Silicon Metal from Russia

Investigation No. 731-TA-991 (Third Review)

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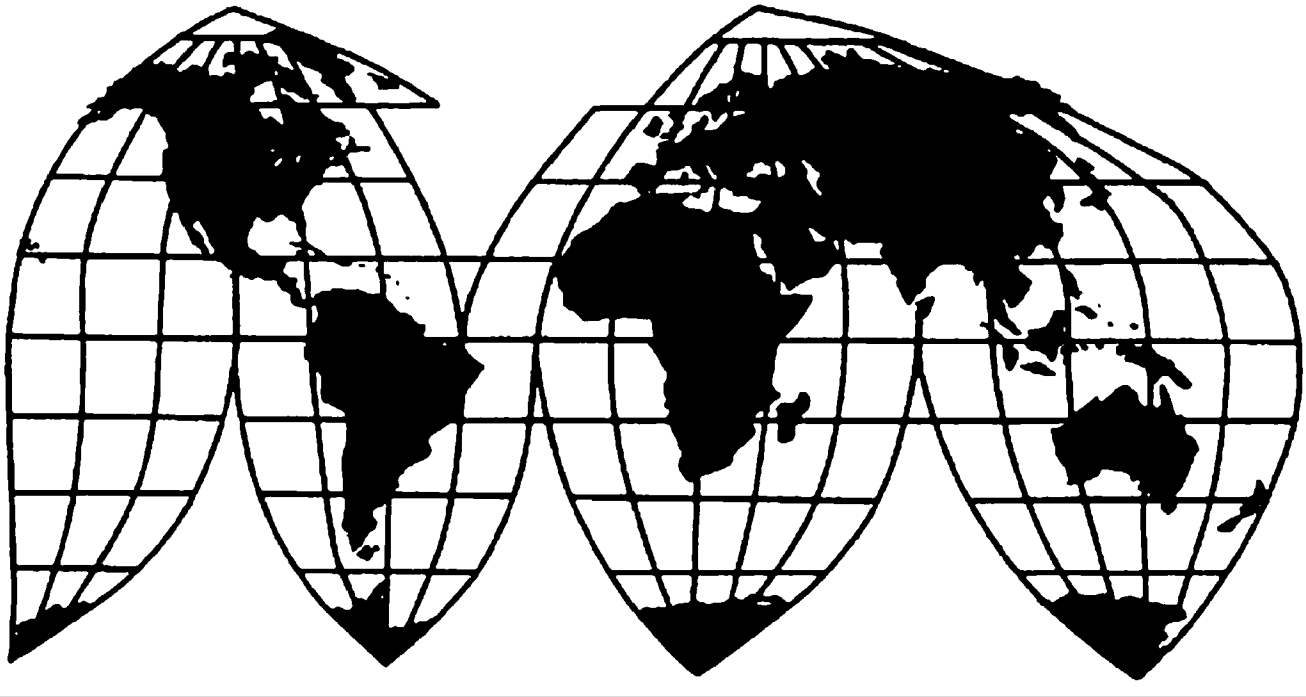
U.S. International Trade Commission



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CONTENTS

Page

CONTENTS

Page

CONTENTS

Page

CONTENTS

Page

CONTENTS

Page

Appendixes

Note.--Information that would reveal confidential operations of individual concerns may not be published. Such information is identified by brackets in confidential reports and is deleted and replaced with asterisks (***) in public reports.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-991 (Third Review)

Silicon Metal from Russia

DETERMINATION

On the basis of the record[1] developed in the subject five-year review, the United States International Trade Commission ("Commission") determines, pursuant to the Tariff Act of 1930 ("the Act"), 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.

BACKGROUND

The Commission instituted this review on June 3, 2019 (84 FR 25561) and determined on September 6, 2019 that it would conduct a full review (84 FR 49763, September 23, 2019). Notice of the scheduling of the Commission's review 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 December 10, 2019 (84 FR 67475). In light of the restrictions on access to the Commission building due to the COVID-19 pandemic, and in accordance with 19 U.S.C. section 1677c(a)(1), the Commission did not cancel its hearing scheduled for March 31, 2020, but conducted its hearing through a series of written questions, submissions of written testimony, written responses to questions, posthearing briefs, and closing statements presented via video and teleconference; all persons who requested the opportunity were permitted to participate.

[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 this five-year review, we determine under section 751(c) of the Tariff Act of 1930, as amended ("the Tariff Act"), 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.

I. Background

Original Investigation and Remand Proceedings: Globe Metallurgical, Inc., a domestic producer of silicon metal, was one of five firms to file a petition on March 7, 2002 seeking imposition of antidumping duties on imports of silicon metal from Russia.[1] In March 2003, the Commission determined that an industry in the United States was materially injured by reason of less than fair value ("LTFV") imports of silicon metal from Russia.[2] The U.S. Department of Commerce ("Commerce") issued an antidumping duty order on March 26, 2003.[3]

Respondents Bratsk Aluminum Smelter and Sual Trade Limited appealed the Commission's determination to the U.S. Court of International Trade ("CIT"), which remanded the case to the Commission for further explanation.[4] On September 15, 2004, the Commission filed its affirmative remand determination with the CIT and on December 3, 2004, the CIT affirmed the Commission's remand determination.[5]

Plaintiffs appealed the CIT's judgment to the U.S. Court of Appeals for the Federal Circuit ("Federal Circuit"), which vacated and remanded the CIT's decision. A divided panel held that the Commission's determination was not in accordance with law because, in the Court's view, the Commission had not considered whether, for the commodity product at issue, price-competitive nonsubject imports would have replaced the subject imports without any beneficial effect on domestic producers. Therefore, the Commission had not established that any material injury was "by reason of" subject imports.[6]

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[1] The other petitioners were SIMCALA, Inc., a domestic producer of silicon metal; the International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers (I.U.E.-C.W.A, AFL-CIO, C.L.C., Local 693); the Paper, Allied-Industrial Chemical and Energy Workers International Union (Local 5-89); and the United Steel Workers of America (AFL-CIO, Local 9436). *Silicon Metal from Russia*, Inv. No. 731-TA-991 (Final), USITC Pub. 3584 at 1 (Mar. 2003) ("Original Determination").

[2] Original Determination, USITC Pub. 3584 at 1.

[3] *Antidumping Duty Order: Silicon Metal from Russia*, 68 Fed. Reg. 14578 (Mar. 26, 2003).

[4] The CIT ordered the Commission: (1) to explain its reasons for accepting evidence that "spot" prices may affect contract prices while rejecting contradictory evidence; (2) to explain the significance or effect of the similar pricing trends of the different market segments; and (3) to change its determination accordingly if the Commission could not provide sufficient reasons or explanations. *Bratsk Aluminum Smelter v. United States*, 28 CIT 955, 968 (2004).

[5] *Bratsk Aluminum Smelter v. United States*, 28 CIT 2043 (2004).

[6] *Bratsk Aluminum Smelter v. United States*, 444 F.3d 1369, 1373 (Fed. Cir. 2006).

On remand, the Commission, after conducting a "replacement/benefit" analysis, determined that an industry in the United States was materially injured by reason of imports of silicon metal from Russia sold at LTFV.[7] On January 15, 2008, the CIT issued an opinion affirming the Commission's affirmative remand determination. This decision was not appealed to the Federal Circuit.[8]

First Review: The Commission instituted its first five-year review of the antidumping duty order on February 1, 2008.[9] After conducting an expedited review, the Commission made an affirmative determination 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.[10] Commerce issued a continuation of the order on July 16, 2008.[11]

Second Review: The Commission instituted its second five-year review on June 3, 2013.[12] After conducting a full review,[13] the Commission made an affirmative determination 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.[14] Commerce issued a continuation of the order on July 2, 2014.[15]

The Current Review: The Commission instituted this third five-year review on June 3, 2019.[16] Globe Specialty Metals, Inc. ("Globe"), a domestic producer of silicon metal, and Limited Liability Company RUSAL Ural Silicon and Joint Stock Company Kremny, each of which is a subsidiary of UC Rusal (collectively "Rusal") and a producer of subject merchandise, responded to the notice of institution. The Commission found that both the domestic and

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[7] *Silicon Metal from Russia*, Inv. No. 731-TA-991 (Final) (Second Remand), USITC Pub. 3910 (Mar. 2007) at 1 and I-1 ("Second Remand Determination"). We observe that the Court of International Trade has held that the *Bratsk* causation analysis does not apply to five-year reviews of antidumping duty orders. *Nucor Corp. v. United States*, 594 F. Supp. 2d 1320, 1447 (Ct. Int'l Trade 2008).

[8] *Bratsk Aluminum Smelter v. United States*, 533 F. Supp. 2d 1348 (Ct. Int'l Trade 2008).

[9] *Silicon Metal from Russia*, 73 Fed. Reg. 28153 (Feb. 1, 2008).

[10] *Silicon Metal from Russia*, Inv. No. 731-TA-991 (Review), USITC Pub. 4018 at 3–4 (Jun. 2008) ("First Review Determination").

[11] *Silicon Metal from the Russian Federation: Continuation of Antidumping Duty Order*, 73 Fed. Reg. 40848 (Jul. 16, 2008).

[12] *Silicon Metal from Russia: Institution of Five-Year Review*, 78 Fed. Reg. 33064 (Jun. 3, 2013).

[13] The hearing was cancelled upon Globe's request after subject producers of silicon metal indicated shortly after the scheduling notice issued that they would no longer participate.

[14] *Silicon Metal from Russia*, Inv. No. 731-TA-991 (Second Review), USITC Pub. 4471 at 1 (June 2014) ("Second Review Determination").

[15] *Silicon Metal from the Russian Federation: Continuation of Antidumping Duty Order*, 79 Fed. Reg. 37718 (Jul. 2, 2014).

[16] *Silicon Metal from Russia; Institution of a Five-Year Review*, 84 Fed. Reg. 25561 (Jun. 3, 2019).

respondent interested party group responses to its notice of institution were adequate and determined on September 6, 2019 to proceed to a full review.[17]

Globe filed prehearing and posthearing briefs and submitted written witness testimony and responses to Commission questions.[18] Rusal filed prehearing and posthearing briefs, and submitted written witness testimony and responses to Commission questions.[19] The Commission also received prehearing and posthearing briefs from the Ministry of Economic Development of the Russian Federation ("Russian Government"),[20] and a posthearing brief from Wacker Polysilicon North America LLC ("Wacker"), a U.S. purchaser and importer of silicon metal.[21] Representatives of Globe and Rusal appeared at the Commission's closing argument/rebuttal remark session of the hearing, accompanied by counsel.[22]

U.S. industry data for this review are based on the questionnaire responses of three U.S. producers that are believed to have accounted for all domestic silicon metal production in 2018.[23] U.S. import data and related information are based on Commerce's official import statistics, and the questionnaire responses of 17 U.S. importers that are believed to have accounted for 81.4 percent of total silicon metal imports in 2018.[24] Foreign industry data and

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[17] *Silicon Metal from Russia; Notice of Commission Determination to Conduct a Full Five-Year Review*, 84 Fed. Reg. 49763 (Sept. 6, 2019); *see also* Explanation of Commission Determination on Adequacy, EDIS Doc. 687994 (Sept. 12, 2019).

[18] Globe's Prehearing Brief, EDIS Doc. 705962 (Mar. 24, 2020); Globe's Posthearing Brief, EDIS Doc. 707338 (Apr. 8, 2020).

[19] Rusal's Prehearing Brief, EDIS Doc. 705969 (Mar. 24, 2020); Rusal's Posthearing Brief, EDIS Doc. 707403 (Apr. 8, 2020).

[20] Russian Government's Prehearing Brief, EDIS Doc. 705517 (Mar. 24, 2020); Russian Government's Posthearing Brief, EDIS Doc. 707294 (Apr. 8, 2020). Among the Russian Government's main contentions is that the dumping margins from the original investigation should no longer apply, as they were calculated using a non-market economy methodology, while Russia has been recognized as a market economy since 2002. *See* Russian Government's Prehearing Brief at 1; Russian Government's Posthearing Brief at 1. The determination of whether dumping is likely to continue or recur is made by Commerce, not the Commission. 19 U.S.C. § 1675a(c)(1); *see also* 19 U.S.C. § 1675a(a)(5).

[21] Wacker's Posthearing Brief, EDIS Doc. 707254 (Apr. 8, 2020).

[22] In accordance with 19 U.S.C. § 1677c(a)(1), and in light of the restrictions on access to the Commission building due to the COVID-19 pandemic, the Commission did not cancel its hearing originally scheduled for March 31, 2020, but conducted a hearing through a series of written questions, submissions of written testimony, written responses to questions, posthearing briefs, and closing arguments/rebuttal remarks by telephone and video conference as set forth in procedures provided to the parties and announced on its website.

