pp. 3 and 12, Exhibit 13, pp. 1-3.

Figure V-1

Electricity costs: U.S. average retail price of electricity, Industrial, monthly, January 2014-September 2017



Source: U.S. Energy Information Administration.

U.S. inland transportation costs

All U.S. producers and most responding importers (10 of 15) reported that they typically arrange transportation to their customers. U.S. producers reported that their U.S. inland transportation costs were between 1.6 and 3.0 percent while importers reported costs of 0.1 to 5.0 percent of the total delivered cost. Of the 15 responses, 9 importers reported that they shipped silicon metal from storage, while 6 importers reported that they shipped from the point of importation.

According to respondents, U.S. producers have a cost advantage over imports due to high freight costs in the United States and purchasers' need for just-in-time deliveries, as U.S. producers are located near their East Coast customers.[4] However, for shipments going to the West Coast, U.S. purchaser *** reported that some foreign producers in Asia and Australia have lower freight costs to reach West Coast ports, and that U.S. producers in the East and Midwest frequently do not offer quotes to West Coast purchasers. Importer and purchaser *** stated that while other silicon metal consumers are located closer to silicon metal production in the East or Midwest, its facilities are in ***, and the transportation cost of imported silicon metal from the West Coast is almost one-third of the cost of shipping domestically produced silicon metal across the continental United States.[5]

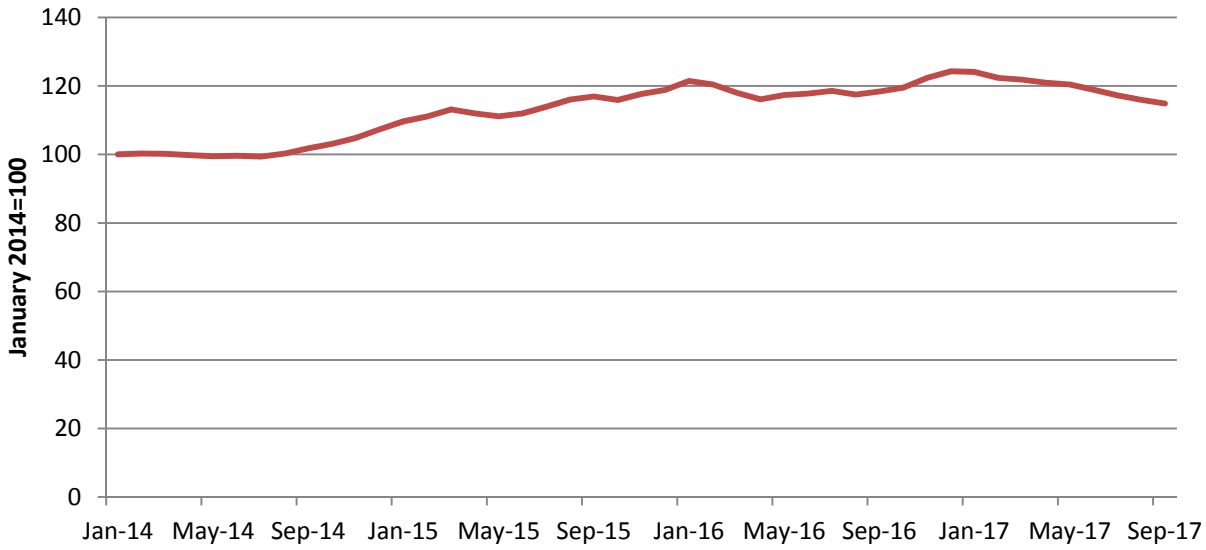
[4] Joint respondents' postconference brief, p. 5.

[5] Conference transcript, pp. 83, 119-120, and 122 (Bowes, Stoel, and Lewis); *** postconference brief, p. 5.

Exchange rates

U.S. producer *** stated that the exchange rate for currencies of subject countries relative to the U.S. dollar "significantly affects the competitiveness" of silicon metal imported from those countries in the U.S. market. *** reported that the majority of silicon production costs are incurred in local currencies, and that depreciation of those currencies against the U.S. dollar lowers foreign producers' production costs. U.S. importer *** reported that exchange rates have affected the price of production inputs including carbon electrodes and low ash coal. U.S. purchaser *** stated that the depreciation of local currencies against the U.S. dollar led to reduced production costs for foreign producers during 2014-16. The Federal Reserve's broad dollar index increased by 15 percent from January 2014 to September 2017, indicating an overall appreciation of the dollar against world currencies (figure V-2).

Figure V-2
Exchange rates: Trade weighted U.S. dollar index, monthly, not seasonally adjusted, January 2014-September 2017



Source: U.S. Federal Reserve.

PRICING PRACTICES

Pricing methods

Silicon metal contract prices are sometimes determined based on a formula that accounts for published price indexes (figure V-3).[6] These published price data are readily available to purchasers, and purchasers may share competing prices with suppliers during

[6] Conference transcript, pp. 32, 36, 60-61, 92 (Lutz, Kramer, Augusto).

negotiations.[7] The published index reflects a product that is likely to be sold to secondary aluminum producers, but purchasers in all sectors reference these indices.[8] There are no published price series data for chemical or polysilicon grade silicon metal.[9]

Figure V-3

Silicon metal: Published price index of silicon metal, *, average price reported, cents per pound, for all transactions during the month, January 2014–December 2017**

* * * * * * *

U.S. producers and importers reported using transaction-by-transaction negotiations and contracts as their primary pricing methods (table V-1).

Table V-1

Silicon metal: U.S. producers' and importers' reported price setting methods, by number of responding firms[1]

Method	U.S. producers	U.S. importers
Transaction-by-transaction	***	14
Contract	***	13
Set price list	***	0
Other[1]	***	7
Total responding firms	**3**	**22**

[1] Other pricing methods include pricing based on published indexes.

Note.--The sum of responses down may not add up to the total number of responding firms as each firm was instructed to check all applicable price setting methods employed.

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

U.S. producers *** reported selling the majority of their production under annual or long-term contracts in 2016, with some contracts lasting as long as three years (table V-2). Short-term contracts were generally for six months or less. ***. Most importers reported selling the bulk of their silicon metal primarily under annual contracts, with short-term contracts or spot sales to supply additional purchaser demand as necessary. Of 13 responding importers, 7 reported selling on annual contracts, 9 reported selling by short-term contracts, and 10 reported selling on the spot market.

[7] Conference transcript, p. 20 (Perkins).
[8] Conference transcript, pp. 63 and 134 (Lutz, Stoel).
[9] Joint respondents' postconference brief, Exhibit 1.

Table V-2
Silicon metal: U.S. producers' and importers' shares of U.S. commercial shipments by type of sale, 2016

Item	U.S. producers	Subject U.S. importers
	Share (percent)	
Share of commercial U.S. shipments.-- Long-term contracts	***	---
Annual contract	***	62.6
Short-term contracts	***	19.2
Spot sales	***	18.2

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

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

U.S. producers reported that their contracts do not allow for price renegotiation, nor do their contracts contain meet-or-release provisions. One importer (***) reported that its contracts allow for price renegotiation. No importers reported providing meet-or-release provisions. One importer reported contracts with fixed prices, and *** importers reported having contracts with fixed quantities.

Typically, contracts are negotiated or competitively bid on during the fourth quarter for shipments in the following year.[10] U.S. producers *** and seven (of 13) responding importers reported that some of their contract prices are based on silicon metal price indexes published by Platts or CRU. U.S. producers and importers, however, reported that they did not base contract prices on raw material indexes. Some purchasers reported that contracts are usually signed in the last quarter of the preceding year, but that agreements for 2018 had stalled. U.S. purchasers *** reported that U.S. producers were not willing to negotiate agreements or provide quotes during the usual fourth quarter negotiation period.[11] Purchaser *** also reported that U.S. producers prioritize contracts with purchasers that buy higher grades of silicon metal, such as polysilicon producers.

During the preliminary phase of these investigations, *** explained that a discontinued producer pricing mechanism of discounting to published indexes had the effect of allowing low volume spot purchases in the aluminum industry to cause indexes to "ratchet down" from month to month, as the price index declined and the discount to index policy further lowered prices in the following month.[12]

Two purchasers reported that they purchase silicon metal weekly, 11 purchase monthly, 3 purchase quarterly, 10 purchase annually, and 7 purchasers also reported buying silicon metal on an as-needed basis. Twenty of 31 responding purchasers reported that their purchasing frequency had not changed since 2014. Purchasers reporting a change in purchase frequency usually cited increasing demand and production or an uncertain business outlook. Most

[10] Conference transcript, p. 23 (Perkins).

[11] See Part II, supply constraints, for additional information.

[12] Purchaser *** stated that chemical industry buyers saw little benefit from price drops due to most chemical purchases being on fixed price contracts.

purchasers contact between one and eight suppliers before making a purchase, with the majority contacting between two and four suppliers, and some contacting up to 15 suppliers.

Sales terms and discounts

Most U.S. producers (2 of 3) and importers (11 of 15) typically quote prices on a delivered basis. All U.S. producers and almost all importers (except for ***) reported having no discount policy. All U.S. producers and most importers reported sales terms of net 30 days, with some variation.[13]

Price leadership

Most responding purchasers reported that U.S. producer Globe is a price leader. Several U.S. purchasers, including ***, noted that Globe's merger with Grupo FerroAtlantica during the fourth quarter of 2015 consolidated two silicon metal suppliers into one larger supplier, with some purchasers indicating that this allowed the recently merged company to have greater influence on market pricing.

PRICE DATA

The Commission requested U.S. producers and importers to provide quarterly data for the total quantity and f.o.b. value of the following silicon metal products shipped to unrelated U.S. customers during January 2014-September 2017.

***Product 1*.--** Sold to primary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 98.5% silicon, a maximum of 1.00% iron, a maximum of 0.07% calcium, and no restriction of the aluminum content.

***Product 2*.--** Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

***Product 3*.--** Sold to chemical and/or polysilicon manufacturers; silicon metal less than 99.99% pure that contains a minimum of 98.0% silicon, a maximum of 1.50% iron, a maximum of 0.2% calcium, and a maximum of 0.4% aluminum.

All three U.S. producers and 23 importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all quarters. [14]

[13] U.S. producers *** additionally reported sales terms of net 45 days. Six importers additionally reported sales terms of net 60 days, and three reported variations of less than or more than net 60 days.

Pricing data reported by these firms accounted for approximately *** percent of U.S. producers' U.S. commercial shipments of silicon metal in 2016. Pricing data reported by importers accounted for approximately *** percent of U.S. commercial shipments of subject imports from Australia, *** percent of U.S. commercial shipments of subject imports from Brazil, *** U.S. commercial shipments of subject imports from Kazakhstan, and *** percent of U.S. commercial shipments of subject imports from Norway in 2016.

Price data for products 1-3 are presented in tables V-3 to V-5 and figures V-4 to V-6. Nonsubject country prices for Canada and South Africa are presented in Appendix E.

Table V-3
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 1[1] and margins of underselling/(overselling), by quarters, January 2014-September 2017

* * * * * * *

Table V-4
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 2[1] and margins of underselling/(overselling), by quarters, January 2014-September 2017

* * * * * * *

Table V-5
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 3[1] and margins of underselling/(overselling), by quarters, January 2014-September 2017

* * * * * * *

Figure V-4
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 1,[1] by quarters, January 2014-September 2017

* * * * * * *

Figure V-5
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 2,[1] by quarters, January 2014-September 2017

* * * * * * *

Figure V-6
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 3,[1] by quarters, January 2014-September 2017

* * * * * * *

(…*continued*)

[14] Per-unit pricing data are calculated from total quantity and total value data provided by U.S. producers and importers. The precision and variation of these figures may be affected by rounding, limited quantities, and producer or importer estimates.

Import purchase costs

The Commission also requested importers provide landed-duty paid values and quantities for imports used for internal consumption. Very small quantities of products 1 and 2 were imported for a firm's own use.[15] However, imports for internal consumption accounted for a relatively large volume of product 3 from subject countries, particularly product 3 imports from Brazil that were imported by chemical/polysilicon manufacturers. Purchase cost data for imports of product 3 are presented in tables V-6 and figure V-7.

Table V-6
Silicon metal: Weighted-average f.o.b. prices and landed duty-paid values and quantities of domestic and imported product 3,[1] by quarter, January 2014-September 2017

* * * * * * *

Figure V-7
Silicon metal: Weighted-average f.o.b. prices and landed duty-paid values and quantities of domestic and imported product 3,[1] by quarter, January 2014-September 2017

* * * * * * *

Price trends

During January 2014-September 2017, prices declined overall. In general, prices increased slightly in 2014 and 2015, declined in 2016, and stabilized in 2017. Table V-7 summarizes the price trends, by country and by product. As shown in the table, domestic price decreases ranged from *** percent to *** percent during January 2014 to September 2017, while import price decreases ranged from *** percent to *** percent. Direct import purchase costs also decreased during the period, with decreases ranging from *** percent to *** percent.

Table V-7
Silicon metal: Number of quarters containing observations, low price, high price and change in price over period by product and source country, January 2014-September 2017

* * * * * * *

Price comparisons

As shown in tables V-8 and V-9, prices for silicon metal imported from subject countries were below those for U.S.-produced silicon metal in 66 of 88 instances (*** short tons); margins of underselling ranged from *** to *** percent. In the remaining 22 instances (*** short tons), prices for silicon metal from subject countries were between *** and *** percent

[15] ***. For product 1, there were ***.

above prices for the domestic product. Lower grade silicon metal may occasionally be sold at higher prices than purer grades of silicon metal during the same time period, because of supply and demand pressure which may vary between different end-use sectors, and the relatively limited ability of consumers to switch to alternate input products that contain different characteristics.

Table V-8
Silicon metal: Instances of underselling/overselling and the range and average of margins, by product, January 2014-September 2017

* * * * * * *

Table V-9
Silicon metal: Instances of underselling/overselling and the range and average of margins, by country, January 2014-September 2017

* * * * * * *

Compared to U.S. commercial shipments of silicon metal from subject countries, relatively higher volumes of silicon metal from subject countries were directly imported and internally consumed. Virtually all directly imported silicon metal shipments consisted of product 3.[16] Costs for product 3 silicon metal imported from subject countries were below those for U.S.-produced silicon metal in 9 of 33 instances (*** short tons), and above in the remaining 24 instances (*** short tons).

LOST SALES AND LOST REVENUE

In the preliminary phase of these investigations, the Commission requested that U.S. producers of silicon metal report purchasers where they experienced instances of lost sales or revenue due to competition from imports of silicon metal from Australia, Brazil, Kazakhstan, and Norway during 2014-16. *** submitted lost sales and lost revenue allegations, and identified eight firms where *** lost sales or revenue (seven consisting of lost sales allegations and one consisting of lost revenue allegations). All allegations of lost sales and lost revenue occurred in 2016 and 2017. Five allegations included Australia, three allegations included Brazil, two allegations included Kazakhstan, and four allegations included Norway. Most alleged lost sales and lost revenue were through contract negotiations and two were through a request for quote.

In the final phase of these investigations, *** of the three responding U.S. producers, ***, reported that they had to either reduce prices and/or roll back announced price increases, and one firm *** reported that it had lost sales. Staff contacted 47 firms and received responses from 31 purchasers. During 2014-2016, the share of domestic product purchased by

[16]According to questionnaire responses, *** were directly imported.

respondents increased by *** percent and the share of subject imports purchased by respondents increased by *** percent (table V-10).

Table V-10
Silicon metal: Purchasers' responses to purchasing patterns

* * * * * * *

Of the 31 responding purchasers, 25 purchased silicon metal from subject countries instead of domestic producers on at least one occasion since 2014 (table V-11). Of those 25 purchasers, 15 reported that prices of imported silicon metal were lower than domestic, and 11 reported that price was a primary reason for the decision to purchase subject imports rather than U.S.-produced silicon metal. Some purchasers reported that they did not know if subject import prices were lower or higher than U.S.-produced product because they did not receive price quotes from U.S. producers, or because they did not know from where their shipment was sourced at the time of purchase.

Table V-11
Silicon metal: Purchasers' responses to purchasing subject imports instead of domestic, by country

Source	Count of purchasers reporting subject instead of domestic	Count of purchasers reported that imports were priced lower	Count of purchasers reporting that price was a primary reason for purchasing imports instead of domestic	Quantity subject purchased (short tons)	Other reasons for purchasing imports instead of domestic
Australia	17	10	6	***	15
Brazil	17	10	9	***	10
Kazakhstan	12	7	6	***	9
Norway	4	1	1	***	8
All subject sources	25	15	11	***	15

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

Of the 11 purchasers reporting that price was a primary reason for the decision to purchase imported product rather than U.S.-produced product, six purchasers reported purchasing Australian silicon metal with quantities ranging from *** short tons, nine purchasers reported purchasing Brazilian silicon metal with quantities ranging from *** short tons, six purchasers reported purchasing silicon metal from Kazakhstan with quantities ranging from *** short tons, and one purchaser reported purchasing silicon metal from Norway for a total quantity of *** short tons (table V-12). Purchasers also identified various non-price reasons for purchasing imported rather than U.S.-produced product, including diversity of supply, chemical characteristics, contract terms, longstanding business relationships, and availability from foreign producers when domestic producers were unable to meet demand.

Table V-12
Silicon metal: Purchasers' responses to purchasing subject imports instead of domestic product

* * * * * * *

*** identified a reduction in U.S. producers' prices in order to compete with subject imports.[17] Seven purchasers reported that U.S. producers did not reduce prices to compete with subject imports, while the majority of purchasers stated that they did not know if domestic prices were reduced to compete with subject imports (table V-13).

Table V-13
Silicon metal: Purchasers' responses to U.S. producer price reductions, by country

Source	Count of purchasers reporting U.S. producers reduced prices	Simple average of estimated U.S. price reduction (percent)	Range of estimated U.S. price reductions (percent)
Australia	1	***	***
Brazil	1	***	***
Kazakhstan	---	***	***
Norway	---	***	***
All subject sources	1	***	***

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

ADDITIONAL COMMENTS FROM PURCHASERS

Some purchasers also provided additional comments and information on purchases, pricing, and market dynamics. Frequently cited issues included a desire for specific quality characteristics and reliability/diversity of supply.