[23] Confidential Report, Memorandum INV-SS-048 at I-12 (Apr. 23, 2020) ("CR"); Public Report at I-12 ("PR").

[24] CR/PR at I-12. U.S. imports of silicon metal during the current review period were exclusively from nonsubject sources. CR/PR at II-5. There have been no exports of silicon metal from Russia to the United States since 2014. *Id*.; *see also* CR/PR at Table IV-1.

related information are based on the questionnaire responses and other data from Rusal, the sole Russian producer of silicon metal.[25]

II. Domestic Like Product and Industry

A. Domestic Like Product

In making its determination under section 751(c) of the Tariff Act, the Commission defines the "domestic like product" and the "industry."[26] 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 under this subtitle."[27] The Commission's practice in five-year reviews is to examine the domestic like product definition from the original investigation and consider whether the record indicates any reason to revisit the prior findings.[28]

Commerce has defined the scope of the antidumping duty order in this five-year review as follows:

> {S}ilicon metal, which generally contains at least 96.00 percent but less than 99.99 percent silicon by weight. The merchandise covered by the order also includes silicon metal from Russia containing between 89.00 and 96.00 percent silicon by weight, but containing more aluminum than the silicon metal which contains at least 96.00 percent but less than 99.99 percent silicon by weight. Silicon metal currently is classifiable under subheadings 2804.69.10 and 2804.69.50 of the Harmonized Tariff Schedule of the United States (HTSUS). The Order covers all silicon metal meeting the above specification, regardless of tariff classification.[29]

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[25] CR/PR at I-12 and IV-9.

[26] 19 U.S.C. § 1677(4)(A).

[27] 19 U.S.C. § 1677(10); *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); *Timken Co. v. United States*, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996); *Torrington Co. v. United States*, 747 F. Supp. 744, 748–49 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991); *see also* S. Rep. No. 249, 96th Cong., 1st Sess. 90–91 (1979).

[28] *See, e.g.*, *Internal Combustion Industrial Forklift Trucks from Japan*, Inv. No. 731-TA-377 (Second Review), USITC Pub. 3831 at 8–9 (Dec. 2005); *Crawfish Tail Meat from China*, Inv. No. 731-TA-752 (Review), USITC Pub. 3614 at 4 (July 2003); *Steel Concrete Reinforcing Bar from Turkey*, Inv. No. 731-TA-745 (Review), USITC Pub. 3577 at 4 (Feb. 2003).

[29] *Silicon Metal from the Russian Federation: Final Results of Expedited Third Sunset Review of the Antidumping Duty Order*, 84 Fed. Reg. 54594 (Oct. 10, 2019).

The scope has not changed since the original investigation.[30] Silicon is a chemical element, metallic in appearance, solid in mass, and steel gray in color. Although commonly referred to as metal, silicon exhibits characteristics of both metals and nonmetals. Whether imported or domestic, it is usually sold in a lump form. The four broadly defined grades of silicon metal are: (1) semiconductor grade; (2) chemical grade; (3) a metallurgical grade used to produce primary aluminum; and (4) a metallurgical grade used to produce secondary aluminum.[31] The silicon metal content for all four grades is typically at least 98.5 percent.[32] As semiconductor grade silicon generally contains over 99.99 percent silicon, it is not within the scope of this review.[33]

Silicon metal is used in the chemical industry to produce silanes, which in turn are used to produce a family of organic chemicals known as silicones.[34] Silicones are used in a wide variety of applications including resins, lubricants, plastomers, anti-foaming agents, and water-repellent compounds that are employed in the chemical, pharmaceutical, automotive, and aerospace industries.[35] Primary aluminum applications for silicon metal include the manufacture of components that require higher purity aluminum, such as automobile wheels. Secondary-aluminum applications include other automotive castings.[36]

Prior Proceedings: In the original investigation, the Commission found that there was one domestic like product consisting of all silicon metal described in Commerce's scope.[37] It found that the grades of silicon metal within the scope had shared physical characteristics, some overlapping uses, similar channels of distribution, some interchangeability, the same production processes and employees, and relatively minor differences in prices.[38] In both prior reviews, the Commission defined a single domestic like product consisting of all silicon metal within the scope of the order.[39]

The Current Review: In this full third five-year review, no party has argued for a definition of the domestic like product different from the one adopted in the prior

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[30] *Antidumping Duty Order: Silicon Metal from Russia*, 68 Fed. Reg. 14578 (Mar. 26, 2003); *Silicon Metal from the Russian Federation: Continuation of Antidumping Duty Order*, 73 Fed. Reg. 40848 (Jul. 16, 2008); *Silicon Metal from the Russian Federation: Continuation of Antidumping Duty Order*, 79 Fed. Reg. 37718 (Jul. 2, 2014).

[31] CR/PR at 1-15; Globe Answers to First Set of Hearing Questions, EDIS Doc. 706856 at 33–34; Rusal's Answers to First Set of Hearing Questions, EDIS Doc. 706857 at 26.

[32] CR/PR at I-15.

[33] CR/PR at I-15 n.29.

[34] CR/PR at I-16.

[35] CR/PR at I-16.

[36] CR/PR at I-16.

[37] Original Determination, USITC Pub. 3584 at 5.

[38] Original Determination, USITC Pub. 3584 at 5.

[39] First Review Determination, USITC Pub. 4018 at 5–6; Second Review Determination, USITC Pub. 4471 at 7.

proceedings.[40] The record does not suggest that there have been any changes in the characteristics or uses of domestically produced silicon metal since the prior proceedings.[41] Accordingly, we again define a single domestic like product consisting of silicon metal, coextensive with Commerce's scope.

B. Domestic Industry

Section 771(4)(A) of the Tariff Act defines the relevant industry 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."[42] 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.

In the original investigation and prior reviews, the Commission defined the domestic industry to include all domestic producers of silicon metal.[43] In this review, no party has argued for a different definition of the domestic industry,[44] and there are no related party issues.[45] Accordingly, we again define the domestic industry as all domestic producers of silicon metal.

III. Revocation of the Antidumping Duty Order Would Likely Lead to Continuation or Recurrence of Material Injury Within a Reasonably Foreseeable Time

A. Legal Standards

In a five-year review conducted under section 751(c) of the Tariff Act, Commerce will revoke an antidumping or countervailing duty order unless: (1) it makes a determination that

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[40] Both Globe and Rusal agree with the Commission's domestic like product definition from the prior proceedings. *See* Globe's Response to Notice of Institution, EDIS Doc. 680041, at 29; Rusal's Response to Notice of Institution, EDIS Doc. 680156, at 12. Neither the Russian Government nor Wacker commented on this issue in their submissions.

[41] *See generally* CR/PR at I-15–17.

[42] 19 U.S.C. § 1677(4)(A). The definitions in 19 U.S.C. § 1677 are applicable to the entire subtitle containing the antidumping and countervailing duty laws, including 19 U.S.C. §§ 1675 and 1675a. *See* 19 U.S.C. § 1677.

[43] Original Determination, USITC Pub. 3584 at 6; First Review Determination, USITC Pub. 4018 at 6; Second Review Determination, USITC Pub. 4471 at 7. There were no domestic industry issues in any of the prior proceedings.

[44] Both Globe and Rusal agree with the Commission's domestic industry definition from the prior proceedings. *See* Globe's Response to Notice of Institution at 29; Rusal's Response to Notice of Institution at 12. Neither the Russian Government nor Wacker commented on this issue in their submissions.

[45] CR/PR at I-26.

dumping or subsidization is likely to continue or recur and (2) the Commission makes a determination that revocation of the antidumping or countervailing duty order "would be likely to lead to continuation or recurrence of material injury within a reasonably foreseeable time."[46] The Uruguay Round Agreements Act Statement of Administrative Action (SAA) states that "under the likelihood standard, the Commission will engage in a counterfactual analysis; it must decide the likely impact in the reasonably foreseeable future of an important change in the status quo – the revocation or termination of a proceeding and the elimination of its restraining effects on volumes and prices of imports."[47] Thus, the likelihood standard is prospective in nature.[48] The U.S. Court of International Trade has found that "likely," as used in the five-year review provisions of the Act, means "probable," and the Commission applies that standard in five-year reviews.[49]

The statute states that "the Commission shall consider that the effects of revocation or termination may not be imminent, but may manifest themselves only over a longer period of time."[50] According to the SAA, a "'reasonably foreseeable time' will vary from case-to-case, but normally will exceed the 'imminent' timeframe applicable in a threat of injury analysis in original investigations."[51]

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[46] 19 U.S.C. § 1675a(a).

[47] SAA, H.R. Rep. 103-316, vol. I at 883–84 (1994). The SAA states that "{t}he likelihood of injury standard applies regardless of the nature of the Commission's original determination (material injury, threat of material injury, or material retardation of an industry). Likewise, the standard applies to suspended investigations that were never completed." *Id*. at 883.

[48] While the SAA states that "a separate determination regarding current material injury is not necessary," it indicates that "the Commission may consider relevant factors such as current and likely continued depressed shipment levels and current and likely continued {sic} prices for the domestic like product in the U.S. market in making its determination of the likelihood of continuation or recurrence of material injury if the order is revoked." SAA at 884.

[49] *See NMB Singapore Ltd. v. United States*, 288 F. Supp. 2d 1306, 1352 (Ct. Int'l Trade 2003) ("'likely' means probable within the context of 19 U.S.C. § 1675(c) and 19 U.S.C. § 1675a(a)"), *aff'd mem.*, 140 Fed. Appx. 268 (Fed. Cir. 2005); *Nippon Steel Corp. v. United States*, 26 CIT 1416, 1419 (2002) (same); *Usinor Industeel, S.A. v. United States*, 26 CIT 1402, 1404 nn.3, 6 (2002) ("more likely than not" standard is "consistent with the court's opinion;" "the court has not interpreted 'likely' to imply any particular degree of 'certainty'"); *Indorama Chemicals (Thailand) Ltd. v. United States*, 26 CIT 1059, 1070 (2002) ("standard is based on a likelihood of continuation or recurrence of injury, not a certainty"); *Usinor v. United States*, 26 CIT 767, 794 (2002) ("'likely' is tantamount to 'probable,' not merely 'possible'").

[50] 19 U.S.C. § 1675a(a)(5).

[51] SAA at 887. Among the factors that the Commission should consider in this regard are "the fungibility or differentiation within the product in question, the level of substitutability between the imported and domestic products, the channels of distribution used, the methods of contracting (such as spot sales or long-term contracts), and lead times for delivery of goods, as well as other factors that may only manifest themselves in the longer term, such as planned investment and the shifting of production facilities." *Id*.

Although the standard in a five-year review is not the same as the standard applied in an original investigation, it contains some of the same fundamental elements. The statute provides that the Commission is to "consider the likely volume, price effect, and impact of imports of the subject merchandise on the industry if the orders are revoked or the suspended investigation is terminated."[52] It directs the Commission to take into account its prior injury determination, whether any improvement in the state of the industry is related to the order or the suspension agreement under review, whether the industry is vulnerable to material injury if an order is revoked or a suspension agreement is terminated, and any findings by Commerce regarding duty absorption pursuant to 19 U.S.C. § 1675(a)(4).[53] The statute further provides that the presence or absence of any factor that the Commission is required to consider shall not necessarily give decisive guidance with respect to the Commission's determination.[54]

In evaluating the likely volume of imports of subject merchandise if an order under review is revoked and/or a suspended investigation is terminated, the Commission is directed to consider whether the likely volume of imports would be significant either in absolute terms or relative to production or consumption in the United States.[55] In doing so, the Commission must consider "all relevant economic factors," including four enumerated factors: (1) any likely increase in production capacity or existing unused production capacity in the exporting country; (2) existing inventories of the subject merchandise, or likely increases in inventories; (3) the existence of barriers to the importation of the subject merchandise into countries other than the United States; and (4) 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.[56]

In evaluating the likely price effects of subject imports if an order under review is revoked and/or a suspended investigation is terminated, the Commission is directed to consider whether there is likely to be significant underselling by the subject imports as compared to the domestic like product and whether the subject imports are likely to enter the United States at prices that otherwise would have a significant depressing or suppressing effect on the price of the domestic like product.[57]

In evaluating the likely impact of imports of subject merchandise if an order under review is revoked and/or a suspended investigation is terminated, the Commission is directed to consider all relevant economic factors that are likely to have a bearing on the state of the

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[52] 19 U.S.C. § 1675a(a)(1).

[53] 19 U.S.C. § 1675a(a)(1). Commerce has not made any duty absorption findings with respect to this order. CR/PR at I-12.

[54] 19 U.S.C. § 1675a(a)(5). Although the Commission must consider all factors, no one factor is necessarily dispositive. SAA at 886.

[55] 19 U.S.C. § 1675a(a)(2).

[56] 19 U.S.C. § 1675a(a)(2)(A–D).