: " would like to maintain multiple supply options to safeguard the various manufacturing sites that we operate in the U.S. that rely on silicon as a raw material in our production processes. *** in the U.S. who are represented by various labor unions. Given that Simcoa have ceased marketing silicon metal to the U.S. market due to the impending anti-dumping and countervailing duties, we have been forced to go back to FerroGlobe for 2018 supply at price levels that are 65 percent higher than prior levels. This has a negative impact on our financials and places us at increased risk due to lack of diversity of supply options."

***: "We purchase predominantly a by-product of silicon metal crushing. Much of it is from traders rather than direct manufacturers. ***, and their sources could be any of the countries in question. As long as they meet our spec, we have not been concerned with the source."

[17] U.S. purchaser ***.

***: "It does not matter if it is domestic or imported as long as the supplier can meet the delivery, quality and price requirements."

***: "The U.S. market is not served by a single dominant player, such as Globe, who works to raise prices and control supply, which results in U.S. consumers paying the highest silicon prices in the world. This puts the U.S. consumers at a severe disadvantage to consumers in Canada, Mexico and everywhere else."

***: "When we place our orders for silicon, we have no knowledge of where the origin of the material might be coming from. For instance, our annual contract with FerroGlobe, they could supply us material from their plant outside of U.S., such as France, Spain, and South Africa, which they have done. All we want is diversity in supply with minimum of two suppliers."

***: "One of the biggest issues is the timing of entering into a contract. Many times the domestic producers want to delay entering into a contract until they understand where they can book the highest value contracts for themselves. With our two domestic suppliers now one (two years ago), they first want to sell to the polysilicon customers, then the chemical grade customers, then the primary aluminum customers. When those customers are booked then they will finally come to the secondary aluminum smelters because we are typically the worst spec for them. Their goal is to produce and sell the highest purity silicon first at the highest price and then come to the secondary aluminum group with 553 grade or lower. By the time the higher purity grades are sold they cannot even come close to supplying the domestic secondary aluminum market which makes the need for imports all the greater. …This leads to apples and oranges pricing where pricing and contracts are awarded at different times, thus different prices and discounts."

. "."

*** stated "***."[18]

*** stated "Maintaining a diverse supply is important to us. We don't want to sole source silicon metal because it is too important as an input raw material."

[18] *** provided these comments in the preliminary phase, but did not provide this information in the additional information section of the questionnaire during the final phase.

PART VI: FINANCIAL EXPERIENCE OF U.S. PRODUCERS

BACKGROUND

Three firms, DC Alabama, Globe, and Mississippi Silicon, reported financial results on their U.S. silicon metal operations.[1] For the period as a whole and with regard to operations reflecting both commercial sales and transfers of silicon metal, *** accounted for *** percent of total silicon metal sales quantity, *** accounted for *** percent, and *** accounted for *** percent. When considering open market silicon metal operations (i.e., operations reflecting only commercial sales), *** accounted for *** percent of commercial silicon metal sales quantity, *** accounted for *** percent, and *** accounted for *** percent.[2] .

To varying degrees and with the exception of the ***,[3] the following changes/events directly or indirectly impacted the U.S. industry's silicon metal financial results during the period: Mississippi Silicon began silicon metal operations at its newly-established Burnsville, Mississippi plant in 2015, Globe Specialty Metals (Globe's previous stand-alone parent company) and FerroAtlantica merged to form Ferroglobe in late 2015, and Dow Corning became a wholly-owned subsidiary of Dow Chemical in 2016.[4] ***.[5] ***.[6] ***.[7]

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[1] All three U.S. producers reported their silicon metal financial results on a GAAP basis and for calendar-year periods. Staff conducted a verification of Globe's U.S. producer questionnaire on January 11-12, 2018. Data changes pursuant to verification are reflected in this and other relevant sections of the staff report. Verification report, p. 2.

[2] While the underlying production process is essentially the same, U.S. producers vary in terms of their focus on commercial sales versus transfers. ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor. ***. Verification report, p. 4. Transfer valuation of Dow Corning's share of the Alloy, West Virginia plant joint venture is described further below. ***.

Consistent with its normal practice, the Commission collected financial results in a manner that did not explicitly identify the Alloy, West Virginia joint venture as a separate entity and/or by joint venture partner share. In the absence of corresponding modifications to the Commission's U.S. producer questionnaire format, stand-alone joint venture financial results are not directly compatible with the financial results information gathered in the Commission's questionnaire.

[3] ***. *** U.S. producer questionnaire, response to III-11.

[4] Globe's silicon metal operations are part of parent company Ferroglobe's Electrometallurgy—North America segment. Ferroglobe 2016 20-F, p. 66. Verification report, p. 3. Ferroglobe was created pursuant to the merger of Globe Specialty Metals and FerroAtlantica on December 23, 2015. Ferroglobe 2016 20-F, p. F-27. Dow Corning is part of DowDuPont's Performance Materials & Coatings segment. DowDuPont 2017 10Q (Q3), p. 68. Dow Corning became a wholly-owned subsidiary of Dow Chemical on June 1, 2016. Dow Chemical and DuPont merged to form DowDuPont on September 1, 2017.

[5] ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor. ***. Ibid. Verification report, p. 6.

[6] ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.

[7] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

OPERATIONS ON SILICON METAL

Income-and-loss data for the U.S. producers' total operations on silicon metal are presented in table VI-1. Table VI-2 presents corresponding changes in average per short ton values.[8] Table VI-3 presents company-specific financial information for total operations. Income-and-loss data for the U.S. producers' open market operations are presented in table VI-4. Table VI-5 presents corresponding changes in average per short ton values. Table VI-6 presents company-specific financial information for open market operations.[9]

Net sales

Commercial sales represent the majority of the U.S. industry's overall silicon metal revenue during 2014 through interim 2017 (*** percent of total sales quantity). Transfers, which were reported by *** and ***, accounted for *** percent total sales quantity.[10]

Quantity

Total silicon metal sales quantities for overall operations and open market operations increased in each full-year and were higher in interim 2017 compared to interim 2016 (see table VI-1 and table VI-4). The increase in the U.S. industry's total sales quantity in 2015 primarily reflects *** relatively large increase in transfer sales quantity, attributed to improved operating conditions,[11] and to a lesser degree the ***. The further increase in 2016 total sales quantity reflects *** transition from start-up to commercial production. Reflecting alternating declines in transfer and commercial sales quantities, *** total net sales quantity declined throughout the period, with its largest decline ocurring in 2016 (see table VI-3).[12]

Value

According to U.S. producers, silicon metal pricing/sales values are not directly tied to underlying material input or other manufacturing costs. ***, however, noted an indirect connection between silicon metal sales values and production costs inasmuch as the cost of material inputs can be impacted, to some extent, by changes in the demand for silicon metal.[13]

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[8] Mississippi Silicon's entry to the market impacts the pattern of period-to-period volume and calculated average values for silicon metal sales, cost of goods sold (COGS), and sales, general and administrative (SG&A) expenses. Accordingly, a variance analysis of financial results on overall operations or open market operations is not presented in this report.

[9] ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor. Note: ***. Verification report, p. 4. Because of these differences, direct extrapolation of transfer-only financial results is not possible.

[10] ***. Verification report, p. 4. ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.

[11] ***. Ibid.

[12] ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor.

[13] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

On an overall basis average sales value (see table VI-1) increased more notably in 2015 compared to open market sales (see table VI-4). Both groups reported declines in average sales values in 2016 and interim 2017. To the extent that company-specific product mix did not change substantially during the period, overall declines in average sales value were primarily a function of declines in silicon metal prices.

Table VI-1
Silicon metal: Results of overall operations of U.S. producers, 2014-16, January-September 2016, and January-September 2017

* * * * * * *

Table VI-2
Silicon metal: Changes in the U.S. producers' average per short ton contained silicon values reported for overall operations 2014-16, January-September 2016, and January-September 2017

* * * * * * *

While reporting the same directional trend in average sales value for the majority of the period (see table VI-3), U.S. producers varied in terms of the magnitude of change in average sales value. ***, which reported minimal commercial sales in 2015, reported a large decline in average sales value in 2016 followed by a somewhat higher average sales value in interim 2017 compared to interim 2016.[14] Table VI-3 shows that *** reported the lowest company-specific average commercial sales value throughout the period (see footnote 2).

Transfer valuation

As noted previously (see footnote 10), transfers reported by DC Alabama represent sales to related downstream Dow Corning affiliates, while the transfers reported by Globe primarily represent Alloy, West Virginia joint venture sales to Dow Corning. Reflecting different reporting structures and operations, the underlying transfer valuations adopted by DC Alabama and Globe were based on different assumptions.[15] ***.[16]

[14] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

[15] ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor. Verification report, p. 4.

[16] ***. March 5, 2018 e-mail with attachment from Counsel on behalf of *** to USITC auditor. USITC auditor posthearing notes. The decision to revise Globe's transfer values was specific to an evaluation of issues related to the financial section of the staff report and the measurement of the U.S. industry's financial results. Because overall trends in the trade section are not impacted by revaluation of transfers, these changes were not applied to the trade data for U.S. producers presented in Part III of this report.

Cost of goods sold and gross profit

While U.S. producers generally indicated that they all use the same underlying production process, there are company-specific differences with respect to silicon metal operations.[17] In terms of vertical integration, *** U.S. producer that reported input purchases from related suppliers.[18]

Raw materials

In addition to other identified inputs, total raw material cost represents several primary items, which were common to all U.S. producers: electrodes, coal, quartz, and woodchips. For all companies, coal accounts for the largest share of raw material costs, followed by electrodes, quartz, and woodchips.[19] On an average basis, ***.[20] *** average unit costs for these inputs reflect a mix of increases and decreases, with *** higher at the end of the period and *** lower. *** average coal and electrode cost declined during the period, while its average quartz cost increased.[21]

On an overall basis, *** average raw material cost fluctuated and increased to its highest level in interim 2017, while *** average raw material costs declined throughout the period (see table VI-3). Direct comparability of *** average raw material cost to those of the other U.S. producers is limited, at least to some extent, due to *** deduction of byproduct revenue from raw material cost (see *Byproducts* section below). In contrast, *** deducted byproduct revenue from other factory costs.

Electricity

On an overall basis (see table VI-1), electricity's share of total COGS declined somewhat during the period from *** percent in 2014 to *** percent in interim 2017. Open market operations (see table VI-4) reflect the same trend and similar cost shares.

On a company-specific basis, average electricity cost for overall operations reflects somewhat different patterns: *** average electricity cost declined substantially in 2016, largely reflecting ***,[22] *** average electricity cost fluctuated somewhat but generally remained

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[17] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

[18] ***. *** U.S. producer questionnaire, response to III-7. ***. Verification report, p. 5. ***. Posthearing brief submitted by counsel on behalf of Dow Corning, Attachment 2. ***.

The information submitted by *** and *** indicated that neither purchase inputs from related suppliers. *** U.S. producer questionnaire, response to III-7. *** U.S. producer questionnaire, response to III-7.

[19] *** U.S. producer questionnaire, response to III-9b. *** U.S. producer questionnaire, response to III-9b. *** U.S. producer questionnaire, response to III-9b. USITC auditor prehearing notes. ***.

[20] As calculated based on questionnaire information, total average raw material cost and average costs for specific inputs reflect the average cost incurred to produce and sell the silicon metal reported as revenue. As such, these averages do not directly reflect the price paid for a specific input.

[21] ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.

[22] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

within a relatively narrow range throughout the period, and *** average electricity cost declined during the full-year period.[23]

Direct labor and other factory costs

For overall operations and open market operations, direct labor as a share of COGS declined during 2014 through interim 2017, while the share of other factory costs increased (see table VI-1 and table VI-4). The increase in other factory costs reflects the initiation of ***,[24] as well as increasing full-year average other factory costs reported by ***.[25] [26] While *** other factory costs were somewhat lower in interim 2017 compared to interim 2016, *** other factory costs were at their highest level of the period in interim 2017.[27]

Byproducts

All three U.S. producers reported similar byproducts (fume, dross, and fines) generated during the production of silicon metal, but varied somewhat in terms of how byproducts are recognized.[28] In *** financial results, the byproduct deduction was to raw material cost, while *** byproduct deductions were to other factory costs.[29] The extent to which byproducts are sold can also vary by producer. For example, *** noted that fines can be either recycled into the production process or sold and *** indicated that in 2017 some of its fume byproduct was not sold due to impurities.[30] [31]

Cost of goods sold

For overall operations and open market operations (see table VI-1 and table VI-4), the U.S. industry's average full-year COGS increased to its highest level in 2015 and then declined somewhat in 2016. Higher 2015 average COGS reflects ***, as well as higher average COGS reported by ***. In contrast, *** average COGS declined in 2015 (see footnote 11). In 2016, the decrease in average COGS, partially offset by *** higher average COGS, reflects a continued decline in *** average COGS and a substantial decline in *** average COGS, generally reflecting

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[23] ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.

[24] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

[25] ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor.

***. *** U.S. producer questionnaire, response to III-10a. ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor.

[26] ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.

[27] ***. Ibid.

[28] In general, the distinction between joint products, also called main products, and byproducts is largely dependent on the market value of the products in question and their contribution to overall revenue. As such, a product's designation as a byproduct or a main product can change over time given market conditions. For cost accounting purposes the market value of a byproduct is generally treated as a deduction to arrive at the cost of the main product. *Cost Accounting: Using a Cost Management Approach*, L. Gayle Rayburn, Irwin, 1993, pp. 258-259.

[29] ***. USITC auditor prehearing notes.

[30] December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor.

[31] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

***. At the end of the period and with respect to overall operations, the higher level of average COGS in interim 2017 compared to interim 2016 is generally attributable to *** (see footnote 27); i.e., *** reported essentially the same average COGS in each interim period and *** reported modestly lower average COGS in interim 2017 compared to interim 2016.

Gross profit or loss

Gross profit for overall operations and open market operations contracted throughout the period (see table VI-1 and table VI-4). For both sets of financial results, the decline in gross profit in 2015 reflects an increase in average COGS, which was only partially offset by higher average sales value. In contrast, the much larger contraction in average gross profit in 2016 reflects a substantial decline in average sales value, which was only partially offset by lower average COGS. At the end of the period, the two sets of financial results diverged: average COGS for overall operations increased somewhat, which amplified the negative impact of lower average sales value in interim 2017 compared to interim 2016, while average COGS for open market operations declined somewhat and partially offset lower average sales value. On an overall and open market basis, table VI-1 and table VI-4 show that the U.S. industry generated gross profit in 2014 and 2015, a marginal gross profit for overall operations and a gross loss for open market operations in 2016, respectively, and gross losses of differing magnitudes in interim 2017.

SG&A expenses and operating income or loss

SG&A expenses

For overall operations and open market operations (see table VI-1 and table VI-4), total SG&A expenses increased throughout the full-year period and were lower in interim 2017 compared to interim 2016. During the full-year period, this pattern reflects *** and higher levels of SG&A expenses reported by ***, which offset relatively large declines in *** SG&A expenses. At the end of the period, lower SG&A expenses in interim 2017 compared to interim 2016 reflect reduced SG&A expenses reported by ***, which were partially offset by higher SG&A expenses reported by ***.

Lower SG&A expense ratios (total SG&A expenses divided by total revenue) for overall operations compared to open market operations generally reflect the larger presence of ***, which reported the lowest company-specific SG&A expense ratios throughout the period (see table VI-3 and table VI-6).[32] *** SG&A expense ratios for its overall operations were in the same general range as its open market SG&A ratios.[33] *** SG&A expense ratios, which were notably high in 2015, subsequently declined but remained the highest on a company-specific basis throughout the period.[34]

[32] ***. December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.
[33] ***. December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor.
[34] ***. December 18, 2017 e-mail with attachments from *** to USITC auditor.

Table VI-3
Silicon metal: Results of operations of U.S. producers' overall operations, by firm, 2014-16, January-September 2016, and January-September 2017

* * * * * * *

Operating income or loss

During the full-year period, the pattern of higher SG&A expense ratios reported for overall operations and open market operations amplified the negative impact of declining gross results. In contrast and to a modest degree, the lower SG&A expense ratio in interim 2017 compared to interim 2016 partially offset the gross loss ratios reported for overall operations (table VI-1) and open market operations (table VI-4).

In general, the level and pattern of SG&A expenses played a limited role in terms of explaining the U.S. industry's operating results; i.e., the factors that determined financial results at the gross level were more important.

Interest expense, other expenses, and net income or loss

For overall operations and open market operations (see table VI-1 and table VI-4), the directional trend of operating results and net results was the same throughout the period. The absolute amounts reported for operating results and net results, however, diverged more notably in 2016 due to higher levels of interest expense and other expenses, reflected in net results, which were only partially offset by corresponding other income.

While *** reported interest expense throughout the period and *** reported small amounts in 2014 and 2015, *** accounts for the large increase in total interest expense during the period.[35] Other expenses were reported throughout the period by *** and by *** in 2016.[36] *** reported no other expenses during the period. While *** and *** reported other income, the large increase in other income in 2016 and interim 2017 primarily reflects ***.[37]

Table VI-4
Silicon metal: Results of open market operations of U.S. producers, 2014-16, January-September 2016, and January-September 2017

* * * * * * *

Table VI-5
Silicon metal: Changes in the U.S. producers' average per short ton contained silicon values reported for open market operations 2014-16, January-September 2016, and January-September 2017

* * * * * * *

[35] ***. Ibid.
[36] ***. *** U.S. producer questionnaire, response to III-10a.
[37] ***. *** U.S. producer questionnaire, response to III-10a.

Table VI-6
Silicon metal: Results of operations of U.S. producers' open market operations, by firm, 2014-16, January-September 2016, and January-September 2017

* * * * * * *

CAPITAL EXPENDITURES AND RESEARCH AND DEVELOPMENT EXPENSES

Table VI-7 presents the U.S. producers' capital expenditures and research and development (R&D) expenses related to silicon metal operations. Overall capital expenditures increased to their highest level in 2015 and then declined to their lowest full-year level in 2016. While *** reported modest increases, the large overall increase in the U.S. industry's total capital expenditures in 2015 primarily reflects ***.[38] For the period as a whole, *** accounted for *** percent of total capital expenditures, followed by *** (*** percent),[39] and *** (*** percent).[40]

Table VI-7 shows that *** of the U.S. producers reported R&D expenses. ***.[41] *** provided a similar response.[42] With the regard to the *** of R&D expenses, ***.[43]

Table VI-7
Silicon metal: U.S. producers' capital expenditures and research and development (R&D) expenses, by firm, 2014-16, January-September 2016, and January-September 2017

* * * * * * *

ASSETS AND RETURN ON ASSETS

Table VI-8 presents the U.S. producers' silicon metal-related total assets and operating return on assets.[44]

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[38] ***. *** U.S. producer questionnaire, response to III-13 (note 1).