[57] *See* 19 U.S.C. § 1675a(a)(3). The SAA states that "{c}onsistent with its practice in investigations, in considering the likely price effects of imports in the event of revocation and termination, the Commission may rely on circumstantial, as well as direct, evidence of the adverse effects of unfairly traded imports on domestic prices." SAA at 886.

industry in the United States, including but not limited to the following: (1) likely declines in output, sales, market share, profits, productivity, return on investments, and utilization of capacity; (2) likely negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment; and (3) likely negative effects on the existing development and production efforts of the industry, including efforts to develop a derivative or more advanced version of the domestic like product.[58] All relevant economic factors are to be considered within the context of the business cycle and the conditions of competition that are distinctive to the industry. As instructed by the statute, we have considered the extent to which any improvement in the state of the domestic industry is related to the order under review and whether the industry is vulnerable to material injury upon revocation.[59]

B. Conditions of Competition and the Business Cycle

In evaluating the likely impact of the subject imports on the domestic industry if an order is revoked, the statute directs the Commission to consider all relevant economic factors "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[60] The following conditions of competition inform our determination.

1. Demand Conditions

In the original investigation, the Commission found that demand for silicon metal was dependent on the demand for the products in which it was used, specifically aluminum products and some chemical products.[61] The Commission repeated this finding in the first two reviews.[62] In the current review, the record indicates that U.S. demand for silicon metal continues to be driven by demand for the products in which it is used, particularly silicon-based chemicals and aluminum alloys.[63]

In the original investigation, apparent U.S. consumption increased slightly between 1999 and 2000 before decreasing in 2001.[64] In the expedited first five-year review, the Commission found that the United States was among the world's largest silicon metal consuming countries, that apparent U.S. consumption had increased over the period of review, and that demand was

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[58] 19 U.S.C. § 1675a(a)(4).

[59] The SAA states that in assessing whether the domestic industry is vulnerable to injury if the order is revoked, 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 may also demonstrate that an industry is facing difficulties from a variety of sources and is vulnerable to dumped or subsidized imports." SAA at 885.

[60] 19 U.S.C. § 1675a(a)(4).

[61] Original Determination, USITC Pub. 3584 at 7.

[62] First Review Determination, USITC Pub. 4018 at 9; Second Review Determination, USITC Pub. 4471 at 11.

[63] CR/PR at II-1.

[64] Original Determination, USITC Pub. 3584 at 7.

expected to increase over the next few years.[65] In the full second five-year review, the Commission found that apparent U.S. consumption had decreased over the period of review, but indicated that a majority of market participants reported anticipating increased demand for silicon metal in the future.[66]

In the current review, apparent U.S. consumption of silicon metal declined overall by 7.6 percent between 2016 and 2018, increasing from 344,148 short tons contained silicon ("short tons") in 2016 to 360,492 short tons in 2017, before declining to 318,133 short tons in 2018.[67] Apparent U.S. consumption was 2.4 percent lower in January-September ("interim") 2019, at 232,796 short tons, than in interim 2018, at 238,501 short tons.[68]

A majority of responding U.S. producers indicated that demand for silicon metal in the United States has decreased overall since January 1, 2014, while a plurality of responding U.S. purchasers indicated that demand has fluctuated overall since that time.[69] Responding U.S. importers reported mixed perceptions.[70] Responding market participants reported mixed perceptions with respect to anticipated future overall demand for silicon metal in the United States.[71]

The Commission asked the parties to address the impact, if any, of the COVID-19 pandemic on U.S. and global demand for silicon metal. In response, Globe emphasized that a recent report projects ***.[72] Rusal acknowledged that the pandemic has influenced demand, but stated that it expects demand to return to previously projected levels as soon as the pandemic has subsided, when pent-up demand will cause rapid growth.[73] Monitoring service CRU's March 2020 Silicon Metal Market Outlook ***.[74]

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[65] First Review Determination, USITC Pub. 4018 at 9.

[66] Second Review Determination, USITC Pub. 4471 at 11–12.

[67] CR/PR at Tables C-1 and I-8.

[68] CR/PR at Tables C-1 and I-8.

[69] Two of three responding U.S. producers reported that demand for silicon metal in the U.S. market has decreased overall since 2014, while five of 12 responding purchasers indicated that demand has fluctuated overall since that time. CR/PR at Table II-4. Rusal, the sole foreign producer, reported an increase in overall U.S. demand since that time. *Id*.

[70] Four importers each reported fluctuating or decreased overall demand since 2014, three importers reported no change since 2014, and one importer reported an increase in overall demand since 2014. CR/PR at Table II-4.

[71] One responding U.S. producer each anticipated increasing, decreasing, or fluctuating demand overall. A plurality of responding importers anticipated no change in overall demand, while a plurality of responding purchasers anticipated fluctuating overall demand. Rusal, the sole foreign producer, anticipated an increase in demand overall. CR/PR at Table II-4.

[72] Globe's Answers to First Set of Hearing Questions at 4.

[73] Rusal's Answers to First Set of Hearing Questions at 7.

[74] Globe's Answers to First Set of Hearing Questions at Exhibit 1 (March 2020 CRU Silicon Metal Market Outlook, p. 17 and Table 7). CRU likewise projects that demand in other global markets will ***. The record also indicates a downturn in demand for downstream products resulting from the COVID-19 pandemic. CR/PR II-7–8.

2. Supply Conditions

In the original investigation, the Commission found that three firms produced silicon metal in the United States at the time of its determination.[75] The Commission indicated that these firms were able to satisfy only a portion of U.S. silicon metal demand, with the balance satisfied by subject and nonsubject imports.[76] The Commission found that nonsubject imports were an important factor in the U.S. market.[77]

In the expedited first five-year review, the Commission observed that, since the original investigation, the number of U.S. silicon metal producers had decreased from three to two.[78] The Commission also noted changes in the Russian silicon metal industry as well, with mergers and acquisitions resulting in a single Russian silicon metal producer, Rusal.[79] The Commission found that nonsubject imports remained an important source of supply in the U.S. market,[80] while subject imports had essentially declined to zero.[81]

In the full second five-year review, the Commission found that the domestic industry was then composed of two firms, Globe and Dow Corning Alabama ("DC Alabama"), with Globe being the principal domestic supplier in the U.S. merchant market.[82] The Commission further found that U.S. producers were the largest suppliers to the U.S. market at the end of the period of review, that nonsubject imports' market share fluctuated during this period, and that there had been few subject imports since the imposition of the order.[83]

During the review period of this current review, the U.S. market was supplied exclusively by domestically produced silicon metal and imports from nonsubject countries.[84] U.S. producers' share of the domestic silicon metal market increased by 6.7 percentage points from 2016 to 2018, from 51.6 percent in 2016 to 52.4 percent in 2017 and 58.3 percent in 2018. U.S. producers' share was lower in interim 2019, at 47.6 percent, than in interim 2018, at 57.6 percent.[85] Nonsubject imports' market share decreased by 6.7 percentage points from 2016 to 2018, declining from 48.4 percent in 2016 to 47.6 percent in 2017 and 41.7 percent in 2018.

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[75] Original Determination, USITC Pub. 3584 at 7. A fourth firm had ceased production during the original period of investigation. *Id*. at 7–8.

[76] Original Determination, USITC Pub. 3584 at 8.

[77] Original Determination, USITC Pub. 3584 at 9.

[78] First Review Determination, USITC Pub. 4018 at 9.

[79] First Review Determination, USITC Pub. 4018 at 9.

[80] First Review Determination, USITC Pub. 4018 at 10.

[81] First Review Determination, USITC Pub. 4018 at 11.

[82] Second Review Determination, USITC Pub. 4471 at 12. The Commission noted that, since 2009, Globe and DC Alabama's parent company, Dow Corning, Inc., had jointly owned a silicon metal plant in Alloy, West Virginia. Second Review Determination, USITC Pub. 4471 at 12 n.70.

[83] Second Review Determination, USITC Pub. 4471 at 12–13.

[84] CR/PR at Table C-1. There have been no exports of silicon metal from Russia to the United States since 2014. CR/PR at II-5; *see also* CR/PR at Table IV-1.

[85] CR/PR at Tables I-9 and C-1.

Nonsubject imports' market share was higher in interim 2019, at 52.4 percent, than in interim 2018, at 42.4 percent.[86]

The domestic industry is composed of three firms: Globe,[87] DC Alabama, and Mississippi Silicon, LLC ("Mississippi Silicon"), which began operations in 2015.[88] *** is the principal domestic supplier to the U.S. merchant market (as measured by quantity of net commercial sales), followed by *** and then ***.[89] The domestic industry *** sold silicon metal to the U.S. polysilicon and chemical sector in 2018,[90] but also sold *** to the U.S. secondary aluminum sector, and had sales to the U.S. primary aluminum sector.[91] The domestic industry's production capacity was below apparent U.S. consumption throughout the period of review,[92] and seven of 17 purchasers reported experiencing supply constraints, with most of these seven reporting that *** was unable to supply desired quantities of silicon metal on time or meet purchaser specifications.[93]

The leading sources of nonsubject imports in 2018 were Brazil, Canada, and Norway, which together accounted for *** percent of nonsubject imports that year.[94] Nonsubject imports were sold *** to the U.S. polysilicon and chemical sector in 2018,[95] but were also sold to the U.S. primary aluminum[96] and U.S. secondary aluminum sectors that year.[97] Imports of silicon metal from Australia, Brazil, Kazakhstan, and Norway were the subject of antidumping and countervailing duty investigations that concluded in 2018 with negative Commission

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[86] CR/PR at Tables I-9 and C-1.

[87] Globe's parent company merged in 2015 to form Ferroglobe PLC, reportedly the leading silicon metal producer in the world. *See* CR/PR at Table III-1. Globe's joint venture with Dow Corning in Alloy, West Virginia continues to be operational. *See* Globe's Response to Notice of Institution at 24 n.90.

[88] CR/PR at Tables I-5 and III-1.

[89] CR/PR at Table III-14. *** production is primarily internally transferred. CR/PR at III-28 and Table III-14.

[90] Shipments to this sector accounted for *** percent of the domestic industry's total U.S. silicon metal shipments in 2018. *See* Table II-I.

[91] Shipments to the secondary aluminum sector accounted for *** percent of the domestic industry's total U.S. silicon metal shipments in 2018. *See* Table II-1. Shipments to the primary aluminum sector accounted for *** percent of the domestic industry's total U.S. silicon metal shipments in 2018. *Id*.

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

[93] CR/PR at II-5.

[94] CR/PR at II-5 and Table IV-1.

[95] Shipments to this sector accounted for *** percent of U.S. importers' total U.S. silicon metal shipments in 2018. *See* Table II-I.

[96] Shipments to this sector accounted for *** percent of U.S. importers' total U.S. silicon metal shipments in 2018. *See* Table II-I.

[97] Shipments to this sector accounted for *** percent of U.S. importers' total U.S. silicon metal shipments in 2018. *See* Table II-I.

determinations.[98] Imports of silicon metal from China have been subject to an antidumping duty order since 1991.[99]

Rusal, as in the prior five-year review, remains the sole subject producer.[100] As previously stated, it did not export to the U.S. market during the period of review. Rusal's main export markets during the period of review were in the European Union ("EU").[101]

3. Substitutability and Other Conditions

In the original investigation and the two prior reviews, the Commission found that materials of the same grade of silicon metal were interchangeable and sold mainly on the basis of price.[102] In each of the prior proceedings, the Commission found a high degree of substitutability between domestically produced silicon metal and subject merchandise.[103]

In the original investigation, the Commission observed that sales were made on both a contract and spot basis, with contracts somewhat more common in the chemical market.[104] Annual contracts were usually negotiated during the fourth quarter of the prior year and often contained approximate, but not fixed, volumes.[105] In the full second five-year review, the Commission observed that sales were made primarily through spot sales or through long-term and short-term contracts based on formulas tied to publicly available reference prices.[106]

In both the original investigation and expedited first five-year review, the Commission observed that silicon metal producers also produced ferrosilicon, and on that basis found that there was the potential for product shifting, noting it was generally easier for firms to switch from silicon metal production to ferrosilicon production than vice versa.[107] In the full second

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[98] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway*, Inv. Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final), USITC Pub. 4773 (Apr. 2018) (the "Four Country Investigation"); CR/PR at Table I-1. These negative determinations were not appealed.

[99] *Silicon Metal from the People's Republic of China: Continuation of Antidumping Duty Order*, 83 Fed. Reg. 25644 (Jun. 4, 2018); CR/PR at Table I-1.

[100] CR/PR at I-12, II-5, and IV-9.

[101] CR/PR at Table IV-8. The top three export markets for silicon metal from Russia in descending order during the period of review were Jersey, Germany, and the Netherlands. *Id*. The Bailiwick of Jersey is treated as part of the EU for the purposes of free trade in goods. *See* CR/PR at IV-16 n.21.