[39] ***. *** U.S. producer questionnaire, response to III-13 (note 1).

[40] ***. *** U.S. producer questionnaire, response to III-13 (note 1).

[41] December 18, 2017 e-mail with attachments from Counsel on behalf of *** to USITC auditor.

[42] December 18, 2017 letter with attachments from Counsel on behalf of *** to USITC auditor.

[43] December 18, 2017 e-mail with attachments from *** to USITC auditor.

[44] Total asset value (i.e., the bottom line value on the asset side of a company's balance sheet) reflects an aggregation of a number of assets, which in many instances are not product specific. Accordingly, high-level allocation factors were likely required, to some extent, in order to report a total asset value (i.e., current and non-current assets) specific to silicon metal operations. As such, it should be noted that the pattern of total asset values reported can reflect changes in underlying asset account balances, as well as period-to-period variations in relevant allocation factors. The ability of U.S. producers to assign total asset values to discrete product lines affects the meaningfulness of calculated return on assets.

Table VI-8
Silicon metal: U.S. producers' total assets and return on assets, 2014-16

* * * * * * *

The increase in the U.S. industry's total assets in 2015 primarily reflects ***.[45] In 2016, the higher level of total assets primarily reflects the ***.[46]

CAPITAL AND INVESTMENT

The Commission requested the U.S. producers of silicon metal to describe any actual or potential negative effects on their return on investment or their growth, investment, ability to raise capital, existing development and production efforts (including efforts to develop a derivative or more advanced version of the product), or the scale of capital investments as a result of imports of silicon metal from Australia, Brazil, Kazakhstan, and/or Norway. Table VI-9 tabulates the U.S. producers' responses regarding actual negative effects on investment, growth and development, as well as anticipated negative effects. Table VI-10 presents U.S. producers' narrative responses regarding actual and anticipated negative effects on investment, growth and development.

Table VI-9
Silicon metal: Negative effects of imports from subject sources on investment, growth, and development since January 1, 2014

* * * * * * *

Table VI-10
Silicon metal: Narrative responses of U.S. producers regarding actual and anticipated negative effects of imports from subject sources on investment, growth, and development since January 1, 2014

* * * * * * *

[45] ***. *** U.S. producer questionnaire, response to III-12 (note 1).
[46] ***. *** U.S. producer questionnaire, response to III-12 (note 1).

PART VII: THREAT CONSIDERATIONS AND INFORMATION ON NONSUBJECT COUNTRIES

Section 771(7)(F)(i) of the Act (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 subject merchandise, the Commission shall consider, among other relevant economic factors*[1]*--*
>
> *(I) if a countervailable 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 countervailable subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement), and whether imports of the subject merchandise are likely to increase,*
>
> *(II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,*
>
> *(III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,*
>
> *(IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices, and are likely to increase demand for further imports,*
>
> *(V) inventories of the subject merchandise,*

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[1] Section 771(7)(F)(ii) of the Act (19 U.S.C. § 1677(7)(F)(ii)) provides that "The Commission shall consider {these factors} . . . as a whole in making a determination of whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted under this title. The presence or absence of any factor which the Commission is required to consider . . . shall not necessarily give decisive guidance with respect to the determination. Such a determination may not be made on the basis of mere conjecture or supposition."

(VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,

(VII) 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),

(VIII) 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 domestic like product, and

(IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).[2]

Information on the nature of the subsidies was presented earlier in this report; information on the volume and pricing of imports of the subject merchandise is presented in *Parts IV* and *V*; and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts is presented in *Part VI*. Information on inventories of the subject merchandise; foreign producers' operations, including the potential for "product-shifting;" any other threat indicators, if applicable; and any dumping in third-country markets, follows. Also presented in this section of the report is information obtained for consideration by the Commission on nonsubject countries.

THE INDUSTRY IN AUSTRALIA

The Commission issued a foreign producer/exporter questionnaire to one firm, Simcoa (Australia), believed to be the only producer of silicon metal in Australia.[3] A completed

[2] 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 WTO 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."

[3] This firm was identified through a review of information submitted in the petition and contained in *** records.

response to the Commission's questionnaire was received from this firm. Simcoa (Australia)'s exports to the United States accounted for all known U.S. imports of silicon metal from Australia in 2016. According to information requested of the responding Australian producer, the production of silicon metal in Australia reported in this part of the report accounts for all production of silicon metal in Australia in 2016. Table VII-1 presents information on the silicon metal operations of the responding producer in Australia.

Table VII-1
Silicon metal: Summary data for Simcoa (Australia), 2016

* * * * * * *

Changes in operations

As presented in table VII-2, the producer in Australia reported *** since January 1, 2014.

Table VII-2
Silicon metal: Simcoa (Australia's) reported changes in operations, since January 1, 2014

* * * * * * *

Operations on silicon metal

Table VII-3 presents information on the silicon metal operations of the responding producer and exporter in Australia for 2014-16, the January-September ("interim") periods in 2016 and 2017, as well as projections for 2017-18.

Table VII-3
Silicon metal: Data for Simcoa (Australia), 2014-16, January to September 2016, January to September 2017, and projections for calendar years 2017 and 2018

* * * * * * *

Capacity in Australia increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016, resulting in an overall increase of *** percent from 2014 to 2016. ***. No change in the capacity to produce was reported during interim periods 2016 and 2017. The firm's production increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016, resulting in an overall increase of *** percent from 2014 to 2016. Production was higher in interim 2017 than in interim 2016. ***. Capacity utilization decreased by *** percentage points from *** percent in 2014 to *** percent 2015, but increased by *** percentage points to *** 2016. Capacity utilization was *** percent in interim 2017. In addition, end-of-period inventories increased by *** percent from 2014 to 2015, but decreased

by *** percent from 2015 to 2016. End-of-period inventories decreased overall by *** percent from 2014 to 2016, but were higher in interim 2017 than in the comparable period in 2016.[4]

Total shipments of the responding Australian producer increased by *** percent from 2014 to 2016, but were lower in interim 2017 than in the comparable period in 2016. Home market shipments declined from *** percent of total shipments in 2014 to *** percent of total shipments in 2015, but increased to *** percent of total shipments in 2016. Home market shipments as a share of total shipments were higher in interim 2017 at *** percent than in interim 2016 at *** percent.

Exports of silicon metal to the United States increased by *** percent from 2014 to 2015, but decreased by *** percent from 2015 to 2016. Exports of silicon metal to the United States decreased overall by *** percent from 2014 to 2016, but were higher in the first nine months of 2017 as compared to the first nine months of 2016. As a share of total shipments, exports to the United States increased from *** percent of total shipments in 2014 to *** percent of total shipments in 2015, but decreased to *** percent of total shipments in 2016. Exports to the United States accounted for *** percent of total shipments in January-September 2017. Exports of silicon metal to countries other than the United States accounted for *** (***) of total shipments, during 2014-16, but accounted for a smaller share (*** percent) in interim 2017. Other export markets identified include ***. Projections indicate the exports to the United States will decline in 2017 and 2018 both in absolute quantity and relative to total shipments.[5]

Alternative products

As shown in table VII-4, the responding Australian firm reported that, from 2014 to 2016, *** production capacity was devoted to in-scope silicon metal production. The firm reported that elements other than silicon accounted for less than *** percent of the total weight of in-scope silicon metal production.

Table VII-4
Silicon metal: Overall capacity and production on the same equipment as subject production by Simcoa (Australia), 2014-16, January to September 2016, and January to September 2017

* * * * * * *

[4] Projections indicate that capacity, production, and inventories will be higher in 2018 than reported in 2016.

[5] "Simcoa has participated in the U.S. market for more than 20 years, but has neither the plans nor the means to increase our exports to the United States. Additionally, high logistical costs and a weak U.S. dollar make it far less attractive for us to export products here than to other markets." Hearing transcript, pp. 145-147 (Miles).

Exports

According to Global Trade Atlas ("GTA"), the leading export market for silicon metal from Australia was the United States (table VII-5). Germany was the second-largest export destination of silicon metal from Australia. During 2016, the United States and Germany accounted for 35.2 and 19.6 percent of total exports from Australia of silicon metal, respectively.

Table VII-5
Silicon metal: Exports from Australia by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
Exports from Australia to the United States	20,320	22,284	18,616
Exports from Australia to other major destination markets.--			
Germany	13,733	13,942	10,375
United Arab Emirates	6,360	2,381	5,842
Japan	232	3,231	5,595
Thailand	---	---	4,409
Qatar	---	---	2,816
Netherlands	2,804	3,679	1,181
Poland	1,508	4,021	1,121
United Kingdom	1,282	1,089	925
All other destination markets	10,145	2,228	1,967
Total exports from Australia	56,384	52,856	52,848
	Value (1,000 dollars)		
Exports from Australia to the United States	51,120	55,930	32,277
Australia's exports to other major destination markets.--			
Germany	32,371	29,946	20,644
United Arab Emirates	14,922	6,167	9,151
Japan	543	7,110	10,140
Thailand	---	---	7,509
Qatar	---	---	4,507
Netherlands	6,099	7,742	2,127
Poland	3,462	8,138	1,802
United Kingdom	2,486	1,922	1,067
All other destination markets	12,646	5,358	3,547
Total exports from Australia	123,649	122,313	92,771

Table continued on next page.

Table VII-5--Continued
Silicon metal: Exports from Australia by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
Exports from Australia to the United States	2,516	2,510	1,734
Exports from Australia to other major destination markets.--			
Germany	2,357	2,148	1,990
United Arab Emirates	2,346	2,590	1,566
Japan	2,337	2,201	1,812
Thailand	---	---	1,703
Qatar	---	---	1,600
Netherlands	2,175	2,104	1,802
Poland	2,296	2,024	1,607
United Kingdom	1,940	1,764	1,153
All other destination markets	1,247	2,404	1,804
Total exports from Australia	2,193	2,314	1,755
	Share of quantity (percent)		
Exports from Australia to the United States	36.0	42.2	35.2
Exports from Australia to other major destination markets.--			
Germany	24.4	26.4	19.6
United Arab Emirates	11.3	4.5	11.1
Japan	0.4	6.1	10.6
Thailand	---	---	8.3
Qatar	---	---	5.3
Netherlands	5.0	7.0	2.2
Poland	2.7	7.6	2.1
United Kingdom	2.3	2.1	1.8
All other destination markets	18.0	4.2	3.7
Total exports from Australia	100.0	100.0	100.0

Source: Official Australia export statistics under HTS subheading 2804.69 as reported by Australian Bureau of Statistics in the IHS/GTA database accessed November 28, 2017.

THE INDUSTRY IN BRAZIL

The Commission issued foreign producers' or exporters' questionnaires to five firms believed to produce and/or export silicon metal from Brazil.[6] Usable responses to the Commission's questionnaire were received from four firms: Companhia Ferroligas Minas Gerais ("Minasligas"), Dow Corning (Brazil), Ligas de Alumínio S/A ("LIASA"), and Rima Industrial S.A.

[6] These firms were identified through a review of information submitted in the petitions and contained in *** records.

("RIMA").[7] The four responding Brazilian producers are believed to have accounted for all known production of silicon metal in Brazil and all known exports of silicon metal from Brazil to the United States in 2016.[8] Table VII- 6 presents information on the silicon metal operations of the responding producers and exporters in Brazil.

Table VII-6
Silicon metal: Summary data for producers in Brazil, 2016

* * * * * * *

Changes in operations

As presented in table VII-7 producers in Brazil reported several operational and organizational changes since January 1, 2014.

Table VII-7
Silicon metal: Brazilian producers' reported changes in operations, since January 1, 2014

* * * * * * *

Operations on silicon metal

Table VII-8 presents information on the silicon metal operations of the responding producers and exporters in Brazil for 2014-16, interim 2016, and interim 2017, as well as projections for 2017-18. Projections indicate that capacity, production, and shipments will fluctuate, while inventories will increase during 2017-18.

Table VII-8
Silicon metal: Data for producers in Brazil, 2014-16, January to September 2016, January to September 2017, and projections for calendar years 2017 and 2018

* * * * * * *

Capacity in Brazil decreased by *** percent from 2014 to 2015, but increased by *** percent from 2015 to 2016. Capacity in Brazil decreased overall by *** percent from 2014 to 2016 and was lower in interim 2017 than in interim 2016. Production decreased by *** percent from 2014 to 2015, but increased by *** percent from 2015 to 2016.[9] Production increased

[7] The one firm that did not respond to the Commission's questionnaire was ***. In their posthearing brief, LIASA and Minasligas indicate that *** has not produced silicon metal in Brazil since 2014. ***. Joint respondents (LIASA and Minasligas) posthearing brief, p. 11 and email message from ***.

[8] Joint respondents (LIASA and Minasligas) posthearing brief, p. 11.

[9] The increase in production was largely due to *** silicon metal production increasing from *** short tons in 2014 to *** short tons in 2015, and to *** short tons of silicon metal produced in 2016. This resulted in capacity utilization increases from *** percent in 2014 to *** percent in 2015 and to

(*continued*...)

overall by *** percent from 2014 to 2016, but was lower in interim 2017 than in interim 2016.[10] Capacity utilization decreased by *** percentage points from 2014 to 2015, but increased by *** percentage points from 2015 to 2016. Capacity utilization increased overall by *** percentage points from 2014 to 2016 but was lower in interim 2017 than in interim 2016.[11] In addition, end-of-period inventories increased by *** percent from 2014 to 2016 but were lower in interim 2017 than in interim 2016.

Total shipments of the responding Brazilian producers decreased by *** percent from 2014 to 2015, but increased by *** percent from 2015 to 2016. Total shipments of the responding Brazilian producers increased overall by *** percent from 2014 to 2016 but were lower in interim 2017 than in interim 2016. Home market shipments declined from *** percent of total shipments in 2014 to *** percent of total shipments in 2015, and further declined to *** percent of total shipments in 2016. Home market shipments increased by *** percentage points (as a share of total shipments) from interim 2016 to interim 2017.

Brazilian exports of silicon metal to the United States decreased by *** percent from 2014 to 2015, but increased by *** percent from 2015 to 2016.[12] Exports of silicon metal to the United States increased overall by *** percent from 2014 to 2016, but were lower in interim 2017 than in interim 2016.[13] As a share of the responding Brazilian producers' total shipments, exports to the United States decreased from *** percent of total shipments in 2014 to *** percent of total shipments in 2015, and further decreased to *** percent of total shipments in 2016, but were lower in quantity, higher in share in interim 2017 than in interim 2016. Exports of silicon metal to countries other than the United States accounted for *** of total shipments during 2015 and 2016.[14] Exports of silicon metal to countries other than the United States

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(…*continued*)
*** percent in 2016 for LIASA. *** indicated that the prolonged shutdowns of the furnaces during 2014 and 2015 were due to high energy prices. *** foreign producer questionnaire, section II-4a. Dow Corning noted that "significant issues in the energy sector due to weather conditions in Brazil led many production facilities to cut back on their production, or even stop production of silicon metal altogether, during the period of investigation." Dow Corning's postconference brief, p. 28.

[10] LIASA noted that all producers in Brazil use charcoal as a resin in their production process rather than coal and the silicon metal they produce has very low levels of impurities. In addition, Brazilian "production technology offers a very high efficiency for the chemical industry with high reactivity and selectivity" on the silicon metal production process. Conference transcript, p. 89 (Augusto).

[11] *** indicated that "the design of the furnaces and supporting processes constrain the limits of the production capacity. The semi-batch smelting process also has inherent inefficiencies that make it difficult to reach full, theoretical production capacity (e.g. variability in raw material quality, silicon recovery, and unplanned downtime caused by equipment failure)." *** foreign producer questionnaire response, section II-4d.

[12] Minasligas explained that it ***. ***.

[13] Dow Corning (Brazil) noted in its questionnaire response that ***. *** U.S. importer questionnaire response, section II-4.

[14] Dow Corning noted that ***, demonstrating that there are significant markets other than the United States that are open to Brazilian producers and exporters. Dow Corning's postconference brief, p. 26.

increased by *** percent from 2014 to 2016, but were lower in interim 2017 than in interim 2016. Other export markets identified include ***.

Alternative products

As shown in table VII-9, responding Brazilian firms reported that, from 2014 to 2016, *** production capacity was devoted to in-scope silicon metal production. The four Brazilian firms reported that elements other than silicon accounted for approximately *** percent of the total weight of in-scope silicon metal production in 2016.

Table VII-9
Silicon metal: Brazilian producers' overall capacity and production on the same equipment as subject production, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Exports

According to GTA, the leading export market for silicon metal from Brazil was the United States in 2016 (table VII-10). Germany was the second-largest export market by quantity for silicon metal from Brazil in 2016. During 2016, the United States and Germany accounted for 38.4 and 16.2 percent of total exports from Brazil of silicon metal, respectively.

Table VII-10
Silicon metal: Exports from Brazil by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
Exports from Brazil to the United States	79,228	46,198	78,275
Exports from Brazil to other major destination markets.- Germany	21,390	9,740	33,060
United Kingdom	25,353	46,071	31,764
Netherlands	1,708	441	17,633
Poland	187	386	8,822
Japan	2,094	1,543	5,093
Thailand	2,646	882	4,685
Canada	882	1,213	4,317
Italy	4,324	---	3,663
All other destination markets	5,943	2,534	16,318
Total exports from Brazil	143,755	109,007	203,630
	Value (1,000 dollars)		
Exports from Brazil to the United States	189,129	113,143	172,694
Exports from Brazil to other major destination markets.- Germany	49,787	22,036	57,154
United Kingdom	63,685	113,003	62,728
Netherlands	3,837	862	25,514
Poland	383	647	12,989
Japan	4,234	3,403	9,717
Thailand	5,063	1,988	9,148
Canada	2,083	3,097	6,043
Italy	9,448	---	5,302
All other destination markets	13,145	4,969	23,986
Total exports from Brazil	340,793	263,149	385,275

Table continued on next page.

Table VII-10--Continued
Silicon metal: Exports from Brazil by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
Exports from Brazil to the United States	2,387	2,449	2,206
Exports from Brazil to other major destination markets.--			
Germany	2,328	2,262	1,729
United Kingdom	2,512	2,453	1,975
Netherlands	2,246	1,954	1,447
Poland	2,045	1,676	1,472
Japan	2,022	2,205	1,908
Thailand	1,914	2,255	1,953
Canada	2,362	2,554	1,400
Italy	2,185	---	1,447
All other destination markets	2,212	1,961	1,470
Total exports from Brazil	2,371	2,414	1,892
	Share of quantity (percent)		
Exports from Brazil to the United States	55.1	42.4	38.4
Exports from Brazil to other major destination markets.--			
Germany	14.9	8.9	16.2
United Kingdom	17.6	42.3	15.6
Netherlands	1.2	0.4	8.7
Poland	0.1	0.4	4.3
Japan	1.5	1.4	2.5
Thailand	1.8	0.8	2.3
Canada	0.6	1.1	2.1
Italy	3.0	---	1.8
All other destination markets	4.1	2.3	8.0
Total exports from Brazil	100.0	100.0	100.0

Source: Official Brazil export statistics under HTS subheading 2804.69 as reported by Brazil's Foreign Trade Secretariat (SECEX) in the IHS/GTA database, accessed November 28, 2017

THE INDUSTRY IN KAZAKHSTAN

The Commission issued foreign producers' or exporters' questionnaires to two firms believed to produce and/or export silicon metal from Kazakhstan.[15] Usable responses to the Commission's questionnaire were received from one firm: Tau-Ken.[16] This firm's exports to the

[15] These firms were identified through a review of information submitted in the petitions and contained in proprietary *** records.

[16] Kaz Silicon was the other silicon metal producer in Kazakhstan identified by Staff during the preliminary phase of these investigations. Kaz Silicon *** Staff's attempts to reach Kaz Silicon

(*continued*...)

United States accounted for approximately *** percent of U.S. imports of silicon metal from Kazakhstan in 2016. According to estimates requested of the responding Kazakh producer, the production of silicon metal in Kazakhstan reported in this part of the report accounts for *** production of silicon metal in Kazakhstan in 2016. Table VII-11 presents information on the silicon metal operations of the responding producers in Kazakhstan during 2016.

Table VII-11
Silicon metal: Summary data for industry in Kazakhstan, 2016

* * * * * * *

Changes in operations

As presented in table VII-12 producers in Kazakhstan reported several operational and organizational changes since January 1, 2014.

Table VII-12
Silicon metal: Kazakhstan producers' reported changes in operations, since January 1, 2014

* * * * * * *

Note.—Tau-Ken indicated in its posthearing brief that it is *** to meet an anticipated increase in demand for its silicon metal in Kazakhstan because of the following events: (1) the launch of *** new alloy plant which plans to consume *** metric tons of silicon metal per month and up to *** metric tons of silicon metal per month at full capacity; and (2) the signing of a ***.

Source: Compiled from data submitted in response to Commission questionnaires, Tau-Ken's posthearing brief, p.2, and email messages from ***.

Operations on silicon metal

Table VII-13 presents information on the silicon metal operations of the responding producers and exporters in Kazakhstan for 2014-16, January-September 2016, and January-September 2017, as well as projections for 2017-18. Projections indicate that capacity, production, and shipments are expected to fluctuate, while inventories are expected to decrease during 2017-18.

Table VII-13
Silicon metal: Data on industry in Kazakhstan, 2014-16, January to September 2016, January to September 2017, and projections for calendar years 2017 and 2018

* * * * * * *

(…*continued*)
representatives went unanswered, and the firms' information provided in the preliminary phase was again utilized in this final phase for country-specific analysis.

Capacity in Kazakhstan increased by *** percent from 2014 to 2016. Production increased by *** percent from 2014 to 2016, but was lower in interim 2017 than in interim 2016. Capacity utilization increased by *** percentage points from 2014 to 2016, but decreased from interim 2016 to interim 2017.[17] In addition, end-of-period inventories decreased by *** percent from 2014 to 2016, but were higher in interim 2017 than in interim 2016. Tau-Ken indicated that ***.[18]

Total shipments of the responding producer in Kazakhstan increased by *** percent from 2014 to 2016, but were lower in interim 2017 than in interim 2016. Home market shipments declined from *** percent of total shipments in 2014 to *** percent of total shipments in 2015, but increased to *** percent of total shipments in 2016.[19]

Exports of silicon metal to the United States increased by *** percent from 2014 to 2016, but were lower in interim 2017 than in interim 2016. As a share of total shipments of the responding producers in Kazakhstan, exports to the United States increased from *** percent of total shipments in 2014 to *** percent of total shipments in 2016, while total exports and total shipments *** during the 2017 interim period. Exports of silicon metal to countries other than the United States increased by *** percent from 2014 to 2016, and continued to increase during interim 2016 to interim 2017. Other export markets identified include ***.

Alternative products

As shown in table VII-14, responding Kazakh firms produced other products on the same equipment and machinery used to produce silicon metal during 2014-15. *** produced both subject silicon metal and out-of-scope products on the same equipment until ***. Out-of-scope production accounted for *** percent and *** percent of total production in 2014 and 2015, respectively. Other products produced on the same equipment as silicon metal included ***. *** did not produce out-of-scope products.

Table VII-14
Silicon metal: Kazakh producers' overall capacity and production on the same equipment as subject production, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

[17] This increase in capacity, production, and capacity utilization in 2015 and 2016 is due to ***. *** foreign producer questionnaire, section II-4.

[18] Tau-Ken's posthearing brief, p. 2.

[19] Tau-Ken indicated that it plans to increase its market share in the Eurasian Economic Union (the "EEU," which consists of Russia, Belorussia, Kazakhstan, Armenia, and Kyrgyzstan), mainly in Russia. Tau-Ken plans to sell ***. Tau-Ken estimates that is approximately *** of its total output. Tau-Ken posthearing brief, p. 1.

Exports

According to GTA, the top export market for silicon metal from Kazakhstan was the United States in 2016 (table VII-15). The Netherlands was the second-largest export destination of silicon metal from Kazakhstan. During 2016, the United States and Netherlands accounted for 48.0 and 25.0 percent of total exports from Kazakhstan of silicon metal, respectively.

Table VII-15
Silicon metal: Exports from Kazakhstan, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
Exports from Kazakhstan to the United States	485	5,472	9,637
Exports from Kazakhstan to other major destination markets.--			
Netherlands	---	397	5,013
Germany	772	5,045	2,840
Slovakia	---	---	1,134
United Kingdom	---	66	551
Canada	---	732	331
Italy	---	---	306
Spain	---	---	220
Estonia	---	---	22
All other destination markets	551	1,080	18
Total exports from Kazakhstan	1,808	12,792	20,073
	Value (1,000 dollars)		
Exports from Kazakhstan to the United States	1,194	12,536	16,968
Exports from Kazakhstan to other major destination markets.--			
Netherlands	---	779	7,022
Germany	1,773	9,821	3,578
Slovakia	---	---	1,656
United Kingdom	---	110	727
Canada	---	1,628	571
Italy	---	---	506
Spain	---	---	384
Estonia	---	---	32
All other destination markets	1,172	2,022	10
Total exports from Kazakhstan	4,139	26,895	31,453

Table continued on next page.

Table VII-15--Continued
Silicon metal: Exports from Kazakhstan, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
Exports from Kazakhstan to the United States	2,461	2,291	1,761
Exports from Kazakhstan to other major destination markets.--			
Netherlands	---	1,962	1,401
Germany	2,298	1,947	1,260
Slovakia	---	---	1,460
United Kingdom	---	1,658	1,319
Canada	---	2,224	1,726
Italy	---	---	1,653
Spain	---	---	1,740
Estonia	---	---	1,450
All other destination markets	2,127	1,872	532
Total exports from Kazakhstan	2,289	2,102	1,567
	Share of quantity (percent)		
Exports from Kazakhstan to the United States	26.8	42.8	48.0
Exports from Kazakhstan to other major destination markets.--			
Netherlands	---	3.1	25.0
Germany	42.7	39.4	14.1
Slovakia	---	---	5.7
United Kingdom	---	0.5	2.7
Canada	---	5.7	1.6
Italy	---	---	1.5
Spain	---	---	1.1
Estonia	---	---	0.1
All other destination markets	30.5	8.4	0.1
Total exports from Kazakhstan	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Official exports statistics under HS subheading 2804.69 as reported by various national statistical authorities in the IHS/GTA database, accessed November 28, 2017.

THE INDUSTRY IN NORWAY

The Commission issued foreign producers' or exporters' questionnaires to two firms believed to produce and/or export silicon metal from Norway.[20] Usable responses to the Commission's questionnaire were received from two firms: Elkem and Wacker Chemical Norway AS ("Wacker"). These firms' exports to the United States accounted for approximately

[20] These firms were identified through a review of information submitted in the petitions and contained in *** records.

*** percent of U.S. imports of silicon metal from Norway in 2016. According to estimates requested of the responding Norwegian producers, the production of silicon metal in Norway reported in questionnaires accounts for essentially all production of silicon metal in Norway. Table VII-16 presents information on the silicon metal operations of the responding producers and exporters in Norway.

Table VII-16
Silicon metal: Summary data for producers in Norway, 2016

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Changes in operations

As presented in table VII-17 producers in Norway reported several operational and organizational changes since January 1, 2014.

Table VII-17
Silicon metal: Norwegian producers' reported changes in operations, since January 1, 2014

* * * * * * *

Operations on silicon metal

Table VII-18 presents information on the silicon metal operations of the responding producers and exporters in Norway. Projections indicate that capacity, production, and total shipments will decrease (from 2016 levels), while inventories will fluctuate during 2017-18.

Table VII-18
Silicon metal: Data for producers in Norway, 2014-16, January to September 2016, January to September 2017, and projections for 2017 and 2018

* * * * * * *

Capacity in Norway decreased by *** percent from 2014 to 2015 and remained constant from 2015 to 2016 but was lower in interim 2017 than in interim 2016.[21] Production decreased by *** percent from 2014 to 2015, but increased by *** percent from 2015 to 2016. Production increased overall by *** percent from 2014 to 2016, but was lower in interim 2017 than in interim 2016. Capacity utilization increased by *** percentage points from 2014 to 2016, but

[21] On March 8, 2017, Wacker announced that it is investing €85 million to expand the capacity of its silicon metal plant in Holla, Norway. The plant is expected to be completed during the first half of 2019. *WACKER Expands Silicon-Metal Capacity at Norwegian Production Site in Holla*, https://www.wacker.com/cms/en/press_media/press-releases/pressinformation-detail_78912.jsp?from_all_summary=true, March 8, 2017.

was lower in interim 2017 than in interim 2016. In addition, end-of-period inventories decreased by *** percent from 2014 to 2016, and were lower in interim 2017 than in interim 2016.

Total shipments of the responding Norwegian producers increased by *** percent from 2014 to 2016, but were lower in interim 2017 than in interim 2016. Home market shipments increased from *** percent of total shipments in 2014 to *** percent of total shipments in 2015, but decreased to *** percent of total shipments in 2016. Home market shipments were *** percent of total shipments in interim 2016 and were *** percent of total shipments in interim 2017.[22]

Exports of silicon metal to the United States increased by *** percent from 2014 to 2016, but were lower in interim 2017 than in interim 2016. As a share of the responding Norwegian producers' total shipments, exports to the United States decreased from *** percent of total shipments in 2014 to *** percent of total shipments in 2016, but remained the same during the interim periods. Exports of silicon metal to countries other than the United States accounted for *** of total shipments, increasing by *** percentage points from 2014 to 2016, but were lower in interim 2017 than in interim 2016. Other export markets identified include ***.[23] In its hearing testimony, officials for Wacker indicated that Wacker's export volumes have been stable since 2014, and that it does not have plans to increase exports to the United States.[24] [25]

Alternative products

As shown in table VII-19, responding Norway firm *** reported producing both subject silicon metal and out-of-scope products on the same equipment. Overall capacity decreased by *** percent from 2014 to 2016. Production of subject silicon metal accounted for *** percent of overall total production and out-of-scope production accounted for *** percent in 2016. A 1.6 percent switch production between silicon metal and certain out-of-scope products, such as ferrosilicon.[26]

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[22] Bjornar Ovesen, the Vice President of sales and marketing of silicon with Elkem, testified that "our capacity to produce increased quantity is limited and any incremental shipment volumes would be logically directed to the continue -- to serve the EU market because of our proximity and preferential market access." Hearing transcript, p. 149 (Ovesen).

[23] Wacker noted that it does not export silicon metal to the United States because it currently only produces silicon metal with specification suitable for the production of silicons, but not polysilicons. Therefore, it only exports to its parent company in Germany. Conference transcript, p. 98 (Majumdar).

[24] Hearing transcript, p. 148 (Ovesen).

[25] Oliver Majumdar, the Director of raw materials procurement at Wacker's parent company in Germany (Wacker Chemie AG), testified that Wacker Polysilicon North America ("WPNA") "cannot even use silicon metal from the Wacker silicon metal production plant in Norway. Our Norwegian high quality silicon metal has specifications suitable for the production silicones, but not polysilicon." Hearing transcript, p. 131 (Majumdar).

[26] Conference transcript, p. 99 (Majumdar).

Table VII-19
Silicon metal: Norwegian producers' overall capacity and production on the same equipment as subject production, 2014-16, January to September 2016, January to September 2017

* * * * * * *

Exports

According to GTA, the top export market for silicon metal from Norway was Germany in 2016 (table VII-20). The Netherlands was the second-largest export destination of silicon metal from Norway. During 2016, Germany and the Netherlands accounted for 46.8 and 19.3 percent of total exports from Norway of silicon metal, respectively.

Table VII-20
Silicon metal: Exports from Norway, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
Exports from Norway to the United States	9,587	9,533	11,093
Exports from Norway to other major destination markets.-			
Germany	107,414	106,692	98,754
Netherlands	46,058	30,738	40,840
France	14,204	22,320	23,099
Korea	12,900	12,126	11,729
United Kingdom	---	22	8,185
Sweden	6,654	7,037	7,142
Japan	4,634	6,650	6,725
Canada	683	---	1,402
All other destination markets	3,180	5,534	2,090
Total exports from Norway	205,314	200,653	211,059
	Value (1,000 dollars)		
Exports from Norway to the United States	27,936	24,970	23,244
Exports from Norway to other major destination markets.-			
Germany	234,132	209,945	167,367
Netherlands	104,246	65,254	77,906
France	30,874	45,878	42,205
Korea	33,262	32,354	23,544
United Kingdom	---	68	13,827
Sweden	15,417	15,014	11,534
Japan	15,428	17,681	18,952
Canada	1,769	---	1,987
All other destination markets	8,780	17,837	6,914
Total exports from Norway	471,844	429,000	387,480

Table continued on next page.

Table VII-20-Continued
Silicon metal: Exports from Norway, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
Exports from Norway to the United States	2,913.89	2,619.23	2,095.45
Exports from Norway to other major destination markets.-			
Germany	2,179.72	1,967.76	1,694.78
Netherlands	2,263.37	2,122.88	1,907.61
France	2,173.61	2,055.53	1,827.14
Korea	2,578.55	2,668.22	2,007.34
United Kingdom	---	3,085.26	1,689.27
Sweden	2,316.94	2,133.42	1,614.86
Japan	3,329.18	2,658.64	2,818.14
Canada	2,587.80	---	1,417.47
All other destination markets	2,760.89	3,223.09	3,308.57
Total exports from Norway	2,298.15	2,138.02	1,835.89
	Share of quantity (percent)		
Exports from Norway to the United States	4.7	4.8	5.3
Exports from Norway to other major destination markets.--			
Germany	52.3	53.2	46.8
Netherlands	22.4	15.3	19.3
France	6.9	11.1	10.9
Korea	6.3	6.0	5.6
United Kingdom	---	0.0	3.9
Sweden	3.2	3.5	3.4
Japan	2.3	3.3	3.2
Canada	0.3	---	0.7
All other destination markets	1.5	2.8	1.0
Total exports from Norway	100.0	100.0	100.0

Source: Official Norway export statistics under HTS subheading 2804.69 as reported by Statistics Norway in the IHS/GTA database accessed November 28, 2017.

THE INDUSTRIES IN SUBJECT COUNTRIES

Operations on silicon metal

Table VII-21 presents information on the silicon metal operations of the producers and exporters in all four subject countries combined during 2014-16, January-September 2016, and January-September 2017, as well as projections for calendar years 2017-18. The overall capacity and overall production for the combined subject country producers both increased from 2014-16, but were both lower in interim 2017 than in interim 2016.

Table VII-21
Silicon metal: Data on combined industries in subject countries, 2014-16, January to September 2016, January to September 2017, and projections for 2017 and 2018

	Actual experience					Projections	
	Calendar year			January to September		Calendar year	
	2014	2015	2016	2016	2017	2017	2018
	Quantity (short tons contained silicon)						
Capacity	521,427	506,806	530,498	411,315	381,003	527,393	552,369
Production	421,079	405,845	512,821	393,349	352,723	476,090	506,555
End-of-period inventories	51,616	53,251	47,829	56,671	46,529	48,466	46,628
Shipments:							
Home market shipments:							
Internal consumption/ transfers	7,450	8,339	5,647	3,055	5,616	8,941	22,804
Commercial home market shipments	23,915	18,633	30,366	21,972	25,490	33,793	36,218
Total home market shipments	31,365	26,972	36,013	25,027	31,106	42,734	59,022
Export shipments to:							
United States	109,563	83,403	118,181	94,596	91,358	109,178	69,137
All other markets	275,773	293,833	364,052	270,256	231,552	323,197	380,033
Total exports	385,336	377,236	482,233	364,852	322,910	432,375	449,170
Total shipments	416,701	404,208	518,246	389,879	354,016	475,109	508,192
	Ratios and shares (percent)						
Capacity utilization	80.8	80.1	96.7	95.6	92.6	90.3	91.7
Inventories/production	12.3	13.1	9.3	10.8	9.9	10.2	9.2
Inventories/total shipments	12.4	13.2	9.2	10.9	9.9	10.2	9.2
Share of shipments:							
Home market shipments:							
Internal consumption/ transfers	1.8	2.1	1.1	0.8	1.6	1.9	4.5
Commercial home market shipments	5.7	4.6	5.9	5.6	7.2	7.1	7.1
Total home market shipments	7.5	6.7	6.9	6.4	8.8	9.0	11.6
Export shipments to:							
United States	26.3	20.6	22.8	24.3	25.8	23.0	13.6
All other markets	66.2	72.7	70.2	69.3	65.4	68.0	74.8
Total exports	92.5	93.3	93.1	93.6	91.2	91.0	88.4
Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note.—Shares and ratios shown as “0.0” represent values greater than zero, but less than “0.05” percent.