[102] Original Determination, USITC Pub. 3584 at 8; First Review Determination, USITC Pub. 4018 at 10; Second Review Determination, USITC Pub. 4471 at 13.

[103] Original Determination, USITC Pub. 3584 at 15; First Review Determination, USITC Pub. 4018 at 13; Second Review Determination, USITC Pub. 4471 at 13.

[104] Original Determination, USITC Pub. 3584 at 8.

[105] Original Determination, USITC Pub. 3584 at 8.

[106] Second Review Determination, USITC Pub. 4471 at 14.

[107] Original Determination, USITC Pub. 3584 at 8; First Review Determination, USITC Pub. 4018 at 10. The Commission in the original determination explained that when production is switched from ferrosilicon to silicon metal, typically the furnace must at a minimum be relined, as ferrosilicon contains more impurities than silicon metal and tends to contaminate the furnace lining with impurities

five-year review, the Commission observed that there had been considerable increases in worldwide silicon metal capacity since the first review due to the conversion of ferrosilicon furnaces to silicon metal production.[108]

In the current review, we find that there is a high degree of substitutability between domestically produced silicon metal and subject merchandise.[109] All responding U.S. producers and the majority of importers reported that domestically produced silicon metal and subject merchandise are "always" interchangeable, and a majority of purchasers reported that they are "always" or "frequently" interchangeable.[110] Moreover, the majority of all responding market participants reported that silicon metal from the United States is "always" or "frequently" interchangeable with silicon metal from nonsubject sources, and that silicon metal from Russia is likewise "always" or "frequently" interchangeable with silicon metal from nonsubject sources.[111]

We also find that price is an important factor in purchasing decisions for silicon metal. More purchasers ranked "price/cost" as among the top three factors they consider in their purchasing decisions for silicon metal than any other factor.[112] Moreover, purchasers that reported changing suppliers since 2014 (13 of 17) reported changing suppliers mainly because of price.[113] Finally, we observe that Rusal, while asserting that inter-grade price competition

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intolerable to silicon metal production. *See* Original Determination, USITC Pub. 3584 at 8. In the current review, Globe has indicated that in its experience the elimination of certain impurities can be accomplished by allowing the furnace to "burn down" after production of the last batch of ferrosilicon and manually cleaning the furnace lining with an excavator. Globe's Answers to Second Set of Hearing Questions at 29. Rusal also did not indicate that all furnaces must be relined when switching from ferrosilicon production to silicon metal production. Rusal's Answers to First Set of Commission Questions at 15 ("In *some* cases, the entire lining of furnace baths needs to be replaced if the iron contamination is too serious." (emphasis added)).

[108] Second Review Determination, USITC Pub. 4471 at 13.

[109] CR/PR at II-10.

[110] CR/PR at Table II-10.

[111] CR/PR at Table II-10. We also observe with respect to the degree of substitutability between domestically produced silicon metal and subject merchandise that the domestic industry and Rusal both produce ***. *See* CR/PR at Tables II-1 and V-3; Rusal's Prehearing Brief at Exhibit 6. Rusal has not contested that silicon metal can be a commodity and generally interchangeable when competing within identical or similar grades. *See* Rusal's Final Comments, EDIS Doc. 709513 at 5 (May 4, 2020). Further, we note record evidence exists supporting Globe's contention that primary aluminum grade silicon metal and chemical grade silicon metal can and has been "sold down" to secondary aluminum producers. Globe's Response to Second Set of Hearing Questions at 27 and Exhibit 1.

[112] CR/PR at Table II-6. Specifically, "price/cost" was a top three factor for 17 purchasers, followed by "quality" and "availability/supply," which were named as among the top three factors by 15 purchasers and 12 purchasers, respectively. *Id*.

[113] CR/PR at II-14.

does not occur, acknowledges that "actual price competition clearly occurs within the same grade of material."[114]

We note that other factors are also important in purchasing decisions. "Availability/supply" was the factor purchasers most frequently named as the most important purchasing factor.[115] A majority of purchasers rated availability, chemistry/specific product specifications, delivery time, product consistency, quality meets industry standards, and reliability of supply as very important purchasing factors, along with price.[116]

During the period of review, U.S. producers and importers reported using both transaction-by-transaction negotiations and contracts, as well as other methods, for determining prices for silicon metal.[117] U.S. producers reported selling most silicon metal in 2018 under annual contracts.[118]

The record indicates that U.S. prices of the different grades of silicon metal within the scope generally move in concert.[119] The record also indicates that price indices for silicon metal, reflecting spot sales of secondary aluminum grade silicon metal, serve as benchmarks for negotiating spot and contract sales prices in all market segments.[120]

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[114] Rusal's Final Comments at 5. *See also* Rusal remarks, Hearing Transcript, EDIS Doc. 707479 at 35.

[115] CR/PR at Table II-6.

[116] CR/PR at Table II-7.

[117] CR/PR at Table V-1. Of the three responding U.S. producers, all three reported using transaction-by-transaction negotiations, two reported using contracts, and one reported using other methods. *Id*. Of the 13 responding importers, nine reported using transaction-by-transaction negotiations, seven reported using contracts, three reported using other methods, and one reported using a set price list. *Id*.

[118] CR/PR at Table V-2. In 2018, *** percent of U.S. producers' sales were on an annual contract basis, *** percent were on a longer-term basis, *** were on a short-term contract basis, and *** percent were on a spot basis.

[119] CR/PR at Figure V-3; Rusal's Posthearing Brief at 5 (acknowledging that prices in different silicon metal market segments follow similar trends).

[120] CR/PR at V-4; Globe's Prehearing Brief at 7–8 (citing Commission findings in previous investigations and reviews supporting this conclusion); Written Testimony of Marlin J. Perkins, EDIS Doc. 706492 at 3 (Mar. 30, 2020) ("Publications such as CRU Monitor and Platts Metals Week regularly publish information regarding silicon metal prices. These published prices are based on spot sales of secondary aluminum grade silicon metal. However, buyers and sellers use the published price benchmarks in negotiating prices for both spot and contract sales in all segments of the market."); Written Testimony of Jennifer Lutz, EDIS Doc. 706492 at 3 (Mar. 30, 2020) ("While the published silicon metal prices reflect specifications typical for the secondary aluminum segment, those prices affect all segments of the silicon metal market."). *See also* Globe's Prehearing Brief at Exhibit 15 (showing that ***). *See further* Globe's Prehearing Brief at Exhibit 3 (reflecting that ***).

Thirteen of 17 responding purchasers required their suppliers to become certified or qualified to sell silicon metal to their firms.[121] Most purchasers reported qualification times between 60 and 120 days.[122]

C. Likely Volume of Subject Imports

1. The Prior Proceedings

In its original determination, the Commission found that subject imports increased by 38.6 percent from 2000 to 2001 and increased overall by 35.8 percent from 1999 to 2001.[123] Subject import market share, by quantity, followed a similar trend.[124] The Commission found the volume and increase in volume of subject imports, both in absolute terms and relative to consumption and production in the United States, to be significant.[125] It observed that subject imports gained market share at the expense of the domestic industry.[126]

In each of the subsequent reviews, the Commission found that the likely volume of subject imports would be significant in the reasonably foreseeable future if the order were revoked.[127] The Commission in both reviews noted the Russian industry's substantial production capacity and excess capacity, as well as its export orientation.[128] In the full second five-year review, the Commission also considered the relatively large amount of Russian producers' available capacity to shift production from out-of-scope ferroalloys to silicon metal, the attractiveness of the U.S. market in terms of its size and higher prices relative to other markets, and the existence of an established U.S. distribution channel for subject merchandise in Rusal's U.S. affiliate, Rusal America Corporation.[129]

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[121] CR/PR at II-13.

[122] CR/PR at II-13. When qualifying a supplier, purchasers look at product chemistry and consistency, ISO certifications, and conduct sample analyses and material trials to assess product quality. *Id*.

[123] Original Determination, USITC Pub. 3584 at 10. The volume of subject imports was 57.6 percent higher in interim 2002 than in interim 2001. *Id*.

[124] Original Determination, USITC Pub. 3584, at 10. Subject imports' U.S. market share, by quantity, increased by 4.5 percentage points, from 7.8 percent to 12.3 percent, between 1999 and 2001, and was 6.0 percentage points higher in interim 2002 than in interim 2001. *Id*.

[125] Original Determination, USITC Pub. 3584 at 11.

[126] Original Determination, USITC Pub. 3584 at 10–11.

[127] First Review Determination, USITC Pub. 4018 at 12; Second Review Determination, USITC Pub. 4471 at 17–18.

[128] First Review Determination, USITC Pub. 4018 at 12; Second Review Determination, USITC Pub. 4471 at 16–17.

[129] Second Review Determination, USITC Pub. 4471 at 17. The Commission also noted that Bratsk Ferroalloy Plant, a Russian ferrosilicon producer, had produced subject silicon metal until the imposition of the antidumping duty order on silicon metal. *Id*. at 16 n.105.

2. The Current Review

Based on the record in this review, we find that, should the order be revoked, the likely volume of subject imports from Russia would be significant. The record reflects that Rusal would have an incentive to shift shipments, and particularly its exports, to the United States were the order revoked.

Rusal has substantial production capacity. It is the fifth largest global producer of silicon metal.[130] Its capacity in 2018 was *** short tons,[131] which is equivalent to *** percent of apparent U.S. consumption that year.[132] Although Rusal asserts that it indefinitely closed one of its factories in December 2019 due to negative market conditions, Rusal has acknowledged that it could restart this factory and have it producing at full capacity in nine to ten months.[133] Further, ***.[134]

Rusal exports a substantial percentage of its production. Exports accounted for between *** and *** percent of its total silicon metal shipments during the period of review.[135] Its export shipments in 2018, *** short tons, were equivalent to *** percent of apparent U.S. consumption and *** percent of U.S. production that year.[136] Moreover, the record indicates

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[130] CR/PR at IV-9.

[131] CR/PR at Table IV-6.

[132] Derived from CR/PR Tables I-8 and IV-6.

[133] Rusal's Prehearing Brief at 23. Rusal indicates that restarting this factory would involve a start-up lead time of at least three to four months to start production, and that it would take at least six months to get the factory at or near full capacity, once restarted. *Id*.

According to Rusal, the basis for closing this factory near the end of 2019 was because "world prices had decreased somewhat and costs had increased," making "continued production at this facility no longer economically feasible." Rusal's Answers to Second Set of Hearing Questions at 19–20. Rusal notes that it would be "costly, risky and unpredictable" to restart the factory in order to produce chemical grade silicon metal (the dominant grade sold in the United States); Rusal also notes that there is no "economic sense" in restarting the factory "simply to ship relatively small volumes" of secondary grade product to the United States. *Id*. Rusal asserts that, if it were to restart this factory, it would first use any such output to feed its own production of primary aluminum. Rusal's Prehearing Brief at 23. However, we do not find that this fact would preclude the factory from also producing appreciable quantities of subject merchandise for export in addition to quantities for captive consumption. We also note that Rusal's decision to close the factory was made with the antidumping duty order in place, and that revocation of the order could change the economics of restarting production.

[134] CR/PR at IV-12; Globe's Prehearing Brief at Exhibit 9 ***. Rusal maintains that all production staff at this factory have been laid off. Rusal's Final Comments at 8 (citing Rusal's Answers to Second Set of Hearing Questions at 25).

[135] Table IV-6.

[136] Derived from CR/PR Tables I-8, III-5, and IV-6.

that Rusal's production *** over the period of review, thus creating pressure for Rusal to export.[137] ***.[138]

The record also shows that the U.S. market remained attractive during the period of review, and that Rusal would have incentive to direct its exports to the United States if the order were revoked. The U.S. market is one of the world's largest silicon metal markets.[139] Moreover, the average unit values ("AUVs") of Rusal's export shipments were below the AUVs of imports to the United States during each full year and the interim period of the period of review even accounting for transportation costs from Russia,[140] indicating a price incentive for Rusal to ship to the United States over its current export markets if the order were revoked.[141] For example, the AUVs Rusal received for exports to its largest export market, the Bailiwick of Jersey,[142] were well below the U.S. importer AUVs during the period of review.[143] While silicon metal prices in the United States and Europe (where nearly all of Rusal's current export markets are located) have followed similar trends over the past ten years, U.S. prices have been

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[137] Globe's Prehearing Brief at 11 and Exhibit 5. Globe derived data concerning ***. *Id*. Rusal did not challenge this derivation.

[138] CR/PR at IV-6.

[139] Globe's Answers to First Set of Hearing Questions, Exhibit 1 (March 2020 CRU Silicon Metal Market Outlook, Tables 7 and 8) and Exhibit 2 (comparison of silicon metal demand forecasts in the United States, EU, and Russia, from March 2019 and March 2020).

[140] The U.S. import data in CR/PR Table IV-1 are reported on a CIF basis, whereas the Russian export data in CR/PR Table IV-6, as reported by Rusal, do not include associated CIF charges. However, the record evidence indicates that the difference in U.S. import and Russian export AUVs exceeds any CIF charges that would attach to Rusal's exports, were they destined for the U.S. market. For each year of the review period, the difference between the AUVs of U.S. imports and the AUVs of Rusal's export shipments was greater than Rusal's estimated U.S. CIF charges for shipments to the port of Baltimore. *Derived from* CR/PR Table IV-1 (U.S. import AUVs); Table IV-6 (Rusal's Export AUVs); Rusal's Foreign Producer Questionnaire Response at 32, Exhibit 4 (estimating CIF charges from St. Petersburg to Baltimore). This difference also exceeds 5.1 percent of the value of Rusal's export shipments; this percentage is the estimated transportation costs of silicon metal imports from Russia to the U.S. market in 2012, the last year for which transportation costs are available. *See* CR/PR at V-2.

[141] Compare CR/PR Tables IV-6 and CR/PR Table IV-1. We have compared the AUVs of U.S. imports from all sources to the AUVs of Rusal's exports to all markets. We recognize that differences in AUVs may reflect differences in product mix and the fact that import AUVs are CIF values while export values are FOB. Nevertheless, with respect to product mix, Rusal's exports during the period of review ***, and the vast majority of nonsubject imports during this period were likewise ***. Rusal's Prehearing Brief at Exhibit 6; CR/PR at Table II-1. With respect to the fact that import AUVs are CIF values while export values are FOB, *see supra* n.140.

[142] The Bailiwick of Jersey is a self-governing dependency of the Crown that is part of a customs union with the United Kingdom, but is treated as part of the European Union for the purposes of free trade in goods. CR/PR at IV-16.

[143] Compare CR/PR Tables IV-I and IV-8.

consistently higher than European prices over time.[144] Further, the record does not support Rusal's contention that the advantage of high U.S. prices is rendered negligible after accounting for increased transportation costs, longer lead times for delivery, and associated selling costs of shipping product to the United States instead of Europe.[145]

Additional factors further indicate Rusal's ability and incentive to ship silicon metal to the United States in the event of revocation. Rusal has an established distribution channel through which to ship silicon metal to U.S. customers, Rusal America Corporation, Rusal's U.S.-

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[144] CR/PR at Figure IV-3. Moreover, *** shows that U.S. prices exceeded those in the EU by an average of ***. *See* Globe's Prehearing Brief at Exhibit 6. Contrary to Rusal's suggestion, *** does not indicate that the longstanding historical U.S. price advantage will not return in the reasonably foreseeable future. Prices in the two markets have *** at times before, but U.S. prices nonetheless were consistently greater than European prices during the period. *See id.* Further, the most recent market report in the record forecasts that ***. Globe's Posthearing Brief at Exhibit 4 (March 2020 CRU Silicon Metal Market Outlook, Figure 1).

[145] Rusal estimates the long-term historical average price advantage in the U.S. market relative to EU markets at ***, but estimates that freight/transportation costs are *** greater when shipping to the United States and that total additional costs, which include financing in transit, buffer stock maintenance, credit insurance, warehousing costs, and an additional employee, range between ***. Rusal's Answers to First Set of Hearing Questions at 16; Rusal's Answers to Second Set of Hearing Questions at 19 and 27. Rusal asserts that it was unable to provide documentary support for these estimates due to the short amount of time allotted to answering the Commission's hearing questions and the difficulty involve in obtaining documentary evidence during the COVID-19 pandemic. *Id.* We note that Globe directly challenged Rusal's claim regarding differences in freight and other costs in its prehearing brief, dated March 24, 2020. Globe's Prehearing Brief at 12–13. In that submission, Globe estimates the price advantage in the U.S. market relative to the EU markets of *** during the period of review, derived from the AUVs of Rusal's export shipment to the EU market and official U.S. import data. Globe's Prehearing Brief at Exhibit 7. To rebut Rusal's assertion that additional transportation and related costs effectively eliminate this price advantage, Globe estimates the difference in transportation and other CIF charges between the two markets. It does this by comparing the U.S. CIF charges estimated by Rusal to an estimated average CIF charge associated with Rusal's exports to the EU. This comparison shows a difference in CIF charges of *** less than the *** calculated price advantage of the U.S. market. Globe Prehearing Brief at Exhibit 8; *see also id.* (deriving estimated CIF charge associated with Rusal's exports to EU as difference between FOB AUV of Russian exports to the EU and CIF AUV of EU imports from Russia); Rusal's Foreign Producer Questionnaire Response at 32, Exhibit 4 (reporting estimated CIF charges for shipments from Rusal's FCA plant to the port of Baltimore). However, even assuming Rusal's unsupported estimated costs of ***, a substantial price advantage remains when considering period-specific estimates of the price advantage in the U.S. market. Thus, the record on balance does not support Rusal's position on this issue.

based sales affiliate, which Rusal acknowledges has sold silicon metal in the United States sourced from *** in the past.[146] Additionally, U.S. purchasers have ***,[147] and Rusal is ***.[148]

We are unpersuaded by Rusal's argument that, because it is already operating at full capacity, it is unlikely to become a significant supplier of silicon metal in the United States in event of revocation. Rusal does not need excess capacity in order to supply the U.S. market, as it can shift its sales from its current export markets.[149] Further, as previously discussed, the record indicates that Rusal can increase its capacity in the reasonably foreseeable future by reopening its shuttered factory.

The record also does not support Rusal's argument that lengthy qualification requirements, particularly in the chemical segment, inhibit its ability to supply U.S. purchasers.[150] As discussed, most U.S. purchasers reported that qualification only took between two and four months.[151] Further, ***,[152] and Rusal has stated that its U.S. exports in the event of revocation would most likely comprise secondary aluminum grade silicon metal.[153]

Rusal argues that its ability to export to the United States in the event of revocation is limited by its increasing focus on captively consuming its silicon metal output for downstream aluminum production, and Russian competition law. However, neither of these factors prevented Rusal from ***.[154] The portion of Rusal's silicon metal dedicated to captive consumption in 2018 was far from overwhelming,[155] and although Rusal argues that its overall corporate strategy involves expanding production of primary aluminum, which will require greater levels of captive consumption,[156] Rusal's current corporate strategy is not necessarily

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[146] Rusal's Answers to First Set of Hearing Questions at 14. Rusal argues that Rusal America Corporation could not facilitate the importation of silicon metal from Russia because it sells only primary aluminum, alloys and wire rod. *Id.* We disagree and consider that Rusal America Corporation's pre-existing operations in importing and selling in the U.S. market primary aluminum and alloys could be expanded to facilitate the importation of silicon metal.

[147] CR/PR at Table D-1 (*** entry); ***.

[148] ***.

[149] Rusal also argues that it has no incentive to shift its exports from the EU to the United States because of its long-term contracts with existing customers in the former market. Rusal's Prehearing Brief at 25; Rusal's Answers to Second Set of Hearing Questions at 9; Rusal's Foreign Producer Questionnaire Response at 22 (Question III-8). However, Rusal did not provide any details on the nature, scope or duration of these purported European contracts for the Commission to be able to evaluate whether and how they might affect Rusal's incentive to shift exports from the EU to the United States.

[150] Rusal's Prehearing Brief at 28; Rusal's Answers to First Set of Hearing Questions at 9.

[151] CR/PR at II-13.

[152] Rusal's Prehearing Brief at Exhibit 6; Rusal's Answers to First Set of Hearing Questions at 9.

[153] Rusal's Posthearing Brief at 11.

[154] CR/PR at Table IV-6.

[155] *See* Rusal's Prehearing Brief at 21. Rusal reports that in 2018 captive consumption of silicon by Rusal's aluminum smelters in Russia, foil-rolling facility in Armenia and aluminum foundry in Sweden reached *** percent of its total silicon output. *Id.*

[156] Rusal's Prehearing Brief at 21.

probative of how the company would respond to a significant change in the silicon metal market, such as the revocation of the order.

We are not persuaded by Rusal's argument that it would be unlikely to export significant volumes to the United States because it mainly produces primary aluminum grade silicon metal, while U.S. purchasers mainly demand chemical grade silicon metal.[157] During the period of review, Rusal ***,[158] which the record indicates ***.[159] Moreover, Rusal acknowledges that it has the capability to produce chemical grade silicon metal,[160] and Rusal estimates that *** of its exports in 2016-2018 consisted of chemical grade silicon metal.[161]

As discussed above, the Russian silicon metal industry is large and exports substantial quantities of product. We find that Rusal would likely direct significant volumes of silicon metal to the U.S. market should the antidumping duty order be revoked, based on the attractiveness of the U.S. market. We therefore conclude that the volume of subject imports of silicon metal would likely be significant, both in absolute terms and relative to U.S. consumption, if the antidumping duty order were revoked.[162]

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[157] Rusal's Prehearing Brief at 11–13; Rusal's Posthearing Brief at 6.

[158] Rusal's Prehearing Brief at Exhibit 6; Rusal's Answers to First Set of Hearing Questions at 9.

[159] Shipments to the secondary aluminum sector comprised between *** percent and *** percent of all U.S. silicon metal shipments during the period of review. CR/PR at Table II-1. In addition, we note record evidence exists supporting Globe's contention that primary aluminum grade silicon metal and chemical grade silicon metal can and has been "sold down" to secondary aluminum producers. Globe's Response to Second Set of Hearing Questions at 27 and Exhibit 1. Thus, Rusal also may be positioned to meet U.S. demand for secondary aluminum grade silicon metal with higher grade product.

[160] Rusal's Answers to First Set of Hearing Questions at 9; Rusal's Final Comments at 9. Rusal has also acknowledged more generally that it is possible to produce silicon metal of various grades on the same equipment using the same input materials. *See* Rusal's Answers to Second Set of Hearing Questions at 16.

[161] Rusal's Answers to First Set of Hearing Questions at 9.

[162] We have also examined several other factors in our analysis of the likely volume of subject imports. Rusal's end-of-period inventories were *** short tons in 2016, *** short tons in 2017, and *** short tons in 2018. They were *** short tons in interim 2018, and *** short tons in interim 2019. CR/PR at Table IV-6. In light of the absence of subject imports, there were no inventories of subject merchandise in the United States during the period of review. CR/PR at Table IV-3.

While we do not rely on product shifting as a basis for our likely volume finding, the record contains information pertinent to this factor such that the possibility of a Russian ferrosilicon producer shifting to silicon metal production cannot be ruled out. First, in the United States, Globe has ***. CR/PR at Table III-2; Globe's Answers to Second Set of Hearing Questions at 29. Second, the record indicates that ferrosilicon producers in Russia have the ability to convert to silicon metal production. CR/PR at I-20; Rusal's Posthearing Brief at 7 (in arguing that that ferrosilicon producers cannot "easily switch" to silicon metal production, Rusal in effect still acknowledges that such switching is possible). We also note that Russian ferrosilicon producer Bratsk Ferroalloy Plant previously produced silicon metal, but shifted to ferrosilicon production following the issuance of the order in 2003. First Review Determination, USITC Pub. 4018 at I-33. Third, the record also indicates that the Russian ferrosilicon

D. Likely Price Effects

1. The Prior Proceedings

In the original investigation, the Commission found that domestically produced silicon metal and subject imports were generally substitutable, and that price was a key factor in purchasing decisions. Silicon metal prices in all three markets (chemical, primary aluminum, and secondary aluminum) "keyed off" the secondary aluminum price and exhibited similar trends.[163] The Commission found underselling to be significant.[164] Subject imports destined for the primary and secondary aluminum markets undersold the domestic like product in the vast majority of pricing comparisons.[165] The Commission also found that the AUVs of subject imports were lower than the aggregate AUVs of nonsubject imports during the period of investigation and were lower than the AUVs of imports from individual nonsubject countries during each full year of the period as well as the interim periods.[166]

The Commission also found significant price depression, as sales prices for the domestic like product and subject imports to all three groups of customers generally decreased during the period of investigation.[167] There were a number of confirmed lost sales and revenues.[168] The Commission recognized that nonsubject imports may have had an independent effect on prices, but found that subject imports had significant price-depressing effects in light of their significant underselling, volume surges, and their high degree of substitutability with the domestic like product.[169]

In both prior five-year reviews, the Commission found that meaningful price comparisons were not available for sales in the U.S. market.[170] However, based on an analysis of the AUVs for Russian exports of silicon metal in 2007 (in the case of the first review) and 2013 (in the case of the second review), the Commission concluded in each review that, if the order were revoked, subject producers in Russia would likely sell subject imports at prices lower

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industry is large both in absolute terms and relative to the Russian silicon metal industry. There are three ferrosilicon producers in Russia, with an approximate combined production capacity of *** short tons per year. CR/PR at I-20 n.43. The Russian silicon metal industry's capacity, by comparison, was *** short tons in 2018. CR/PR at Table IV-6.