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

Alternative products

Table VII-22 presents information on the silicon metal and out-of-scope products produced on the same equipment of the combined producers and exporters in all four subject countries during 2014-16, January-September 2016, and January-September 2017. The overall capacity and overall production for the combined subject country producers both increased from 2014-16, but were both lower in interim 2017 than in interim 2016. The overall capacity utilization rate for the combined subject country producers increased by 4.0 percentage points during 2014-16, but was lower in interim 2017 than in interim 2016.

Table VII-22
Silicon metal: Data on combined subject industries' overall capacity and production on the same equipment as subject production, 2014-16, January to September 2016, January to September 2017

	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Quantity (short tons)				
Overall capacity	524,466	509,740	531,649	411,958	380,299
Production:					
Silicon metal contained silicon	421,079	405,845	512,821	393,349	352,723
Silicon metal other elements	5,820	5,890	7,554	5,063	4,701
Silicon metal total weight	426,899	411,735	520,375	398,412	357,424
Semiconductor grade	---	---	---	---	---
Ferrosilicon	---	---	---	---	---
Other products	360	671	---	---	---
Out-of-scope products	360	671	---	---	---
Total same machinery	427,259	412,406	520,375	398,412	357,424
	Ratios and shares (percent)				
Overall capacity utilization	66.2	72.7	70.2	69.3	65.4
Share of production:					
Silicon metal contained silicon	98.6	98.4	98.5	98.7	98.7
Silicon metal other elements	1.4	1.4	1.5	1.3	1.3
Silicon metal total weight	99.9	99.8	100.0	100.0	100.0
Semiconductor grade	---	---	---	---	---
Ferrosilicon	---	---	---	---	---
Other products	0.1	0.2	---	---	---
Out-of-scope products	0.1	0.2	---	---	---
Total same machinery	100.0	100.0	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

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

U.S. INVENTORIES OF IMPORTED MERCHANDISE

Table VII-23 presents data on U.S. importers' reported inventories of silicon metal. U.S. importers' end-of-period inventories of imports from subject countries increased from 2014 to

2015, but fell in 2016 to a level only 2.2 percent higher than reported in 2014. These inventories were lower during interim 2017 than the comparable period in 2016.

Table VII-23
Silicon metal: U.S. importers' inventories, 2014-16, January to September 2016, and January to September 2017

Item	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Inventories (short tons contained silicon); Ratios (percent)				
Imports from Australia					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from Brazil					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from Kazakhstan					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from Norway					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from subject sources					
Inventories	11,591	12,126	11,851	16,623	12,592
Ratio to U.S. imports	10.0	13.6	10.4	14.8	10.1
Ratio to U.S. shipments of imports	10.3	13.7	10.4	15.5	10.0
Ratio to total shipments of imports	10.3	13.6	10.4	15.5	10.0

Table continued on next page.

Table VII-23--Continued
Silicon metal: U.S. importers' inventories, 2014-16, January to September 2016, and January to September 2017

Item	Calendar year			January to September	
	2014	2015	2016	2016	2017
	Inventories (short tons contained silicon); Ratios (percent)				
Imports from Canada					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from South Africa					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from all other sources					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from nonsubject sources					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***
Imports from all import sources:					
Inventories	***	***	***	***	***
Ratio to U.S. imports	***	***	***	***	***
Ratio to U.S. shipments of imports	***	***	***	***	***
Ratio to total shipments of imports	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

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

U.S. IMPORTERS' OUTSTANDING ORDERS

The Commission requested importers to indicate whether they imported or arranged for the importation of silicon metal from Australia, Brazil, Kazakhstan, and Norway after September 30, 2017 (table VII-24). Responding importers reported *** short tons contained silicon of arranged imports from Australia in the last quarter of 2017, *** short tons contained silicon of arranged imports from Brazil during October 2017-September 2018, and *** short tons contained silicon of arranged imports from Norway during October 2017-September 2018. There were *** short tons of contained silicon metal of reported arranged imports from Kazakhstan after September 30, 2017.

Table VII-24
Silicon metal: Arranged imports, October 2017 through September 2018

* * * * * * *

ANTIDUMPING OR COUNTERVAILING DUTY ORDERS IN THIRD-COUNTRY MARKETS

On February 20, 2017, the Canadian International Trade Tribunal ("CITT") gave notice that, pursuant to subsection 34(2) of the *Special Import Measures Act* (*SIMA*), it initiated a preliminary injury inquiry to determine whether the evidence discloses a reasonable indication that the alleged injurious dumping of silicon metal containing at least 96.00% but less than 99.99% silicon by weight, and silicon metal containing between 89.00% and 96.00% silicon by weight that contains aluminum greater than 0.20% by weight, of all forms and sizes (the subject goods), originating in or exported from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand, and subsidizing of the subject goods originating in or exported from Brazil, Kazakhstan, Malaysia, Norway and Thailand, have caused injury or retardation or are threatening to cause injury, as these words are defined in *SIMA*.[27]

On October 3, 2017, the President of the Canada Border Services Agency made a final determination of dumping with respect to goods originating in or exported from Brazil (excluding goods exported by Rima Industrial S.A.), Kazakhstan, Laos, Malaysia, and Thailand, and a final affirmative subsidy determination with respect to goods originating in or exported Brazil, Kazakhstan, Malaysia, and Norway.[28] However, the CITT found, pursuant to subsection 4433(11) of the *Special Import Measures Act*, that the dumping and/or subsidizing of the goods originating in or exported from these countries have not caused injury and are not threatening to cause injury to the domestic industry.[29]

On November 8, 2017, the European Commission received a complaint pursuant to Article 5 of Regulation (EU) 2016/1036 of the European Parliament and of the Council of 8 June 2016 on protection against dumped imports from countries not members of the European Union, alleging that imports of silicon, originating in Bosnia and Herzegovina and Brazil are being dumped and are thereby causing material injury to the Union industry.[30] The complaint

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[27] Petitions, Vol. I, exh. I-51; *Tribunal Initiates Injury—Silicon Metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand*, https://www.canada.ca/en/international-trade-tribunal/news/2017/02/tribunal_initiatesinquirysiliconmetalfrombrazilkazakhstanlaosmal.html, February 21, 2017; *Certain Silicon Metal*, http://www.cbsa-asfc.gc.ca/sima-lmsi/i-e/sm22017/sm22017-in-eng.html, March 7, 2017.

[28] *Tribunal Notice of Final Decisions—Silicon Metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand*,http://www.cbsa-asfc.gc.ca/sima-lmsi/i-e/sm22017/sm22017-nf-eng.html , January 17, 2018.

[29] *Tribunal Statement of Reasons—Silicon Metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand*, http://www.cbsa-asfc.gc.ca/sima-lmsi/i-e/sm22017/sm22017-fd-eng.html , January 17, 2018.

[30] *European Commission--Notice of initiation of an anti-dumping proceeding concerning imports of silicon originating in Bosnia and Herzegovina and in Brazil,*

(*continued*...)

was lodged by Ferroatlantica and Ferropem, representing more than 85 percent of the total European Union production of silicon for silicon with a silicon content of less than 99.99 percent by actual weight.[31]

INFORMATION ON NONSUBJECT COUNTRIES

World production

World production of silicon metal was estimated by the United States Geological Survey (USGS) to have been 2.80 million tons in 2015,[32] excluding silicon metal produced in the United States, an increase from 2.53 million tons in 2014. China was by far the leading producer of silicon metal in 2015 with an estimated 2.15 million tons; accounting for about 77 percent of the world's total silicon metal production. Other major producers of silicon metal in 2015 were, in descending order, Norway (6 percent), France (4 percent), and Brazil (3 percent). These four countries combined for 90 percent of total world silicon metal production.[33] Roskill (a market research firm) estimated that world silicon metal production in 2016 was about 2.44 million tons and China remained the dominant producer. According to Roskill, global silicon metal capacity utilization was estimated at 51 percent in 2016, a marginal increase compared to that in recent years. Reportedly, the low utilization rate primarily reflected overcapacity and underutilization in China's silicon metal industry.[34]

Global exports

Table VII-25 presents the leading exporting countries of silicon metal from 2014 to 2016. Total world exports decreased by 9.3 percent by quantity and 24.0 percent by value from 2014 to 2016. China accounted for the largest share of global exports by quantity in 2016 (45.5 percent), followed by Norway (13.6 percent), Brazil (13.1 percent), Netherlands (10.5 percent), Australia (3.4 percent), and South Africa (1.9 percent).

(…*continued*)
http://trade.ec.europa.eu/doclib/docs/2017/december/tradoc_156471.init.en.C438-2017.html , December 19, 2017 and Petitioner's posthearing brief, Exhibit 39.

[31] In response to Commission questions regarding Ferroglobe's pursuit of trade remedy cases in Canada and the European Union, Globe indicated that "there's a recent case brought by the European operations, which has nothing to do with Globe Specialty Metals, recently filed in Europe covering two countries, Bosnia, which is not part of this case and Brazil." Hearing transcript, p. 65 (Kramer).

[32] This is the most recent year that the USGS published world production data for silicon.

[33] USGS, 2015 Minerals Yearbook, Silicon Chapter, p. 67.2, https://minerals.usgs.gov/minerals/pubs/commodity/silicon/myb1-2015-simet.pdf, retrieved January 11, 2018.

[34] *Outlook for silicon metal diverges sharply from that for ferrosilicon*, Roskill Information Services Ltd., https://roskill.com/news/outlook-silicon-metal-diverges-sharply-ferrosilicon/, retrieved January 11, 2018.

Table VII-25
Silicon metal: Global exports by exporter, 2014-16

Exporter	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
United States	3,756	2,999	5,704
Australia	56,384	52,856	52,848
Brazil	143,755	109,007	203,630
Kazakhstan	1,808	12,792	20,073
Norway	205,314	200,653	211,059
All other major reporting exporters.-- China	960,394	854,819	707,456
Netherlands	77,638	130,549	162,911
South Africa	54,285	56,827	29,803
Bosnia & Herzegovina	18,757	19,730	24,153
Canada	25,493	25,009	21,869
Russia	28,341	29,847	21,677
Spain	17,477	20,971	18,795
Slovenia	6,814	9,285	17,432
Thailand	59,624	18,297	10,324
Poland	1,507	2,771	4,694
All other exporters	52,491	51,379	42,246
Total global exports	1,713,836	1,597,793	1,554,673
	Value (1,000 dollars)		
United States	9,357	7,347	8,800
Australia	123,649	122,313	92,771
Brazil	340,793	263,149	385,275
Kazakhstan	4,139	26,895	31,453
Norway	471,844	429,000	387,480
All other major reporting exporters.-- China	1,978,644	1,777,455	1,223,053
Netherlands	192,459	271,326	282,901
South Africa	136,541	149,197	61,210
Bosnia & Herzegovina	44,770	45,315	41,958
Canada	59,985	62,704	52,272
Russia	54,391	57,180	34,470
Spain	42,912	48,216	35,492
Slovenia	17,424	22,064	35,453
Thailand	95,802	31,591	16,525
Poland	3,677	6,616	8,454
All other exporters	157,969	162,935	142,082
Total global exports	3,734,356	3,483,303	2,839,650

Table continued on next page.

Table VII-25-Continued
Silicon metal: Global exports by exporter, 2014-16

Exporter	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
United States	2,491	2,449	1,543
Australia	2,193	2,314	1,755
Brazil	2,371	2,414	1,892
Kazakhstan	2,289	2,102	1,567
Norway	2,298	2,138	1,836
All other major reporting exporters.-- China	2,060	2,079	1,729
Netherlands	2,479	2,078	1,737
South Africa	2,515	2,625	2,054
Bosnia & Herzegovina	2,387	2,297	1,737
Canada	2,353	2,507	2,390
Russia	1,919	1,916	1,590
Spain	2,455	2,299	1,888
Slovenia	2,557	2,376	2,034
Thailand	1,607	1,727	1,601
Poland	2,440	2,387	1,801
All other exporters	3,009	3,171	3,363
Total global exports	2,179	2,180	1,827
	Share of quantity (percent)		
United States	0.2	0.2	0.4
Australia	3.3	3.3	3.4
Brazil	8.4	6.8	13.1
Kazakhstan	0.1	0.8	1.3
Norway	12.0	12.6	13.6
All other major reporting exporters.-- China	56.0	53.5	45.5
Netherlands	4.5	8.2	10.5
South Africa	3.2	3.6	1.9
Bosnia & Herzegovina	1.1	1.2	1.6
Canada	1.5	1.6	1.4
Russia	1.7	1.9	1.4
Spain	1.0	1.3	1.2
Slovenia	0.4	0.6	1.1
Thailand	3.5	1.1	0.7
Poland	0.1	0.2	0.3
All other exporters	3.1	3.2	2.7
Total global exports	100.0	100.0	100.0

Note.--STCS= short tons contained silicon.

Source: Official exports statistics under HS subheading 2804.69 as reported by various national statistical authorities in the IHS/GTA database, accessed November 28, 2017.

Canada

According to GTA, the United States was Canada's largest export market from 2014 to 2016. Table VII-26 presents data on Canada's top export markets for silicon metal from 2014 to 2016. During that time period the U.S. share of Canada's exports, by quantity, increased by 15.9 percentage points, from 83.5 percent in 2014 to 99.4 percent in 2016.

Table VII-26
Silicon metal: Exports from Canada by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
Exports from Canada to the United States	21,285	23,781	21,740
Exports from Canada to other major destination markets.--			
India	---	---	43
China	8	50	35
France	17	25	28
Brazil	311	441	22
Mexico	2	1	1
Australia	0	---	0
Bermuda	---	1	---
Cuba	0	---	---
All other destination markets	3,870	710	---
Total exports from Canada	25,493	25,009	21,869
	Value (1,000 dollars)		
Exports from Canada to the United States	50,099	60,342	52,123
Exports from Canada to other major destination markets.--			
India	---	---	51
China	11	60	40
France	24	32	32
Brazil	435	549	24
Mexico	3	1	2
Australia	0	---	0
Bermuda	---	1	---
Cuba	0	---	---
All other destination markets	9,412	1,719	0
Total exports from Canada	59,985	62,704	52,272

Table continued on next page.

Table VII-26-Continued
Silicon metal: Exports from Canada by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
Exports from Canada to the United States	2,354	2,537	2,398
Exports from Canada to other major destination markets.--			
India	---	---	1,187
China	1,402	1,212	1,144
France	1,421	1,244	1,158
Brazil	1,401	1,245	1,118
Mexico	1,398	1,292	1,161
Australia	1,345	---	1,191
Bermuda	---	1,248	---
Cuba	1,462	---	---
All other destination markets	2,432	2,421	---
Total exports from Canada	2,353	2,507	2,390
	Share of quantity (percent)		
Exports from Canada to the United States	83.5	95.1	99.4
Exports from Canada to other major destination markets.--			
India	---	---	0.2
China	0.0	0.2	0.2
France	0.1	0.1	0.1
Brazil	1.2	1.8	0.1
Mexico	0.0	0.0	0.0
Australia	0.0	---	0.0
Bermuda	---	0.0	---
Cuba	0.0	---	---
All other destination markets	15.2	2.8	---
Total exports from Canada	100.0	100.0	100.0

Note.--STCS= short tons contained silicon.

Source: Official exports statistics under HS subheading 2804.69 as reported by various national statistical authorities in the IHS/GTA database, accessed November 28, 2017.

South Africa

South Africa was the leading nonsubject source of U.S. silicon metal imports from 2014 to 2016. Table VII-27 presents data on South Africa's top export markets for silicon metal from 2014 to 2016. The United States was South Africa's largest export market in 2016, by quantity, followed by Korea, the Netherlands, Japan, and Germany. The average unit value of South African exports to the United States declined by 13.9 percent from 2014 to 2016. During the same period, the U.S. share of South African exports, by quantity, decreased by 16.7 percentage points, from 79.8 percent in 2014 to 63.1 percent in 2016.

Table VII-27
Silicon metal: Exports from South Africa by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Quantity (short tons contained silicon)		
Exports from South Africa to the United States	43,335	45,013	18,809
Exports from South Africa to other major destination markets.--			
Korea	8,113	9,083	6,197
Netherlands	---	---	1,984
Japan	551	776	731
Germany	556	---	710
India	121	---	473
United Kingdom	397	331	276
Qatar	---	---	240
Greece	---	---	132
All other destination markets	1,212	1,624	250
Total exports from South Africa	54,285	56,827	29,803
	Value (1,000 dollars)		
Exports from South Africa to the United States	110,617	121,171	41,344
Exports from South Africa to other major destination markets.--			
Korea	21,207	24,393	12,189
Netherlands	---	---	2,097
Japan	1,500	2,501	2,146
Germany	1,286	---	1,269
India	17	---	728
United Kingdom	919	615	423
Qatar	---	---	380
Greece	---	---	212
All other destination markets	995	518	422
Total exports from South Africa	136,541	149,197	61,210

Table continued on next page.

Table VII-27-Continued
Silicon metal: Exports from South Africa by destination market, 2014-16

Destination market	Calendar year		
	2014	2015	2016
	Unit value (dollars per STCS)		
Exports from South Africa to the United States	2,553	2,692	2,198
Exports from South Africa to other major destination markets.--			
Korea	2,614	2,685	1,967
Netherlands	---	---	1,057
Japan	2,721	3,223	2,934
Germany	2,315	---	1,787
India	137	---	1,540
United Kingdom	2,316	1,861	1,535
Qatar	---	---	1,581
Greece	---	---	1,599
All other destination markets	822	319	1,687
Total exports to South Africa	2,515	2,625	2,054
	Share of quantity (percent)		
Exports from South Africa to the United States	79.8	79.2	63.1
Exports from South Africa to other major destination markets.--			
Korea	14.9	16.0	20.8
Netherlands	---	---	6.7
Japan	1.0	1.4	2.5
Germany	1.0	---	2.4
India	0.2	---	1.6
United Kingdom	0.7	0.6	0.9
Qatar	---	---	0.8
Greece	---	---	0.4
All other destination markets	2.2	2.9	0.8
Total exports from South Africa	100.0	100.0	100.0

Note.--STCS= short tons contained silicon.

Source: Official exports statistics under HS subheading 2804.69 as reported by various national statistical authorities in the IHS/GTA database, accessed November 28, 2017.