Silicon metal from Russia is not currently subject to any antidumping or countervailing duty orders or proceedings in any markets other than the United States. CR/PR at IV-18.

[163] Original Determination, USITC Pub. 3584 at 11–12.

[164] Original Determination, USITC Pub. 3584 at 12.

[165] Original Determination, USITC Pub. 3584 at 12.

[166] Original Determination, USITC Pub. 3584 at 12–13.

[167] Original Determination, USITC Pub. 3584 at 14.

[168] Original Determination, USITC Pub. 3584 at 14.

[169] Original Determination, USITC Pub. 3584 at 14–15.

[170] First Review Determination, USITC Pub. 4018 at 13; Second Review Determination, USITC Pub. 4471 at 19.

than the domestic like product and nonsubject imports.[171] The Commission observed in both reviews that the AUVs for Russian exports were significantly lower than the prevailing AUVs for the domestic industry's U.S. shipments, as well as the AUVs for U.S. imports of nonsubject imports.[172] Because subject imports and the domestic like product were highly substitutable and competed largely on the basis of price, the Commission found it likely in both prior reviews that the Russian producers would price aggressively in order to gain market share in the United States, and would be likely to undersell the domestic like product to a significant degree if the order were revoked.[173] The Commission further concluded that subject imports would likely have significant depressing or suppressing effects on prices for the domestic like product.[174] In reaching this conclusion, the Commission in each review noted the high degree of interchangeability between subject imports and the domestic like product, and the importance of price in purchasing decisions.[175]

2. The Current Review

As previously discussed, we find that there is a high degree of substitutability between domestically produced silicon metal and subject merchandise, and that price is an important factor in purchasing decisions for silicon metal. Due to the absence of subject imports from the U.S. market during the period of review, the record does not contain any price comparison data for subject imports and domestically produced silicon metal in the U.S. market for this review.[176] In light of our prior findings that a significant volume of subject Imports is likely upon revocation, that domestically produced silicon metal and subject merchandise are highly substitutable, and that price is important to purchasing decisions, we find that Russian exporters are likely to significantly undersell the domestic like product in the event of revocation in order to increase their sales and gain market share, as they did during the original

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[171] First Review Determination, USITC Pub. 4018 at 13; Second Review Determination, USITC Pub. 4471 at 19–20.

[172] First Review Determination, USITC Pub. 4018 at 13; Second Review Determination, USITC Pub. 4471 at 20.

[173] First Review Determination, USITC Pub. 4018 at 13–14; Second Review Determination, USITC Pub. 4471 at 20.

[174] First Review Determination, USITC Pub. 4018 at 14; Second Review Determination, USITC Pub. 4471 at 20.

[175] First Review Determination, USITC Pub. 4018 at 14; Second Review Determination, USITC Pub. 4471 at 20.

[176] The record does contain pricing data for domestically produced silicon metal. Domestic prices for Product 1 (primary aluminum grade) and Product 3 (chemical and polysilicon grade) were, respectively, *** percent and *** percent *** in the third quarter of 2019 than in the first quarter of 2016. Prices for Product 2 (secondary aluminum grade) were *** percent *** over this period. CR/PR at Table V-4.

Globe in its Prehearing Brief compared ***. Globe's Prehearing Brief at 24–25. Rusal has contested the probative value of these comparisons in assessing likely price effects. *See* Rusal's Posthearing Brief at 8–11. We have not relied on these comparisons in our likely price effects analysis.

period of investigation. Moreover, the AUVs of Rusal's exports were lower than both the AUVs of the domestic industry's U.S shipments and the AUVs of U.S. imports from all sources throughout the period of review ***, even including transportation costs from Russia to the United States.[177] This suggests that if the order were revoked and Rusal resumed exports to the United States that it would be in a position to undersell domestic product and nonsubject imports while still taking advantage of the generally higher prices in the U.S. market relative to other markets. This provides further support for our finding that the significant underselling by subject imports observed during the original investigation would likely recur upon revocation.

Thus, we find that, if the antidumping duty order were revoked, importers of subject merchandise would attempt to gain market share by offering prices lower than those for the domestic like product, as they did during the original investigation. In the face of increasing volumes of subject merchandise being offered at low prices, the domestic industry would, in order to retain sales, be forced to cut prices and/or refrain from price increases when its costs increase. Consequently, the likely increasing volumes of subject imports of silicon metal are likely to have a significant depressing or suppressing effects on prices for the domestic like product.

We find unpersuasive Rusal's argument that subject imports would be of a product that does not compete on the basis of price with the silicon metal products sold by U.S. producers, and therefore would be unlikely to have price effects.[178] Rusal's argument cannot be reconciled with information in the record indicating that its exports during the period of review consisted mainly of ***,[179] that its exports to the United States in the event of revocation would likewise likely consist of this grade,[180] and that ***.[181] Were the order revoked, Rusal's product would compete on the basis of price with those sold by the domestic industry. Moreover, the record further indicates that U.S. prices for all grades continue to be derived to a significant extent from the price of secondary aluminum grade silicon metal.[182] Thus, the subject imports that are likely to enter the U.S. market in the event of revocation would likely

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[177] Compare CR/PR Tables III-7, IV-I, and IV-6. As explained above, the AUVs of Rusal's exports were lower than AUVs of U.S. imports of silicon metal even taking into account transportation costs from Russia to the United States, and U.S. prices are generally higher than other markets. *See supra* Section III.C.1.

[178] Rusal's Prehearing Brief at 27–32; Rusal's Posthearing Brief at 8.

[179] Rusal's Prehearing Brief at Exhibit 6; Rusal's Answers to First Set of Hearing Questions at 9.

[180] Rusal's Posthearing Brief at 11.

[181] CR/PR at Tables II-1 and V-3. In addition, Rusal exports ***. *See* Rusal's Answers to First Set of Hearing Questions at 9. U.S. producers also sell this grade in significant amounts. Thus, if the orders were revoked, Rusal would be in a position to export to the United States the same grade of silicon metal that it asserts is the focus of domestic production in the United States.

[182] Written Testimony of Marlin J. Perkins at 3 (March 30, 2020) (testifying that publications such as CRU Monitor and Platts Metals Week publish prices based on spot sales of secondary aluminum grade silicon metal that buyers and sellers across all market segments use as benchmarks); Globe's Prehearing Brief at Exhibit 3 (*** responding purchasers indicating that prices were "always" or "usually" based on published prices, with an additional four reporting "sometimes").

have price effects on all grades of silicon metal sold by the domestic industry, not just in the secondary aluminum segment.[183]

For the foregoing reasons, we find that, if the order is revoked, there is likely to be significant underselling by subject imports as compared to the domestic like product, and that these imports are likely to enter the United States at prices that would have significant depressing or suppressing effect on the price of the domestic like product.[184]

E. Likely Impact

1. The Prior Proceedings

In its original determination, the Commission found that, as subject import volume increased, particularly from 2000 to 2001, at prices that undersold and depressed U.S. prices, subject imports had a significant impact on the domestic industry.[185] The domestic industry suffered declines in prices, sales volume, and most performance and financial indicators.[186] The deterioration in the industry's condition was evidenced by its loss of market share due to decreasing U.S. shipments, which fell by 24.7 percent from 1999 to 2001, and was 29.7 percent lower in interim 2002 than interim 2001.[187]

Reduced sales led domestic producers to shut down facilities and reduce capacity.[188] Most of the closures took place in 2001, which was the same year in which subject imports registered a 38.6 percent increase in volume.[189] The Commission found that as domestic production capacity declined, so did capacity utilization.[190] The increasing ratio of the domestic

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[183] Subject imports' likely price effects are confirmed by purchaser reporting that revocation would lead to lower U.S. prices. *See* ***; ***; and ***.

[184] We reject Rusal's argument that no likely price effects should be found in this review because the likely subject import volumes will be smaller than the volumes of silicon metal imports that were at issue in the Four Country Investigation, in which the Commission did not find significant price effects. *See* Rusal's Prehearing Brief at 28–29. The Commission nowhere found in the Four Country Investigation that the volumes of the subject imports were too small to have significant price effects. Instead, the Commission's price effects finding was premised on a mixed pattern of overselling and underselling, and the fact that price movements for the domestic like product correlated more closely with intra-industry competition than with subject import volumes. *See* Four Country Investigation, USITC. Pub. 4473 at 24–28. Moreover, the Federal Circuit has stressed that "each antidumping duty investigation is *sui generis*, involving a unique combination and interaction of many economic variables." *Hitachi Metals, Ltd. v. United States*, 949 F.3d 710, 718 (Fed. Cir. 2020) (quoting *Nucor Corp. v. United States*, 414 F.3d 1331, 1340 (Fed. Cir. 2005)). Thus, even if the Commission had made such a finding in those investigations, it would not necessarily be of probative value in this review.

[185] Original Determination, USITC Pub. 3584 at 17.

[186] Original Determination, USITC Pub. 3584 at 17.

[187] Original Determination, USITC Pub. 3584 at 17.

[188] Original Determination, USITC Pub. 3584 at 17.

[189] Original Determination, USITC Pub. 3584 at 17–18.

[190] Original Determination, USITC Pub. 3584 at 18.

industry's cost of goods sold to net sales put the industry in a cost-price squeeze.[191] Decreasing sales and increasing costs adversely affected most major financial indicators.[192] The domestic industry's operating income and operating margin declined throughout the period of investigation, with the industry registering a loss in 2001 when subject imports reached their highest volume.[193] Due to decreased cash flow, the domestic industry's capital expenditures also decreased.[194] As a result of the significant volume of subject imports and their adverse effect on domestic prices, the Commission found that low-priced subject imports had a significant impact on the domestic industry.[195]

The Commission also found that subject imports gained more market share than nonsubject imports from 1999 to 2001, and that the industry's loss in market share during that period was attributable to the subject imports.[196] The Commission stated that the fact that nonsubject imports may have contributed to the domestic industry's continued deterioration toward the end of the period of investigation, along with subject imports, did not negate its finding that subject imports had a material adverse impact on the domestic industry.[197]

In the expedited first five-year review, the Commission found that revocation of the antidumping duty order would likely lead to significant increases in the volume of subject imports.[198] Given the likely significant underselling by the subject imports, the significant increase in subject imports would be likely to cause a significant decrease in the volume of domestic producers' shipments, as well as significant negative price effects.[199] The Commission did not find that the domestic industry was vulnerable, but did find that the volume and price effects of the subject imports would have a significant negative impact on the domestic industry and would likely cause the domestic industry to lose market share.[200] In addition, the

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[191] Original Determination, USITC Pub. 3584 at 18.

[192] Original Determination, USITC Pub. 3584 at 18.

[193] Original Determination, USITC Pub. 3584 at 18.

[194] Original Determination, USITC Pub. 3584 at 18.

[195] Original Determination, USITC Pub. 3584 at 18. As previously discussed, the Commission's causation analysis in its original determination was remanded pursuant to the Federal Circuit's decision in *Bratsk Aluminum Smelter*. On second remand, the Commission applied the replacement/benefit analysis directed by the Federal Circuit's decision. The Commission did not contest what it characterized as the Federal Circuit's "apparent assumption" that the triggering factors were satisfied. Second Remand Determination, USITC Pub. 3910 at 10. It found the evidence mixed as to whether and to what extent nonsubject imports would have replaced subject imports. Second Remand Determination, USITC Pub. 3910 at 10-12. It found that the record demonstrated that nonsubject imports consistently oversold the subject imports. Consequently, even if nonsubject imports would have replaced some of the subject imports, the domestic industry would nonetheless have derived a price benefit. Accordingly, the Commission found that application of the replacement/benefit analysis supported an affirmative determination. Second Remand Determination, USITC Pub. 3910 at 12–15.

[196] Original Determination, USITC Pub. 3584 at 19.

[197] Original Determination, USITC Pub. 3584 at 19.

[198] First Review Determination, USITC Pub. 4018 at 15.

[199] First Review Determination, USITC Pub. 4018 at 15.

[200] First Review Determination, USITC Pub. 4018 at 15.

Commission found that the decreases in volumes and prices would likely have a significant adverse impact on the production, shipments, sales, and revenues of the domestic industry.[201] It found that these reductions in the industry's production, sales, and revenues would have had a direct adverse impact on the industry's profitability, as well as its ability to raise capital and make and maintain necessary capital investments, and would have resulted in decreases in employment for the industry.[202] Therefore, the Commission concluded that revocation of the antidumping duty order on silicon metal from Russia likely would have a significant impact on the domestic industry within a reasonably foreseeable time.[203]

In the full second five-year review, the Commission found that the domestic industry was not in a vulnerable position, observing that the industry's output, employment and market share had increased from 2008 to 2013, and that the industry overall had a profitable performance over the period of review.[204] Nevertheless, the Commission found that, should the antidumping duty order be revoked, the domestic industry would respond to the likely significant volume of low-priced subject imports either by forgoing sales and ceding market share or by reducing prices or foregoing price increases to maintain market share.[205] The resulting loss of production or revenues would cause the industry's financial performance to deteriorate, which would likely result in losses of employment and decreasing investment.[206]

In its analysis of factors other than subject imports, the Commission noted that nonsubject imports held an appreciable but decreasing share of the market over the period of review, when the domestic industry was profitable and its trade and employment indicators improved.[207] Moreover, given the high substitutability of silicon metal from different sources, and the fact that the domestic industry was the largest supplier to the U.S. market, the Commission found that any increase in subject import market share would likely come, at least in substantial proportion, at the expense of the domestic industry.[208]

Accordingly, the Commission concluded that subject imports likely would have a significant impact on the domestic industry within a reasonably foreseeable time if the antidumping duty order were revoked.[209]

2. The Current Review

In this third five-year review, most of the domestic industry's trade and employment indicators improved from 2016 to 2018, but were lower in interim 2019 than in interim 2018.

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[201] First Review Determination, USITC Pub. 4018 at 15.
[202] First Review Determination, USITC Pub. 4018 at 15.
[203] First Review Determination, USITC Pub. 4018 at 16.
[204] Second Review Determination, USITC Pub. 4471 at 24.
[205] Second Review Determination, USITC Pub. 4471 at 24.
[206] Second Review Determination, USITC Pub. 4471 at 24.
[207] Second Review Determination, USITC Pub. 4471 at 25.
[208] Second Review Determination, USITC Pub. 4471 at 25.
[209] Second Review Determination, USITC Pub. 4471 at 25.

The domestic industry's financial indicators also trended downward sharply in interim 2019 and exhibited weakness throughout the review period.

The domestic industry's capacity and production increased overall from 2016 to 2018, but each was lower in interim 2019 than interim 2018.[210] Its capacity utilization increased from 2016 to 2018, and was higher in interim 2019 than in interim 2018.[211] Its U.S. shipments and market share increased overall from 2016 to 2018, but each was lower in interim 2019 than in interim 2018.[212] The domestic industry's market share in interim 2019 was lower than its market share in 2016.[213] Its inventories increased from 2016 to 2018, but were lower in interim 2019 than interim 2018.[214]

The number of production related workers, hours worked, and wages paid increased from 2016 to 2018, but each was lower in interim 2019 than interim 2018.[215] By contrast, productivity declined overall from 2016 to 2018, and was higher in interim 2019 than in interim 2018.[216]

The domestic industry's financial indicators improved overall from 2016 to 2018, although even in its peak years the industry was only modestly profitable. These indicators also deteriorated sharply in interim 2019 as compared to interim 2018. Net sales revenues

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[210] The domestic industry's capacity was 232,907 short tons in 2016, 216,413 short tons in 2017, and 233,699 short tons in 2018; it was 176,351 short tons in interim 2018 and 156,645 short tons in interim 2019. Its production was 173,594 short tons in 2016, 194,003 short tons in 2017, and 187,958 short tons in 2018; it was 139,770 short tons in interim 2018 and 109,804 short tons in interim 2019. CR/PR at Table III-5.

[211] The domestic industry's capacity utilization rate was 87.2 percent in 2016, 91.5 percent in 2017, and 89.6 percent in 2018; it was 87.4 percent in interim 2018 and 92.2 percent in interim 2019. CR/PR at Table III-5.

[212] U.S. shipments increased from 177,475 short tons in 2016 to 188,981 short tons in 2017, before decreasing to 185,493 short tons in 2018; they were 137,413 short tons in interim 2018 and 110,760 short tons in interim 2019. CR/PR at Table III-7. The domestic industry's share of apparent U.S. consumption increased from 51.6 percent in 2016 to 52.4 percent in 2017 to 58.3 percent in 2018; it was 57.6 percent in interim 2018 and 47.6 percent in interim 2019. CR/PR at Table I-9.

[213] CR/PR at Table I-9.

[214] Ending inventories were *** short tons in 2016, *** short tons in 2017, and *** short tons in 2018; they were *** short tons in interim 2018 and *** short tons in interim 2019. CR/PR at Table III-8.

[215] The number of production related workers was 605 in 2016, 664 in 2017, and 739 in 2018; it was 745 in interim 2018 and 562 in interim 2019. Total hours worked were 1.4 million in 2016, 1.4 million in 2017, and 1.6 million in 2018; they were 1.2 million in interim 2018 and 930,000 in interim 2019. Wages paid were $39.8 million in 2016, $41.0 million in 2017, and $46.2 million in 2018; they were $34.2 million in interim 2018 and $26.9 million in interim 2019. CR/PR at Table III-10.

[216] Productivity per thousand hours increased from 122.9 short tons in 2016 to 134.0 short tons in 2017, before declining to 115.2 short tons in 2018; it was 113.0 short tons in interim 2018 and higher, at 118.1 short tons, in interim 2019. CR/PR at Table III-10.

increased overall from 2016 to 2018, but were lower in interim 2019 than interim 2018.[217] The domestic industry's gross profit increased substantially from 2016 to 2018, before profit turned to loss in interim 2019.[218] The domestic industry went from an operating loss and net loss in 2016 and 2017 to reporting operating income and net income in 2018, but returned to an operating loss and net loss in interim 2019.[219] Operating margins followed the same trend.[220] Capital expenditures fell overall from 2016 to 2018, and were lower in interim 2019 than in interim 2018.[221]

Based on the foregoing, we find that the domestic industry is vulnerable to material injury if the order is revoked. The domestic industry experienced poor-to-mediocre financial performance during the period of review, including negative operating income during the period of review, and deteriorating performance in interim 2019. Moreover, each firm in the domestic industry reported *** during the period of review,[222] further indicating the vulnerable state of the domestic industry.[223]

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[217] Net sales revenues were $402.5 million in 2016, $425.7 million in 2016, and $489.7 million in 2018; they were $365.8 million in interim 2018 and $265.6 million in interim 2019. CR/PR at Tables III-11.

[218] Gross profit increased from $1.6 million in 2016 to $6.8 million in 2017 and to $47.4 million in 2018; the industry reported a gross profit of $36.1 million in interim 2018, and a gross loss of $48.4 million in interim 2019. CR/PR at Table III-11.

[219] The industry reported operating losses of $25.8 million and $18.5 million in 2016 and 2017, respectively, and operating income of $17.5 million in 2018. It reported operating income of $15.4 million in interim 2018, and an operating loss of $64.5 million in interim 2019. The industry reported net losses of $33.2 million and $25.1 million in 2016 and 2017, respectively, and net income of $11.0 million in 2018; it reported net income of $10.7 million in interim 2018, and a net loss of $70.5 million in interim 2019. CR/PR at Table III-11.

[220] The industry's operating income to net sales ratio was negative 6.4 percent in 2016, negative 4.3 percent in 2017, and 3.6 percent in 2018; it was 4.2 percent in interim 2018 and negative 24.3 percent in interim 2019. CR/PR at Table III-11.

[221] Capital expenditures were $*** in 2016, $*** in 2017, and $*** in 2018; they were $*** in interim 2018 and $*** in interim 2019. CR/PR at Table III-15. The domestic industry reported *** research and development expenses during the period of review. *Id*.

[222] Globe reported ***. CR/PR at Table III-2. DC Alabama recognized ***. CR/PR at III-29. Mississippi Silicon reported ***. CR/PR at Table III-2. All three firms ***. CR/PR at III-11.

[223] We reject Rusal's claim that the domestic industry is not vulnerable because its overall financial performance has strengthened relative to the period examined by the Commission in the Four Country Investigation, in which the Commission found that subject imports did not have a significant impact on the domestic industry. That the Commission made a negative impact finding in those investigations does not mean that the Commission considered the domestic industry to be in a robust state. To the contrary, the Commission acknowledged in those investigations that the domestic industry experienced declines in financial performance, but found that these were not a result of the subject imports. *See* Four Country Investigation, USITC Pub. 4773 at 31, 36.

Wacker suggests that the domestic industry's condition in interim 2019 is insufficient to establish vulnerability, as this is only a short interval out of the entire period of review. Wacker's

As addressed above, we have found that revocation of the order would likely result in a significant increase in the volume of low-priced subject imports that would have significant price effects on the domestic industry. This volume of low-priced subject imports would likely have an adverse impact on the production, shipments, sales, market share, and revenues of the domestic industry. These reductions would likely have a direct adverse impact on the industry's profitability and employment, as well as its ability to raise capital and make and maintain necessary capital investments. We therefore conclude that, if the order were revoked, subject imports from Russia would be likely to have a significant impact on the domestic industry within a reasonably foreseeable time.[224]

We have also considered the role of nonsubject imports in the U.S. market. Nonsubject imports had a substantial presence in the U.S. market during the period of review, and their market share, which decreased during the period, rebounded in interim 2019 to a level in excess of its starting point in 2016.[225] There is no indication on this record that the presence of nonsubject imports would prevent low-priced subject imports from Russia from significantly increasing their presence in the U.S. market in the event of revocation of the order, given the export orientation of the subject industry and the relative attractiveness of the U.S. market. Given the high degree of substitutability between the subject imports and the domestic like product, the likely increase in subject imports upon revocation would likely take significant market share from the domestic industry, or otherwise cause significant price effects, despite the presence of large quantities of nonsubject imports in the U.S. market. Therefore, the subject imports are likely to have adverse effects on the domestic industry, distinct from any adverse effects that nonsubject imports may have on the domestic industry, in the event of revocation.

Posthearing Brief at 9. As indicated above, our vulnerability finding is not based exclusively on data from interim 2019. Moreover, interim 2019 constitutes 20 percent of the entire period for which we collected data, and the domestic industry's condition in this period represents the most up-to-date information available in this review as to its current state.

[224] We are unpersuaded by Rusal's argument that, because U.S. demand exceeds the capacity of the domestic industry, subject imports would only take sales that the domestic industry could not supply. The record does not provide any indication that subject imports would be more likely to take sales from nonsubject imports than from domestically produced silicon metal. As discussed, both the domestic industry and the Russian industry ***. *See* Tables II-1 and V-3. Thus, whatever grade of subject merchandise Rusal ships to the United States in the event of revocation will have the potential to take sales or market share from – and therefore adversely impact – the domestic industry. Moreover, given the price interrelationship among products, significant volumes of low-priced subject imports of any grade will create price effects for all grades of the domestic like product, thereby adversely impacting the domestic industry.

[225] The volume of nonsubject imports was 166,673 short tons in 2016, 171,511 short tons in 2017, and 132,640 short tons in 2018; it was 101,088 short tons in interim 2018, and 122,036 short tons in interim 2019. Nonsubject imports' share of apparent U.S. consumption declined from 48.4 percent in 2016 to 47.6 percent in 2017 and 41.7 percent in 2018; it was 42.4 percent in interim 2018 and higher, at 52.4 percent, in interim 2019. CR/PR at Tables I-8 and I-9.

Accordingly, we find that revocation of the antidumping duty order on silicon metal from Russia would likely have a significant impact on the domestic industry.

IV. Conclusion

For the above-stated reasons, we determine 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.

Part I: Introduction

Background

On June 3, 2019, the U.S. International Trade Commission ("Commission" or "USITC") gave notice, pursuant to section 751(c) of the Tariff Act of 1930, as amended ("the Act"),[1] that it had instituted a review to determine whether revocation of the antidumping duty order on silicon metal from Russia would likely lead to the continuation or recurrence of material injury to a domestic industry.[2] [3] On September 23, 2019, the Commission determined that it would conduct a full review pursuant to section 751(c)(5) of the Act. [4] The following tabulation presents information relating to the background and schedule of this proceeding:[5]

[1] 19 U.S.C. 1675(c).

[2] *Silicon Metal from Russia; Institution of a Five-Year Review*, 84 FR 25561, June 3, 2019. All interested parties were requested to respond to this notice by submitting the information requested by the Commission.

[3] In accordance with section 751(c) of the Act, the U.S. Department of Commerce ("Commerce") published a notice of initiation of five-year review of the subject antidumping duty order on the following day with the Commission's notice of institution. *Initiation of Five-Year (Sunset) Reviews*, 84 FR 25741, June 3, 2019.

[4] *Silicon Metal from Russia; Notice of Commission Determination to Conduct a Full Five-Year Review,* 84 FR 49763, September 23, 2019. The Commission found that both the domestic and respondent interested party group responses to its notice of institution (84 FR 25561, June 3, 2019) were adequate.

[5] The Commission's notice of institution, notice to conduct full reviews, scheduling notice, and statement on adequacy are referenced in appendix A and may also be found at the Commission's web site (internet address *www.usitc.gov*). Commissioners' votes on whether to conduct expedited or full review may also be found at the web site. Appendix B presents the witnesses participating in the Commission's hearing.