Major nonsubject countries

In 2016, Canada and South Africa were the leading nonsubject exporters to the United States. In late 2015, the Spanish firm Grupo FerroAtlántica merged with Globe Specialty Metals (GSM) to become Ferroglobe PLC, the world's leading producer of silicon metal and silicon-based alloys.[35] Collectively, Ferroglobe's silicon metal production capacity is about 543,000

[35] *Globe Specialty Metals and Grupo FerroAtlántica Clear Regulatory Process and Complete Business Combination,* Ferroglobe PLC, December 23, 2015, http://www.ferroatlantica.es/press/news/globe-

(*continued*...)

short tons per year and is distributed as follows: Europe, 40 percent; North America, 40 percent; Africa, 14 percent; and Asia, 7 percent. The other leading global silicon metal producers, in descending order of production capacity, were Dow Corning (228,000 short tons), Elkem (175,000 short tons), and Rima (114,000 short tons).[36]

Canada

There is one producer of silicon metal in Canada, Quebec Silicon Limited Partnership ("QSLP"), owned jointly by GSM and Dow Corning. GSM acquired a 51-percent share of QSLP in 2012. QSLP has the capacity to produce about 52,000 short tons of silicon metal per year.[37]

China

China has the world's largest production capacity and is believed to have over 200 producers of silicon metal with a total annual capacity of 1.65 million short tons.[38] Most of the producers are small, there being only seven producers having capacity in excess of 30,000 short tons per year.[39] China is the largest export source for silicon metal, with most directed to markets in Asia. China also exports large quantities of silicon metal to Europe, the Middle East, Canada and Mexico. Antidumping duty orders on U.S. imports from China have been in place since 1991 and there have been minimal U.S. imports of silicon metal from China since then.[40]

France

Ferroglobe operates five plants in France (Laudun, Anglefort, Les Clavaux, Montricher, and Chateau Feuillet) with a combined silicon metal production capacity of about 164,000 short tons per year.[41]

(…*continued*)
specialty-metals-and-grupo-ferroatl%C3%A1ntica-clear-regulatory-process-and-complete-business-combination/?lang=en, accessed March 24, 2017.

[36] Investor Presentation, January 2017, Ferroglobe PLC, p. 7, http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=890793&filekey=CFE050BE-EFCF-45C5-B36E-E2175021C697&filename=Ferroglobe_-_Investor_Presentation.pdf, accessed March 24, 2017.

[37] Globe Specialty Metals, Inc., http://www.glbsm.com/quebecsilicon/, accessed March 28, 2017.

[38] Roskill Information Services Ltd., *Silicon and Ferrosilicon: Global Industry Markets and Outlook, Thirteenth Edition, 2011*, para. 5.9.1.

[39] Ibid.

[40] *Silicon Metal from Russia: Investigation No. 731-TA-991 (Second Review)*, USITC Publication 4471, June 2014), pp. IV-5 – IV-6.

[41] *Ferroglobe - Investor Presentation - May 2016*, http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=925388&filekey=06493FD0-3C33-49AE-A17E-63A4ED53FEB3&filename=Ferroglobe_-_Investor_Presentation.pdf, accessed March 28, 2017.

Iceland

Silicon metal production is expected to increase in Iceland owing to a new smelter that opened in late 2016 and other smelters that are in different stages of development. ***.[42]

In early 2015, Petro Carbo Chem BakkiSilicon HF began construction on its new silicon metal smelter in Husavik. The plant was expected to open in 2018, and have the capacity to produce about 35,000 short tons of silicon metal per year. The company expected that the majority of the silicon produced would be sold to customers in Germany.[43]

In September 2015, Silicor Materials, Inc., secured $105 million in equity capital agreements to support the construction of its $1 billion commercial-scale solar-grade silicon metal manufacturing operation in Grundartangi.[44] The company expected that at full capacity, the plant would produce about 21,000 short tons of solar grade silicon metal per year. Construction of the plant was expected to take about two years but a start date had not been announced.[45]

In November 2016, United Silicon HF (USi), opened a silicon metal smelter, near Helguvik.[46] It was the first silicon smelter built in Iceland. The company uses geothermal and hydro power sources to run the plant and imports selected quartz and reductants. At full production capacity, the plant can produce 24,000 short tons of silicon metal per year. The company planned to expand production capacity in the future.[47]

Thorsil ehf is planning to build a new silicon metal plant in Helguvik. The company acquired financing for two submerged arc furnaces but it was not clear when construction would begin.[48]

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[42] Joint Respondents' postconference brief, p. 481.

[43] *Official start of construction for PCC's silicon metal project in Iceland,* PCC, February 15, 2016, http://www.pcc.eu/official-start-of-construction-for-pccs-silicon-metal-project-in-iceland/?lang=en, accessed March 24, 2017.

[44] *Silicor Materials Closes $105M in Equity Capital Commitments for Iceland Manufacturing Plant,* September 16, 2016, Silicor Materials, Inc., http://www.silicormaterials.com/news-a-event/press-releases/92-silicor-materials-closes-105m-in-equity-capital-commitments-for-iceland-manufacturing-plant.html, accessed March 24, 2017.

[45] *Silicor Sees Cost Advantage in $1 Billion Icelandic Solar Plant,* Bloomberg, August 31, 2016, https://www.bloomberg.com/news/articles/2016-09-01/silicor-sees-cost-advantage-in-1-billion-icelandic-solar-plant, accessed March 24, 2017.

[46] *First Silicon Metal casting in Iceland,* Fondel, November 2016, https://fondel.com/news/first-silicon-metal-casting-in-iceland, accessed March 24, 2017.

[47] United Silicon website, https://fondel.com/companies/united-silicon, accessed March 24, 2017.

[48] *Thorsil metallurgical grade Silicon slant, Helguvik, Iceland*, Export Credit Norway, June 27, 2016, http://www.eksportkreditt.no/en-GB/52ABOUT-EXPORT-CREDIT-NORWAY/CSR-Engelsk/Category-A-and-B-projects/Thorsil-Metallurgical-Grade-Silicon-Plant-Helguvik-Iceland-Category-A/, accessed March 4, 2017.

South Africa

There are two plants producing silicon metal in South Africa, both owned by Ferroglobe and its subsidiaries. The plants have the capacity to produce about 74,000 shorts tons of silicon metal per year.[49] They are–The eMalahleni plant in the province of Mpumalanga, purchased by FerroAtlantica (now Ferroglobe) in 2009 which produces silicon metal with one of its three furnaces,[50] and the Polokwane silicon plant in the province of Limpopo that produces silicon with three furnaces.[51] In 2016, the United States and Korea were the leading destinations for silicon metal exported from South Africa, accounting for about 63.1 percent and 20.8 percent, respectively, of total exports (table VII-27). ***.[52]

Thailand

In Thailand, G.S. Energy Co., Ltd., began operations in 2008. The company has manufacturing facilities in Ratchaburi with capacity to produce 49,600 short tons of silicon metal per year. [53] Output is almost all exported to Asia and the United States.

In 2015, Sica New Materials Co., Ltd., began producing silicon metal at its facilities in Kanchanaburi. The company was adding production capacity in phases and planned to have the capacity to produce about 99,200 short tons of silicon per year when the project was completed.[54]

United Arab Emirates

Silicon Metal of Abu Dhabi plans to build a silicon plant in the Khalifa Port Industrial Zone, Taweelah. The plant would be the first silicon metal smelter in the Middle East, initially producing 36,000 short tons of silicon per year, though the company planned to double that capacity in the future. [55]

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[49] *Ferroglobe - Investor Presentation - May 2016*, http://investor.ferroglobe.com/common/download/download.cfm?companyid=AMDA-5STP82&fileid=925388&filekey=06493FD0-3C33-49AE-A17E-63A4ED53FEB3&filename=Ferroglobe_-_Investor_Presentation.pdf, accessed March 28, 2017.

[50] *Ferroglobe website*, http://www.ferroglobe.com/business-areas/electrometallurgical/emalahleni/?lang=en, accessed January 17, 2018.

[51] *Ferroglobe website*, http://www.ferroglobe.com/business-areas/electrometallurgical/polokwane/?lang=en, accessed January 17, 2018.

[52] ***.

[53] G.S. Energy Co., Ltd., http://www.gsi99g.com/en/, accessed March 28, 2017.

[54] Sica New Materials Co., Ltd., http://www.sica-mtl.com/index.php, accessed March 28, 2017.

[55] Al-Braik Investments LLC website, http://www.albraik.ae/Silicon Metal.html, accessed April 5, 2017.

APPENDIX A

FEDERAL REGISTER NOTICES

The Commission makes available notices relevant to its investigations and reviews on its website, www.usitc.gov. In addition, the following tabulation presents, in chronological order, *Federal Register* notices issued by the Commission and Commerce during the current proceeding.

Citation	Title	Link
82 FR 13653 March 14, 2017	*Silicon Metal From Australia, Brazil, Kazakhstan, and Norway; Institution of Antidumping and Countervailing Duty Investigations and Scheduling of Preliminary Phase Investigations*	https://www.gpo.gov/fdsys/pkg/FR-2017-03-14/pdf/2017-04994.pdf
82 FR 16356 April 4, 2017	*Silicon Metal From Australia, Brazil, and Kazakhstan: Initiation of Countervailing Duty Investigations*	https://www.gpo.gov/fdsys/pkg/FR-2017-04-04/pdf/2017-06622.pdf
82 FR 19383 April 27, 2017	*Silicon Metal from Australia, Brazil, Kazakhstan, and Norway; Determination*	https://www.gpo.gov/fdsys/pkg/FR-2017-04-27/pdf/2017-08535.pdf
82 FR 37841 August 14, 2017	*Silicon Metal From Brazil: Preliminary Affirmative Countervailing Duty Determination, and Alignment of Final Determination With Final Antidumping Duty Determination*	https://www.gpo.gov/fdsys/pkg/FR-2017-08-14/pdf/2017-17117.pdf
82 FR 37843 August 14, 2017	*Silicon Metal From Australia: Preliminary Affirmative Countervailing Duty Determination and Alignment of Final Determination With Final Antidumping Duty Determination*	https://www.gpo.gov/fdsys/pkg/FR-2017-08-14/pdf/2017-17116.pdf
82 FR 37847 August 14, 2017	*Silicon Metal From the Republic of Kazakhstan: Preliminary Affirmative Countervailing Duty Determination and Alignment of Final Determination With Final Antidumping Duty Determination*	https://www.gpo.gov/fdsys/pkg/FR-2017-08-14/pdf/2017-17112.pdf
82 FR 47475 October 12, 2017	*Silicon Metal From Norway: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Preliminary Negative Determination of Critical Circumstances, Preliminary Determination of No Shipments, Postponement of Final Determination, and Extension of Provisional Measures*	https://www.gpo.gov/fdsys/pkg/FR-2017-10-12/pdf/2017-22065.pdf
82 FR 47466 October 12, 2017	*Silicon Metal From Brazil: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Postponement of Final Determination, and Extension of Provisional Measures*	https://www.gpo.gov/fdsys/pkg/FR-2017-10-12/pdf/2017-22066.pdf

Citation	Title	Link
82 FR 47471 October 12, 2017	*Silicon Metal From Australia: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Preliminary Affirmative Determination of Critical Circumstances, Postponement of Final Determination, and Extension of Provisional Measures*	https://www.gpo.gov/fdsys/pkg/FR-2017-10-12/pdf/2017-22067.pdf
82 FR 49848 October 27, 2017	*Silicon Metal From Australia, Brazil, Kazakhstan, and Norway; Scheduling of the Final Phase of Countervailing Duty and Antidumping Duty Investigations*	https://www.gpo.gov/fdsys/pkg/FR-2017-10-27/pdf/2017-23363.pdf
83 FR 9834 March 8, 2018	*Silicon Metal From Australia: Final Affirmative Countervailing Duty Determination*	https://www.gpo.gov/fdsys/pkg/FR-2018-03-08/pdf/2018-04667.pdf
83 FR 9839 March 8, 2018	*Silicon Metal From Australia: Affirmative Final Determination of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances in Part*	https://www.gpo.gov/fdsys/pkg/FR-2018-03-08/pdf/2018-04667.pdf
83 FR 9838 March 8, 2018	*Silicon Metal From Brazil: Final Affirmative Countervailing Duty Determination*	https://www.gpo.gov/fdsys/pkg/FR-2018-03-08/pdf/2018-04661.pdf
83 FR 9835 March 8, 2018	*Silicon Metal From Brazil: Affirmative Final Determination of Sales at Less Than Fair Value*	https://www.gpo.gov/fdsys/pkg/FR-2018-03-08/pdf/2018-04668.pdf
83 FR 9831 March 8, 2018	*Silicon Metal from the Republic of Kazakhstan: Final Affirmative Countervailing Duty Determination*	https://www.gpo.gov/fdsys/pkg/FR-2018-03-08/pdf/2018-04664.pdf
83 FR 9829 March 8, 2018	*Silicon Metal From Norway: Affirmative Final Determination of Sales at Less Than Fair Value, Final Determination of No Sales, and Final Negative Determination of Critical Circumstances*	https://www.gpo.gov/fdsys/pkg/FR-2018-03-08/pdf/2018-04666.pdf

APPENDIX B

LIST OF HEARING WITNESSES

CALENDAR OF PUBLIC HEARING

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

Subject: Silicon Metal from Australia, Brazil, Kazakhstan, and Norway

Inv. Nos.: 701-TA-567-569 and 731-TA-1343-1345 (Final)

Date and Time: February 15, 2018 - 9:30 a.m.

Sessions were held in connection with these investigations in the Main Hearing Room (Room 101), 500 E Street, SW., Washington, DC.

CONGRESSIONAL APPEARANCES:

The Honorable Scott DesJarlais, M.D., U.S. Representative, 4th District, Tennessee

The Honorable John Moolenaar, U.S. Representative, 4th District, Michigan

OPENING REMARKS:

Petitioners (**William D. Kramer**, DLA Piper LLP (US))
Respondents (**Stephen J. Orava,** King & Spalding LLP; and **Jonathan T. Stoel**, Hogan Lovells US LLP)

In Support of the Imposition of Antidumping and Countervailing Duty Orders:

DLA Piper LLP (US)
Washington, DC
on behalf of

Globe Specialty Metals, Inc. ("GSM")

J. Marlin Perkins, Vice President – Sales, Globe Metallurgical Inc.

Duane Huck, Corporate Manager, IT & Business Information Systems, Globe Metallurgical Inc.

Antonio Williams, President, Local 83693, Industrial Division of the Communication Workers of America (IUE-CWA)

In Support of the Imposition of
Antidumping and Countervailing Duty Orders (continued):

Jennifer Lutz, Vice President, Economic Consulting Services, LLC

William D. Kramer)
Mary E. Gately) – OF COUNSEL
Martin Schaefermeier)

In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders:

Hogan Lovells US LLP
Washington, DC
on behalf of

Wacker Polysilicon North America
Wacker Chemicals Norway
Wacker Chemie AG
Simcoa Operations Pty Ltd.
Shintech Inc.

Oliver Majumdar, Director, Raw Materials Procurement, Wacker Chemie AG

Mary Beth Hudson, Vice President, Wacker Polysilicon North America

Tom Walters, Vice President for Trading, Service Aluminum Corporation

David Miles, Vice President, Simcoa Operations Pty Ltd.

Tiago Borges, Procurement Sourcing Manager, Alcoa Corporation

Dr. Thomas J. Prusa, Professor and Chair, Department of Economics, Rutgers University

Jonathan T. Stoel)
Craig A. Lewis)
) – OF COUNSEL
Jared R. Wessel)
Michael G. Jacobson)

In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders (continued):

King & Spalding LLP
Washington, DC
on behalf of

Dow Silicones Corporation ("Dow Silicones")

Agustin G. Argibay, Global Business Director, Feedstocks, Basics and Intermediates, Dow Silicones

Craig S. Brown, Product Director, Strategic Feedstocks, Dow Silicones

Michael P. Searcy, Commercial Director, Strategic Feedstocks, Dow Silicones

Bonnie B. Byers, Senior International Trade Consultant, King and Spalding LLP

Stephen J. Orava)
) – OF COUNSEL
Benjamin J. Bay)

Cassidy Levy Kent (USA) LLP
Washington, DC
on behalf of

Elkem AS ("Elkem")

Bjørnar Ovesen, Vice President of Sales and Marketing Silicon Division, Elkem

Nils Dybwad, Director of Sales and Marketing Silicon Division, Elkem

Jonathan M. Zielinski)
) – OF COUNSEL
Jack A. Levy)

In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders (continued):

Brinks Gilson & Lione
Washington, DC
on behalf of

Ligas de Aluminio S.A. Ligas ("Liasa")
Cia. Ferroligas Minas Gerais ("Minasligas")

Jay Armstrong, President, TriALco Inc.

Lyle B. Vander Schaaf) – OF COUNSEL

Mayer Brown LLP
Washington, DC
on behalf of

MPM Holdings Inc.

Eric Thaler, Senior Vice President and General Manager,
MPM Silicones

Sydney H. Mintzer) – OF COUNSEL

Smirnow Law
Washington, DC
on behalf of

REC Silicon, Inc.
REC Solar Grade Materials LLC
REC Advanced Silicon Materials LLC

Chris Bowes, Director for Investor Relations and
Global Sourcing, REC Silicon, Inc.

John P. Smirnow) – OF COUNSEL

INTERESTED PARTY IN OPPOSITION:

Mitsubishi Polysilicon
Theodore, AL

Matt Wilson, President

REBUTTAL/CLOSING REMARKS:

Petitioners (**William D. Kramer**, DLA Piper LLP(US))
Respondents (**Stephen J. Orava,** King & Spalding LLP; and **Jonathan T. Stoel** and **Craig A. Lewis**, Hogan Lovells US LLP)

-END-

APPENDIX C

SUMMARY DATA

CONTENTS

Page

Table C-1
Silicon metal: Summary data concerning the U.S. market, 2014-16, January to September 2016, and January to September 2017
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Calendar year			Jan-Sep
	2014	2015	2016	2016	2017	2014-16	2014-15	2015-16	2016-17
U.S. consumption quantity:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
Australia	***	***	***	***	***	***	***	***	***
Brazil	***	***	***	***	***	***	***	***	***
Kazakhstan	***	***	***	***	***	***	***	***	***
Norway	***	***	***	***	***	***	***	***	***
Subject sources	***	***	***	***	***	***	***	***	***
Canada	***	***	***	***	***	***	***	***	***
South Africa	***	***	***	***	***	***	***	***	***
All other sources	***	***	***	***	***	***	***	***	***
Nonsubject sources	***	***	***	***	***	***	***	***	***
All import sources	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
Australia	***	***	***	***	***	***	***	***	***
Brazil	***	***	***	***	***	***	***	***	***
Kazakhstan	***	***	***	***	***	***	***	***	***
Norway	***	***	***	***	***	***	***	***	***
Subject sources	***	***	***	***	***	***	***	***	***
Canada	***	***	***	***	***	***	***	***	***
South Africa	***	***	***	***	***	***	***	***	***
All other sources	***	***	***	***	***	***	***	***	***
Nonsubject sources	***	***	***	***	***	***	***	***	***
All import sources	***	***	***	***	***	***	***	***	***
U.S. imports from:									
Australia:									
Quantity	19,977	22,045	18,458	14,674	20,053	(7.6)	10.4	(16.3)	36.7
Value	52,516	58,984	34,601	28,158	39,793	(34.1)	12.3	(41.3)	41.3
Unit value	$2,629	$2,676	$1,875	$1,919	$1,984	(28.7)	1.8	(29.9)	3.4
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Brazil									
Quantity	83,724	51,888	68,340	47,123	60,449	(18.4)	(38.0)	31.7	28.3
Value	219,760	140,482	158,897	109,522	140,085	(27.7)	(36.1)	13.1	27.9
Unit value	$2,625	$2,707	$2,325	$2,324	$2,317	(11.4)	3.1	(14.1)	(0.3)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Kazakhstan									
Quantity	---	3,006	10,367	7,640	10,359	fn2	fn2	244.9	35.6
Value	---	6,691	17,441	13,279	17,466	fn2	fn2	160.7	31.5
Unit value	---	$2,226	$1,682	$1,738	$1,686	fn2	fn2	(24.4)	(3.0)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Norway:									
Quantity	14,753	14,441	14,432	11,429	10,392	(2.2)	(2.1)	(0.1)	(9.1)
Value	42,151	37,507	29,806	23,778	19,349	(29.3)	(11.0)	(20.5)	(18.6)
Unit value	$2,857	$2,597	$2,065	$2,080	$1,862	(27.7)	(9.1)	(20.5)	(10.5)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Subject sources:									
Quantity	118,454	91,381	111,597	80,866	101,253	(5.8)	(22.9)	22.1	25.2
Value	314,427	243,664	240,745	174,737	216,694	(23.4)	(22.5)	(1.2)	24.0
Unit value	$2,654	$2,666	$2,157	$2,161	$2,140	(18.7)	0.5	(19.1)	(1.0)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Canada:									
Quantity	20,932	23,470	21,542	17,195	21,023	2.9	12.1	(8.2)	22.3
Value	49,973	60,261	52,122	41,668	50,171	4.3	20.6	(13.5)	20.4
Unit value	$2,387	$2,568	$2,420	$2,423	$2,387	1.4	7.5	(5.8)	(1.5)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
South Africa:									
Quantity	44,100	42,886	24,196	20,749	1,624	(45.1)	(2.8)	(43.6)	(92.2)
Value	116,321	117,442	56,427	48,036	3,001	(51.5)	1.0	(52.0)	(93.8)
Unit value	$2,638	$2,739	$2,332	$2,315	$1,848	(11.6)	3.8	(14.8)	(20.2)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
All other sources:									
Quantity	28,072	22,057	9,353	7,884	9,071	(66.7)	(21.4)	(57.6)	15.0
Value	72,488	58,752	18,285	15,896	16,198	(74.8)	(18.9)	(68.9)	1.9
Unit value	$2,582	$2,664	$1,955	$2,016	$1,786	(24.3)	3.1	(26.6)	(11.4)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Nonsubject sources:									
Quantity	93,104	88,413	55,090	45,829	31,718	(40.8)	(5.0)	(37.7)	(30.8)
Value	238,782	236,455	126,834	105,600	69,371	(46.9)	(1.0)	(46.4)	(34.3)
Unit value	$2,565	$2,674	$2,302	$2,304	$2,187	(10.2)	4.3	(13.9)	(5.1)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
All import sources:									
Quantity	211,558	179,793	166,687	126,695	132,971	(21.2)	(15.0)	(7.3)	5.0
Value	553,210	480,118	367,580	280,337	286,064	(33.6)	(13.2)	(23.4)	2.0
Unit value	$2,615	$2,670	$2,205	$2,213	$2,151	(15.7)	2.1	(17.4)	(2.8)
Ending inventory quantity	***	***	***	***	***	***	***	***	***

Table continued on next page.

Table C-1--Continued
Silicon metal: Summary data concerning the U.S. market, 2014-16, January to September 2016, and January to September 2017
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Calendar year			Jan-Sep
	2014	2015	2016	2016	2017	2014-16	2014-15	2015-16	2016-17
U.S. producers':									
Average production capacity	***	***	***	***	***	***	***	***	***
Production	***	***	***	***	***	***	***	***	***
Capacity utilization (fn1)	***	***	***	***	***	***	***	***	***
U.S. shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Export shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Inventories/total shipments (fn1)	***	***	***	***	***	***	***	***	***
Production workers	***	***	***	***	***	***	***	***	***
Hours worked (1,000s)	***	***	***	***	***	***	***	***	***
Wages paid ($1,000)	***	***	***	***	***	***	***	***	***
Hourly wages (dollars)	***	***	***	***	***	***	***	***	***
Productivity (STCS per 1,000 hours)	***	***	***	***	***	***	***	***	***
Unit labor costs	***	***	***	***	***	***	***	***	***
Net sales:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS)	***	***	***	***	***	***	***	***	***
Gross profit or (loss)	***	***	***	***	***	***	***	***	***
SG&A expenses	***	***	***	***	***	***	***	***	***
Operating income or (loss)	***	***	***	***	***	***	***	***	***
Net income or (loss)	***	***	***	***	***	***	***	***	***
Capital expenditures	***	***	***	***	***	***	***	***	***
Unit COGS	***	***	***	***	***	***	***	***	***
Unit SG&A expenses	***	***	***	***	***	***	***	***	***
Unit operating income or (loss)	***	***	***	***	***	***	***	***	***
Unit net income or (loss)	***	***	***	***	***	***	***	***	***
COGS/sales (fn1)	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***
Net income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

fn1.--Reported data are in percent and period changes are in percentage points.
fn2.--Undefined.

Source: Compiled from data submitted in response to Commission questionnaires and from official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and

Table C-2
Silicon metal: Summary data concerning the U.S. merchant market 2014-16, January to September 2016, and January to September 2017
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Calendar year			Jan-Sep
	2014	2015	2016	2016	2017	2014-16	2014-15	2015-16	2016-17
U.S. consumption quantity:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
Australia	***	***	***	***	***	***	***	***	***
Brazil	***	***	***	***	***	***	***	***	***
Kazakhstan	***	***	***	***	***	***	***	***	***
Norway	***	***	***	***	***	***	***	***	***
Subject sources	***	***	***	***	***	***	***	***	***
Canada	***	***	***	***	***	***	***	***	***
South Africa	***	***	***	***	***	***	***	***	***
All other sources	***	***	***	***	***	***	***	***	***
Nonsubject sources	***	***	***	***	***	***	***	***	***
All import sources	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
Australia	***	***	***	***	***	***	***	***	***
Brazil	***	***	***	***	***	***	***	***	***
Kazakhstan	***	***	***	***	***	***	***	***	***
Norway	***	***	***	***	***	***	***	***	***
Subject sources	***	***	***	***	***	***	***	***	***
Canada	***	***	***	***	***	***	***	***	***
South Africa	***	***	***	***	***	***	***	***	***
All other sources	***	***	***	***	***	***	***	***	***
Nonsubject sources	***	***	***	***	***	***	***	***	***
All import sources	***	***	***	***	***	***	***	***	***
U.S. producers':									
Commercial U.S. shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Commercial sales:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS)	***	***	***	***	***	***	***	***	***
Gross profit or (loss)	***	***	***	***	***	***	***	***	***
SG&A expenses	***	***	***	***	***	***	***	***	***
Operating income or (loss)	***	***	***	***	***	***	***	***	***
Net income or (loss)	***	***	***	***	***	***	***	***	***
Unit COGS	***	***	***	***	***	***	***	***	***
Unit SG&A expenses	***	***	***	***	***	***	***	***	***
Unit operating income or (loss)	***	***	***	***	***	***	***	***	***
Unit net income or (loss)	***	***	***	***	***	***	***	***	***
COGS/sales (fn1)	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***
Net income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

fn1.--Reported data are in percent and period changes are in percentage points.
fn2.--Undefined.

Source: Compiled from data submitted in response to Commission questionnaires and from official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and

Table C-3
Silicon metal: Summary data concerning the U.S. market excluding Dow, 2014-16, January to September 2016, and January to September 2017
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Calendar year			Jan-Sep
	2014	2015	2016	2016	2017	2014-16	2014-15	2015-16	2016-17
U.S. consumption quantity:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share (fn1):									
Included producers	***	***	***	***	***	***	***	***	***
Excluded producers	***	***	***	***	***	***	***	***	***
All producers	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
Australia	***	***	***	***	***	***	***	***	***
Brazil	***	***	***	***	***	***	***	***	***
Kazakhstan	***	***	***	***	***	***	***	***	***
Norway	***	***	***	***	***	***	***	***	***
Subject sources	***	***	***	***	***	***	***	***	***
Canada	***	***	***	***	***	***	***	***	***
South Africa	***	***	***	***	***	***	***	***	***
All other sources	***	***	***	***	***	***	***	***	***
Nonsubject sources	***	***	***	***	***	***	***	***	***
All import sources	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount	***	***	***	***	***	***	***	***	***
Producers' share (fn1):									
Included producers	***	***	***	***	***	***	***	***	***
Excluded producers	***	***	***	***	***	***	***	***	***
All producers	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
Australia	***	***	***	***	***	***	***	***	***
Brazil	***	***	***	***	***	***	***	***	***
Kazakhstan	***	***	***	***	***	***	***	***	***
Norway	***	***	***	***	***	***	***	***	***
Subject sources	***	***	***	***	***	***	***	***	***
Canada	***	***	***	***	***	***	***	***	***
South Africa	***	***	***	***	***	***	***	***	***
All other sources	***	***	***	***	***	***	***	***	***
Nonsubject sources	***	***	***	***	***	***	***	***	***
All import sources	***	***	***	***	***	***	***	***	***
U.S. imports from:									
Australia:									
Quantity	19,977	22,045	18,458	14,674	20,053	(7.6)	10.4	(16.3)	36.7
Value	52,516	58,984	34,601	28,158	39,793	(34.1)	12.3	(41.3)	41.3
Unit value	$2,629	$2,676	$1,875	$1,919	$1,984	(28.7)	1.8	(29.9)	3.4
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Brazil									
Quantity	83,724	51,888	68,340	47,123	60,449	(18.4)	(38.0)	31.7	28.3
Value	219,760	140,482	158,897	109,522	140,085	(27.7)	(36.1)	13.1	27.9
Unit value	$2,625	$2,707	$2,325	$2,324	$2,317	(11.4)	3.1	(14.1)	(0.3)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Kazakhstan									
Quantity	---	3,006	10,367	7,640	10,359	fn2	fn2	244.9	35.6
Value	---	6,691	17,441	13,279	17,466	fn2	fn2	160.7	31.5
Unit value	---	$2,226	$1,682	$1,738	$1,686	fn2	fn2	(24.4)	(3.0)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Norway:									
Quantity	14,753	14,441	14,432	11,429	10,392	(2.2)	(2.1)	(0.1)	(9.1)
Value	42,151	37,507	29,806	23,778	19,349	(29.3)	(11.0)	(20.5)	(18.6)
Unit value	$2,857	$2,597	$2,065	$2,080	$1,862	(27.7)	(9.1)	(20.5)	(10.5)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Subject sources:									
Quantity	118,454	91,381	111,597	80,866	101,253	(5.8)	(22.9)	22.1	25.2
Value	314,427	243,664	240,745	174,737	216,694	(23.4)	(22.5)	(1.2)	24.0
Unit value	$2,654	$2,666	$2,157	$2,161	$2,140	(18.7)	0.5	(19.1)	(1.0)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Canada:									
Quantity	20,932	23,470	21,542	17,195	21,023	2.9	12.1	(8.2)	22.3
Value	49,973	60,261	52,122	41,668	50,171	4.3	20.6	(13.5)	20.4
Unit value	$2,387	$2,568	$2,420	$2,423	$2,387	1.4	7.5	(5.8)	(1.5)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
South Africa:									
Quantity	44,100	42,886	24,196	20,749	1,624	(45.1)	(2.8)	(43.6)	(92.2)
Value	116,321	117,442	56,427	48,036	3,001	(51.5)	1.0	(52.0)	(93.8)
Unit value	$2,638	$2,739	$2,332	$2,315	$1,848	(11.6)	3.8	(14.8)	(20.2)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
All other sources:									
Quantity	28,072	22,057	9,353	7,884	9,071	(66.7)	(21.4)	(57.6)	15.0
Value	72,488	58,752	18,285	15,896	16,198	(74.8)	(18.9)	(68.9)	1.9
Unit value	$2,582	$2,664	$1,955	$2,016	$1,786	(24.3)	3.1	(26.6)	(11.4)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Nonsubject sources:									
Quantity	93,104	88,413	55,090	45,829	31,718	(40.8)	(5.0)	(37.7)	(30.8)
Value	238,782	236,455	126,834	105,600	69,371	(46.9)	(1.0)	(46.4)	(34.3)
Unit value	$2,565	$2,674	$2,302	$2,304	$2,187	(10.2)	4.3	(13.9)	(5.1)
Ending inventory quantity	***	***	***	***	***	***	***	***	***

Table continued on next page.

Table C-3--Continued
Silicon metal: Summary data concerning the U.S. market excluding Dow, 2014-16, January to September 2016, and January to September 2017
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Calendar year			Jan-Sep
	2014	2015	2016	2016	2017	2014-16	2014-15	2015-16	2016-17
U.S. imports from:--Continued									
All import sources:									
Quantity	211,558	179,793	166,687	126,695	132,971	(21.2)	(15.0)	(7.3)	5.0
Value	553,210	480,118	367,580	280,337	286,064	(33.6)	(13.2)	(23.4)	2.0
Unit value	$2,615	$2,670	$2,205	$2,213	$2,151	(15.7)	2.1	(17.4)	(2.8)
Ending inventory quantity	***	***	***	***	***	***	***	***	***
U.S. producers':									
Average production capacity	***	***	***	***	***	***	***	***	***
Production	***	***	***	***	***	***	***	***	***
Capacity utilization (fn1)	***	***	***	***	***	***	***	***	***
U.S. shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Export shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Inventories/total shipments (fn1)	***	***	***	***	***	***	***	***	***
Production workers	***	***	***	***	***	***	***	***	***
Hours worked (1,000s)	***	***	***	***	***	***	***	***	***
Wages paid ($1,000)	***	***	***	***	***	***	***	***	***
Hourly wages (dollars)	***	***	***	***	***	***	***	***	***
Productivity (STCS per 1,000 hours)	***	***	***	***	***	***	***	***	***
Unit labor costs	***	***	***	***	***	***	***	***	***
Net sales:									
Quantity	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS)	***	***	***	***	***	***	***	***	***
Gross profit or (loss)	***	***	***	***	***	***	***	***	***
SG&A expenses	***	***	***	***	***	***	***	***	***
Operating income or (loss)	***	***	***	***	***	***	***	***	***
Net income or (loss)	***	***	***	***	***	***	***	***	***
Capital expenditures	***	***	***	***	***	***	***	***	***
Unit COGS	***	***	***	***	***	***	***	***	***
Unit SG&A expenses	***	***	***	***	***	***	***	***	***
Unit operating income or (loss)	***	***	***	***	***	***	***	***	***
Unit net income or (loss)	***	***	***	***	***	***	***	***	***
COGS/sales (fn1)	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***
Net income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

fn1.--Reported data are in percent and period changes are in percentage points.
fn2.--Undefined.

Source: Compiled from data submitted in response to Commission questionnaires and from official U.S. imports based on General Imports using statistical reporting numbers 2804.69.1000 and

APPENDIX D

U.S. SHIPMENTS, BY PRODUCT TYPE

CONTENTS

Page

Tables D-1 through D-11 present data on U.S. producers' and U.S. importers' U.S. shipments, by product type from 2014 through 2016, January-September 2016, and January to September 2017. Staff requested data on shipment types based on low-boron content, high purity grade, and metallurgical grade silicon metal.

Table D-1
Silicon metal: U.S. producers' U.S. shipments (U.S. shipments), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-2
Silicon metal: U.S. importers' U.S. shipments (Australia), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-3
Silicon metal: U.S. importers' U.S. shipments (Brazil), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-4
Silicon metal: U.S. importers' U.S. shipments (Kazakhstan), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-5
Silicon metal: U.S. importers' U.S. shipments (Norway), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-6
Silicon metal: U.S. importers' U.S. shipments (Subject sources), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-7
Silicon metal: U.S. importers' U.S. shipments (Canada), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-8
Silicon metal: U.S. importers' U.S. shipments (South Africa), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-9
Silicon metal: U.S. importers' U.S. shipments (All other sources), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-10
Silicon metal: U.S. importers' U.S. shipments (nonsubject sources), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

Table D-11
Silicon metal: U.S. importers' U.S. shipments (all import sources), by product type, 2014-16, January to September 2016, and January to September 2017

* * * * * * *

APPENDIX E

NONSUBJECT COUNTRY PRICE DATA

Eighteen importers reported shipments of silicon metal from nonsubject countries. The largest sources of nonsubject imports during 2014-16 were South Africa and Canada, in order of size.[1] South Africa and Canada accounted for *** percent respectively, of U.S. silicon metal apparent consumption, and approximately *** percent, respectively, of U.S. silicon metal imports in 2016.

Price data reported by these firms accounted for *** percent of U.S. commercial shipments of silicon metal from South Africa, and *** percent of U.S. commercial shipments of silicon metal from Canada. The price items and accompanying data are comparable to those presented in tables V-3 to V-5. Price and quantity data for domestic sources, subject imports, and nonsubject imports from Canada and South Africa are shown in tables E-1 to E-3 and in figures E-1 to E-3.

In comparing prices for nonsubject imports from South Africa with domestic prices, prices for silicon metal imported from South Africa were lower than prices for U.S.-produced product in 20 instances and higher in 14 instances. In comparing prices for nonsubject imports from Canada with domestic prices, prices for silicon metal imported from Canada were lower than prices for U.S.-produced product in 6 instances and higher in 11 instances. In the posthearing briefs, *** alleged that Globe's affiliates in South Africa were the "low-price leader" underselling domestically produced silicon metal products 1 and 2, and contributed to "price depression" in 2016.[2]

In comparing nonsubject import prices with subject import prices, prices for silicon metal imported from nonsubject countries were lower than prices for silicon metal imported from subject countries in 26 instances and higher in 88 instances. A summary of price differentials is presented in table E-4.

Table E-1

Silicon metal: Weighted-average f.o.b. prices and quantities of imported product 1, by quarters, January 2014-September 2017

* * * * * * *

Table E-2

Silicon metal: Weighted-average f.o.b. prices and quantities of imported product 2, by quarters, January 2014-September 2017

* * * * * * *

[1] The petitioner shares common ownership with foreign producers in South Africa, and some of the nonsubject country producers in Canada.

[2] Respondent Elkem's posthearing brief, p. I-7. Respondent Wacker's posthearing brief, pp. 9-10, Exhibit 1 pp. 11-12.

Table E-3

Silicon metal: Weighted-average f.o.b. prices and quantities of imported product 3, by quarters, January 2014-September 2017

* * * * * * *

Figure E-1

Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 1, by quarters, January 2014-September 2017

* * * * * * *

Figure E-2

Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 2, by quarters, January 2014-September 2017

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Figure E-3

Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 3, by quarters, January 2014-September 2017

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Table E-4

Silicon metal: Summary of underselling/(overselling), by country, January 2014-September 2017

Comparison	Total number of comparisons	Nonsubject lower than the comparison source		Nonsubject higher than the comparison source	
		Number of quarters	Quantity (short tons)	Number of quarters	Quantity (short tons)
Nonsubject vs United States.--					
Canada vs. United States	17	***	***	***	***
South Africa vs. United States	34	***	***	***	***
Nonsubject vs Subject.--					
Canada vs. Australia	15	***	***	***	***
South Africa vs. Australia	26	***	***	***	***
Canada vs. Brazil	16	***	***	***	***
South Africa vs. Brazil	24	***	***	***	***
Canada vs. Kazakhstan	8	***	***	***	***
South Africa vs. Kazakhstan	8	***	***	***	***
Canada vs. Norway	6	***	***	***	***
South Africa vs. Norway	11	***	***	***	***

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

APPENDIX F

PREVIOUS AND RELATED INVESTIGATIONS

Silicon metal from Argentina, Brazil, and China

The Commission has conducted investigations and related five-year reviews on silicon metal with respect to Argentina, Brazil, and China. On August 24, 1990, petitions were filed with Commerce and the Commission alleging that an industry in the United States was materially injured by reason of imports of silicon metal from Argentina, Brazil, and China that were sold at LTFV and imports from Brazil that were subsidized by the government of Brazil.[1] Commerce made a final negative determination with respect to the countervailing duty investigation regarding imports of silicon metal from Brazil[2] and final affirmative determinations with respect to the antidumping duty investigations regarding imports of silicon metal from Argentina,[3] Brazil,[4] and China.[5] In addition, the Commission made final affirmative injury determinations with respect to all three countries in 1991.[6] Thereafter, Commerce issued antidumping duty orders on silicon metal from Argentina,[7] Brazil,[8] and China.[9]

On November 2, 1999, the Commission instituted the first five-year reviews of the antidumping duty orders on imports of silicon metal from Argentina, Brazil, and China.[10] In February 2001, the Commission completed its full first five-year reviews and determined that revocation of the antidumping duty order on silicon metal from Argentina would not be likely to lead to continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time. The Commission further determined that revocation of the antidumping duty orders on silicon metal from Brazil and China would be likely to lead to continuation or recurrence of material injury to an industry in the United States within a

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[1] The petitions were filed by American Alloys, Inc. ("American Alloys"); Elkem Metals Co., L.P. ("Elkem"); Silicon Metaltech, Inc.; SiMETCO, Inc.; and SKW Alloys, Inc. ("SKW"). *Silicon Metal from Argentina, Brazil, and the People's Republic of China*: Investigation Nos. 731-TA-470-472 (Preliminary), USITC Publication 2325, October 1990, p. I-1.

[2] *Final Negative Countervailing Duty Determination: Silicon Metal From Brazil*, 56 FR 26988, June 12, 1991.

[3] *Final Determination of Sales at Less Than Fair Value: Silicon Metal From Argentina*, 56 FR 37891, August 9, 1991.

[4] *Final Determination of Sales at Less Than Fair Value: Silicon Metal From* Brazil, 56 FR 26977, June 12, 1991.

[5] *Final Determination of Sales at Less Than Fair Value: Silicon Metal From the People's Republic of* China, 56 FR 18570, April 23, 1991.

[6] *Determination, Silicon Metal From Argentina*, 56 FR 48577, September 25, 1991; *Determination, Silicon Metal From* Brazil, 56 FR 37572, August 7, 1991; *Determination, Silicon Metal From the People's Republic of* China, 56 FR 27033, June 12, 1991.

[7] *Antidumping Duty Order: Silicon Metal From Argentina*, 56 FR 48779, September 26, 1991.

[8] *Antidumping Duty Order: Silicon Metal From Brazil*, 56 FR 36135, July 31, 1991.

[9] *Antidumping Duty Order: Silicon Metal From the People's Republic of China*, 56 FR 26649, June 10, 1991.

[10] *Silicon Metal From Argentina, Brazil, and China and Silicomanganese From Brazil, China, and* Ukraine, 64 FR 59209, November 2, 1999.

reasonably foreseeable time.[11] Following affirmative determinations on imports of silicon metal from Brazil and China in the first five-year reviews by Commerce and the Commission,[12] Commerce issued a continuation of the antidumping duty orders on silicon metal from Brazil and China, effective February 16, 2001,[13] and revoked the antidumping duty order on silicon metal from Argentina, effective January 1, 2000.[14]

The Commission instituted its second five-year reviews of the antidumping duty orders on imports of silicon metal from Brazil and China on January 3, 2006.[15] The Commission completed its full second five-year reviews in December 2006, determining that revocation of the antidumping duty order on silicon metal from Brazil would not be likely to lead to continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time but that revocation of the antidumping duty order on silicon metal from China would be likely to lead to continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time.[16] Following affirmative determinations on imports of silicon metal from China in the second five-year reviews by Commerce and the Commission,[17] Commerce issued a continuation of the antidumping duty order on silicon metal from China, effective December 21, 2006,[18] and revoked the antidumping duty order on silicon metal from Brazil, effective February 16, 2006.[19]

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[11] *Silicon Metal From Argentina, Brazil, and China: Investigations Nos. 731-TA-470-472 (Review)*, USITC Publication 3385, January 2001, p. 1. Commissioners Okun, Askey, and Devaney did not participate in the first five-year reviews concerning silicon metal from Argentina, Brazil, and China. Commissioner Bragg dissented with respect to the Commission's determination concerning Argentina.

[12] *Silicon Metal From Brazil; Final Results of Expedited Review of Antidumping Duty* Order, 65 FR 35607, June 5, 2000; *Silicon Metal From the People's Republic of China; Final Results of Expedited Sunset Review of Antidumping Duty* Order, 65 FR 35609, June 5, 2000; *Silicon Metal From Argentina, Brazil, and China*, 66 FR 8981, February 5, 2001.

[13] *Continuation of Antidumping Duty Orders on Silicon Metal From Brazil and China and on Silicomanganese From Brazil and China, and Continuation of Suspended Antidumping Duty Investigation on Silicomanganese From Ukraine*, 66 FR 10669, February 16, 2001.

[14] *Revocation of Antidumping Duty Order: Silicon Metal From Argentina*, 66 FR 10669, February 16, 2001.

[15] *Silicon Metal From Brazil and* China, 71 FR 138, January 3, 2006.

[16] *Silicon Metal From Brazil and China: Investigation Nos. 731-TA-471 and 472 (Second Review)*, USITC Publication 3892, December 2006, p. 1.

[17] *Silicon Metal from the People's Republic of China and Brazil: Final Results of the Expedited Reviews of the Antidumping Duty Orders*, 71 FR 26334, May 4, 2006; *Silicon Metal From Brazil and China*, 71 FR 71554, December 11, 2006.

[18] *Silicon Metal from the People's Republic of China: Continuation of Antidumping Duty* Order, 71 FR 76636, December 21, 2006.

[19] *Silicon Metal From Brazil: Revocation of Antidumping Duty* Order, 71 FR 76635, December 21, 2006.

The Commission's third five-year review of the antidumping duty order on imports of silicon metal from China was instituted on November 1, 2011.[20] The Commission completed its expedited third five-year review in March 2012, determining that revocation of the antidumping duty on China would be likely to lead to continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time.[21] Following affirmative determinations in the third five-year review by Commerce and the Commission,[22] Commerce issued a continuation of the antidumping duty order on silicon metal from China, effective April 20, 2012.[23]

The Commission's fourth five-year review of the antidumping order on imports of silicon metal from China was instituted on March 1, 2017.[24] On June 5, 2017, the Commission determined that responses to its notice of institution of the subject five-year review were such that a full review should proceed.[25] On July 3, 2017, Commerce determined that revocation of the antidumping duty order on silicon metal from China would be likely to lead to continuation or recurrence of dumping.[26] On November 24, 2017, the Commission published its schedule for the conduct of the full fourth five-year review. [27]

Silicon metal from Russia

On March 7, 2002, a petition was filed with Commerce and the Commission alleging that an industry in the United States was materially injured and threatened with further material injury by reason of LTFV imports of silicon metal from Russia.[28] On February 11, 2003,

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[20] *Silicon Metal From China; Institution of a Five-Year Review Concerning the Antidumping Duty Order on Silicon Metal From China*, 76 FR 67476, November 1, 2011.

[21] *Silicon Metal From China: Investigation No. 731-TA-472 (Third Review)*, USITC Publication 4312, March 2012, p. 1.

[22] *Silicon Metal From the People's Republic of China: Final Results of the Expedited Third Sunset Review of the Antidumping Duty* Order, 77 FR 10477, February 22, 2012; *Silicon Metal From China*, 77 FR 20649, April 5, 2012.

[23] *Silicon Metal From the People's Republic of China: Continuation of Antidumping Duty* Order, 77 FR 23660, April 20, 2012.

[24] *Silicon Metal From China; Institution of a Five-Year Review*, 82 FR 12234, March 1, 2017.

[25] *Silicon Metal From China; Notice of Commission Determination To Conduct a Full Five-Year Review*, 82 FR 27525, June 15, 2017.

[26] *Silicon Metal From the People's Republic of China: Final Results of the Expedited Fourth Sunset Review of the Antidumping Duty Order*, 82 FR 30841, July 3, 2017.

[27] *Silicon Metal From China: Scheduling of a Full Five-Year Review*, 82 FR 55858, November 24, 2017.

[28] The petition was filed by counsel on behalf of Globe, Cleveland, OH; SIMCALA, Inc. ("SIMCALA"), Mt. Meigs, AL; the International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers (I.U.E.-C.W.A, AFL-CIO, C.L.C., Local 693), Selma, AL; the Paper, Allied-Industrial Chemical and Energy Workers International Union (Local 5-89), Boomer, WV; and the United Steel Workers of America (AFL-CIO, Local 9436), Niagara Falls, NY. *Silicon Metal From Russia: Investigation No. 731-TA-991 (Final)*, USITC Publication 3584, March 2003, p. I-1.

Commerce made an affirmative final LTFV determination regarding silicon metal from Russia.[29] The Commission completed its original investigation concerning silicon metal from Russia on March 19, 2003, determining that an industry in the United States was materially injured by reason of LTFV imports of silicon metal from Russia.[30] After receipt of the Commission's final determination, Commerce issued an antidumping duty order on imports of silicon metal from Russia.[31]

After the Commission determined that an industry in the United States was materially injured by reason of imports from Russia of silicon metal in March 2003,[32] respondents Bratsk Aluminum Smelter and Sual Trade Limited ("plaintiffs") appealed the Commission's determination to the U.S. Court of International Trade ("CIT"). On June 22, 2004, the CIT remanded the case to the Commission for further explanation, and on September 15, 2004, the Commission filed its affirmative remand determination with the CIT. On December 3, 2004, the CIT affirmed the Commission's remand determination in its entirety and dismissed the case.[33] Plaintiffs appealed the CIT's dismissal to the U.S. Court of Appeals for the Federal Circuit ("CAFC"). On April 10, 2006, the CAFC vacated and remanded the CIT's decision so that the CIT would remand the case back to the Commission to address nonsubject imports.[34] On May 25, 2006, the Commission submitted a petition for rehearing *en banc* before the CAFC and on July 24, 2006, the petition was denied. On July 28, 2006, the Commission petitioned the CAFC to stay issuance of the mandate to the CIT while the Commission, through the Office of the Solicitor General, considered the filing of a petition for *certiorari*. On August 7, 2006, the CAFC denied the motion to stay and remanded the case to the CIT. On August 17, 2006, the CIT remanded the case to the Commission. The Commission then filed a motion to stay the remand proceedings at the CIT pending a decision on whether to seek *certiorari*. On September 22, 2006, the CIT granted the stay. On December 20, 2006, the Commission informed the CIT that it would not be seeking certiorari at that time. On December 22, 2006, the CIT entered an order lifting the stay and instructed the Commission to submit its remand results to the CIT by March 22, 2007. Upon consideration of the CIT's remand order that the Commission comply with the CAFC's decision in *Bratsk Aluminum Smelter v. United States*, 444 F.3d 1369 (Fed. Cir. 2006), the Commission determined that an industry in the United States was materially injured by reason of imports of silicon metal from Russia that Commerce found to be sold at LTFV.[35] On January

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[29] *Notice of Final Determination of Sales at Less Than Fair Value: Silicon Metal From the Russian* Federation, 68 FR 6885, February 11, 2003 (as amended, *Notice of Amended Final Determination of Sales at Less Than Fair Value: Silicon Metal From the Russian* Federation, 68 FR 12037, March 13, 2003).

[30] *Silicon Metal From Russia*, 68 FR 14260, March 24, 2003; *Silicon Metal from Russia: Investigation No. 731-TA-991 (Final),* USITC Publication 3584, March 2003, p. I-1.

[31] *Antidumping Duty Order: Silicon Metal From* Russia, 68 FR 14578, March 26, 2003.

[32] *Silicon Metal from Russia: Investigation No. 731-TA-991 (Final)*, USITC Publication 3584, March 2003, p. 1. Chairman Okun did not participate in the investigation.

[33] Bratsk Aluminum Smelter v. United States, Slip Op. 04-153, CIT 2004, December 3, 2004.

[34] Bratsk Aluminum Smelter v. United States, 444 F.3d 1369, 1375 (Fed. Cir. 2006).

[35] Commissioner Deanna Tanner Okun was recused from the investigation. Vice Chairman Aranoff and Commissioners Williamson and Pinkert did not participate in the original investigation or

(*continued*...)

15, 2008, the CIT issued an opinion affirming the Commission's affirmative remand determination that subject imports of silicon metal from Russia were causing material injury to the U.S. industry.[36] That decision was not appealed to the CAFC.

The Commission's first five-year review of the antidumping duty order on imports of silicon metal from Russia was instituted on February 1, 2008.[37] In June 2008, the Commission completed an expedited first five-year review of the subject order and determined that revocation of the antidumping duty order on silicon metal from Russia would be likely to lead to continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time.[38] Following affirmative determinations in the first five-year review by Commerce and the Commission,[39] Commerce issued a continuation of the antidumping duty order on imports of silicon metal from Russia, effective July 16, 2008.[40]

The Commission's second five-year review of the antidumping duty order on imports of silicon metal from Russia was instituted on June 3, 2013.[41] In June 2014, the Commission completed its second full five-year review of the subject order and determined that revocation of the antidumping duty order on silicon metal from Russia would be likely to lead to continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time.[42] Following affirmative determinations in the first five-year review by Commerce and the Commission,[43] Commerce issued a continuation of the antidumping duty order on imports of silicon metal from Russia, effective July 2, 2014.[44]

(…*continued*)
first remand determination, but participated in the second remand proceeding. *Silicon Metal from Russia: Investigation No. 731-TA-991 (Final) (Second Remand)*, USITC Publication 3910, March 2007, pp. 1 and I-1.

[36] Bratsk Aluminum Smelter v. United States, Slip Op. 08-5 (January 15, 2008).

[37] *Silicon Metal From Russia*, 73 FR 6204, February 1, 2008.

[38] *Silicon Metal From Russia: Investigation No. 731-TA-991 (Review)*, USITC Publication 4018, June 2008.

[39] *Silicon Metal From the Russian Federation: Final Results of Expedited Sunset Review of Antidumping Duty Order*, 73 FR 31064, May 30, 2008; *Silicon Metal From Russia*, 73 FR 38467, July 7, 2008.

[40] *Silicon Metal from the Russian Federation: Continuation Of Antidumping Duty Order*, 73 FR 40848 July 16, 2008.

[41] *Silicon Metal From Russia; Institution of a Five-Year Review*, 78 FR 33064, June 3, 2013.

[42] *Silicon Metal From Russia: Investigation No. 731-TA-991 (Second Review)*, USITC Publication 4471 (June 2014).

[43] *Silicon Metal From the Russian Federation: Final Results of the Expedited Second Sunset Review of the Antidumping Duty Order*, 78 FR 61334, October 3, 2013; *Silicon Metal From Russia*, 79 FR 34551, June 17, 2014.

[44] *Silicon Metal From the Russian Federation: Continuation of Antidumping Duty Order*, 79 FR 37718, July 2, 2014.

Silicon metal from Brazil and South Africa

On March 31, 2004, the Commission instituted a countervailing duty investigation on imports of silicon metal from Brazil and an antidumping investigation on imports of silicon metal from South Africa upon receipt of a petition filed by GSM; the International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers, I.U.E.-C.W.A., AFL-CIO, C.L.C., Local 693; and the United Steelworkers of America, AFL-CIO, Local 9436.[45] On April 16, 2004, the petition was withdrawn and the investigations were subsequently terminated.[46]

[45] *Silicon Metal From Brazil and South Africa*, 69 FR 18404, April 7, 2004.
[46] *Silicon Metal From Brazil and South Africa*, 69 FR 23213, April 28, 2004.