Effective date	Action
February 11, 2003	Commerce's notice of final determination of sales at less than fair value: silicon metal from Russia (68 FR 6885)
March 13, 2003	Commerce's notice of final determination of sales at less than fair value: silicon metal from Russia (amended) (68 FR 12037)
March 26,2003	Commerce's antidumping order on silicon metal from Russia (68 FR 14578)
June 3, 2019	Commission's institution of five-year review (84 FR 25561)
June 4, 2019	Commerce's initiation of five-year review (84 FR 25741)
September 23, 2019	Commission's determinations to conduct full five-year review (84 FR 49763)
October 10, 2019	Commerce's final results of expedited five-year review of the antidumping duty order (84 FR 54594)
December 10, 2019	Commission's scheduling of the review (84 FR 67475)
March 31, 2020	Commission's hearing (March 31 – April 9, 2020)
May 8, 2020	Commission's vote
May 28, 2020	Commission's determination and views

The original investigation

The original investigation resulted from a petition filed on March 7, 2002 with Commerce and the Commission by the following petitioners: Globe Metallurgical Inc. ("Globe"), Cleveland, Ohio; SIMCALA, Inc. ("SIMCALA"), Mt. Meigs, Alabama; 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, Alabama; the Paper, Allied-Industrial Chemical and Energy Workers International Union (Local 5-89), Boomer, West Virginia; and the United Steel Workers of America (AFL-CIO, Local 9436), Niagara Falls, New York.[6] On February 11, 2003, Commerce determined that imports of silicon metal from Russia were being sold at less than fair value ("LTFV").[7] The Commission determined on March 19, 2003 that the domestic industry was materially injured by reason of LTFV imports of silicon metal from Russia.[8] After receipt of the Commission's final determination, Commerce issued an antidumping duty order on imports of silicon metal from Russia with final weighted-average dumping margins ranging from 56.11 to 79.42.[9]

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[6] *Silicon Metal from Russia;* Investigation *No. 731-TA-991 (Final)*, USITC Publication 3584, March 2003, p. I-1.

[7] *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, 68 FR 12037, March 13, 2003).

[8] *Silicon Metal From Russia,* 68 FR 14260, March 24, 2003.

[9] *Antidumping Duty Order: Silicon Metal From Russia,* 68 FR 14578, March 26, 2003.

Commission remand proceedings

Respondents Bratsk Aluminum Smelter and Rusal Trade Limited appealed the Commission's determination to the U.S. Court of International Trade ("CIT"), which remanded the case to the Commission for further explanation.[10] On September 15, 2004, the Commission filed its affirmative remand determination with the CIT and on December 3, 2004, the CIT affirmed the Commission's remand determination.[11] Plaintiffs appealed the CIT's judgment to the U.S. Court of Appeals for the Federal Circuit ("Federal Circuit"), which vacated and remanded the CIT's decision. A divided panel held that the Commission's determination was not in accordance with law because, in the Court's view, the Commission had not considered whether, for the commodity product at issue, price-competitive nonsubject imports would have replaced the subject imports without any beneficial effect on domestic producers. Therefore, the Commission had not established that any material injury was "by reason of" subject imports.[12]

On remand, the Commission, after conducting a "replacement/benefit" analysis, determined that an industry in the United States was materially injured be reason of imports of silicon metal from Russia that Commerce found to be sold at less than fair value.[13] On January 15, 2008, the CIT issued an opinion affirming the Commission's affirmative remand determination. This decision was not appealed to the Federal Circuit.[14]

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[10] The CIT ordered the Commission: (1) to explain its reasons for accepting evidence that "spot" prices may affect contract prices while rejecting contradictory evidence; (2) to explain the significance or effect the similar pricing trends of different market segments; and (3) to change its determination accordingly if it could not provide sufficient reasons or explanations. Bratsk Aluminum Smelter v. United States, 28 CIT 955, 968 (2004).

[11] Bratsk Aluminum Smelter v. United States, 28 CIT 2043 (2004).

[12] Bratsk Aluminum Smelter v. United States, 444 F.3d 1369, 1373 (Fed. Cir. 2006).

[13] *Silicon Metal from Russia Inv. No. 731-TA-991 (Final) (Second Remand)*, USITC Publication 3910, March 2007, at 1 and I-1 ("Remand Determination").

[14] Bratsk Aluminum Smelter v. United States, Slip Op. 08-06, Consol. Court No. 03-00200 (Ct. Int'l Trade January 15, 2008).

The first five-year review

On May 6, 2008, the Commission determined that it would conduct an expedited first five-year review of the subject order.[15] On May 30, 2008, Commerce published its determination that revocation of the antidumping duty order on silicon metal from Russia would be likely to lead to continuation or recurrence of dumping.[16] On June 30, 2008, the Commission 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 reasonable foreseeable time.[17] Following the affirmative determinations in the five-year reviews by Commerce and the Commission, effective July 16, 2008, Commerce issued a continuation of the antidumping duty order on imports of silicon metal from Russia.[18]

The second five-year review

On September 6, 2013, the Commission determined that it would conduct a full review of the antidumping duty order on silicon metal from Russia.[19] On October 3, 2013, Commerce published the final results of its expedited second review and its determination that revocation of the antidumping duty order on silicon metal from Russia would be likely to lead to continuation or recurrence of dumping.[20] On June 12, 2014, the Commission notified Commerce of its determination that material injury would be likely to continue or recur within a reasonably foreseeable time if the antidumping duty order on silicon metal from Russia were to be revolved.[21] Following the affirmative determinations in the five-year reviews by Commerce and the Commission, effective July 2, 2014, Commerce issued a continuation of the antidumping duty order on imports of silicon metal from Russia.[22]

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[15] *Silicon Metal From Russia,* 73 FR 28153, May 15, 2008.

[16] *Silicon Metal From the Russian Federation: Final Results of Expedited Sunset Review of Antidumping Duty Order*, 73 FR 31064, May 30, 2008.

[17] *Silicon Metal From Russia*, 73 FR 38467, July 7, 2008.

[18] *Silicon Metal from The Russian Federation: Continuation of Antidumping Duty Order*, 73 FR 40848, July 16, 2008.

[19] *Silicon Metal From Russia; Notice of Commission Determination To Conduct a Full Five-year Review*, 78 FR 61384, October 3, 2013.

[20] *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.

[21] *Silicon Metal From Russia:* 79 FR 34551, June 17, 2014.

[22] *Silicon Metal From the Russian Federation: Continuation of Antidumping Duty Order,* 79 FR 37718, July 2, 2014.

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.

Table I-1
Silicon metal: Previous and related investigations

Year petition filed	Inv. number	Country	USITC publication	Current status
1990	731-TA-470	Argentina[1]	3385	Commerce revoked effective 1/1/2000 (66 FR 10669, 2/16/2001)
1990	731-TA-471	Brazil[1]	3892	Commerce revoked effective 2/16/06 (71 FR 76635, 12/21/2006)
1990	731-TA-472	China	3892	Continuation of order effective 5/25/2018 (83 FR 25644, 6/4/2018)
2004	701-TA-441	Brazil	N/A	Petitions withdrawn on 4/16/2004 (69 FR 23213, 4/28/2004)
2004	731-TA-1081	South Africa	N/A	Petitions withdrawn on 4/16/2004 (69 FR 23213, 4/28/2004)
2017	731-TA-1343 and 701-TA-567	Australia[2]	4773	Negative ITC determinations
2017	731-TA-1344 and 701-TA-568	Brazil[2]	4773	Negative ITC determinations
2017	701-TA-569	Kazakhstan[2]	4773	Negative ITC determinations
2017	731-TA-1345	Norway[2]	4773	Negative ITC determinations

[1] Petitions were filed concurrently with the petition related to silicon metal from China (731-TA-472, order continued in 2018).

[2] Commerce made its final determinations on March 8, 2018, and the Commission made its final negative determinations on April 10, 2018.

Source: *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway,* Inv. Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final), USITC Publication 4773, April 2018; *Silicon Metal From Russia, Investigation No. 731-TA-991 (Second Review)*, USITC Publication 4471, June 2014; and cited FR notices.

Summary data

Tables I-2 and I-3 present a summary of data from the original investigation, the expedited first five-year review, the second full five-year review, and the current full five-year review. U.S. consumption by quantity has increased by 14.4 percent since the final full year of the original investigation, while U.S. consumption by value has increased by 148.5 percent. The U.S. producers' share of apparent U.S. consumption in terms of quantity is 3.7 percentage points higher while U.S. producers' share in terms of value is 0.2 percentage points higher since the final year of the original investigation. U.S. industry capacity quantity has increased by 7.4 percent during this timeframe, while U.S. industry production quantity has increased by 29.3 percent. Overall imports by quantity have increased by 4.9 percent, imports by value have increased by 147.2 percent, and import unit values have increased by 135.7 percent since the final year of the original investigation.

Table I-2
Silicon metal: Comparative data from the original investigation and subsequent reviews, 2001, 2007, 2013, and 2018

Item	Original investigation 2001	First review 2007	Second review 2013	Third review 2018
	Quantity (short tons contained silicon)			
U.S. consumption quantity	278,197	***	***	318,133
	Share of quantity (percent)			
Share of U.S. consumption:				
U.S. producers' share	54.6	***	***	58.3
U.S. importers' share:				
Russia	12.3	***	***	---
Nonsubject sources	33.2	***	***	41.7
All import sources	45.4	***	***	41.7
	Value (1,000 dollars)			
U.S. consumption	335,989	***	***	834,967
	Share of value (percent)			
Share of U.S. consumption:				
U.S. producers' share	58.4	***	***	58.6
U.S. importers' share:				
Russia	10.5	***	***	---
Nonsubject sources	31.1	***	***	41.4
All import sources	41.6	***	***	41.4
	Quantity (short tons contained silicon); Value (1,000 dollars); and Unit Value (dollars per short ton contained silicon)			
U.S. imports.--				
Russia				
Quantity	34,153	---	---	---
Value	35,325	---	---	---
Unit value	1,034	---	---	---
Nonsubject sources:				
Quantity	92,279	159,097	126,540	132,640
Value	104,420	286,171	328,991	345,434
Unit value	1,132	1,799	2,600	2,604
All import sources:				
Quantity	126,431	159,097	126,540	132,640
Value	139,745	286,171	328,991	345,434
Unit value	1,105	1,799	2,600	2,604

Table continued on next page.

Table I-2—Continued
Silicon metal: Comparative data from the original investigation and subsequent reviews, 2001, 2007, 2013, and 2018

Item	Original investigation	First review	Second review	Third review
	2001	2007	2013	2018
	Quantity (short tons contained silicon); Value (1,000 dollars); and Unit Value (dollars per short ton contained silicon)			
U.S. industry:				
Capacity (quantity)	198,363	***	***	213,088
Production (quantity)	145,324	***	***	187,958
Capacity utilization (percent)	73.3	***	***	88.2
U.S. shipments:				
Quantity	151,766	***	***	185,493
Value	196,244	***	***	489,533
Unit value	$1,293	***	***	$2,639
Ending inventory	2,306	NA	***	***
Inventories/total shipments	***	NA	***	***
Production workers	523	NA	***	739
Hours worked (1,000)	1,210	NA	***	1,632
Wages paid (1,000 dollars)	23,675	NA	***	46,193
Hourly wages	$19.57	NA	***	$28.30
Productivity (short tons contained silicon per 1,000 hours)	120.1	NA	***	115.2
Financial data:				
Net sales:				
Quantity	169,520	NA	***	185,575
Value	219,034	NA	***	489,700
Unit value	$1,292	NA	***	$2,639
Cost of goods sold	214,672	NA	***	442,261
Gross profit or (loss)	4,362	NA	***	47,439
SG&A expense	14,703	NA	***	29,933
Operating income or (loss)	(10,341)	NA	***	17,506
Unit COGS	$1,266	NA	***	$2,383
Unit operating income	$(61.00)	NA	***	$94.33
COGS/ Sales (percent)	98.0	NA	***	90.3
Operating income or (loss)/ Sales (percent)	(4.7)	NA	***	3.6

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

Source: Office of Investigations memorandum INV-AA-017 (February 24, 2003), memorandum INV-FF-063 (June 2, 2008), memorandum INV-MM-046 (May 15, 2014), official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019, and compiled from data submitted in response to Commission questionnaires.

Table I-3
Silicon metal: U.S. producers' U.S. shipments and U.S. importers' U.S. imports, 2014-18

Item	Calendar year				
	2014	2015	2016	2017	2018
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	177,475	188,981	185,493
U.S. imports from.--					
Russia	---	---	---	---	---
Nonsubject sources	211,560	179,867	166,673	171,511	132,640
All import sources	211,560	179,867	166,673	171,511	132,640
Apparent U.S. consumption	***	***	344,148	360,492	318,133
	Value (1,000 dollars)				
U.S. producers' U.S. shipments	***	***	400,866	425,621	489,533
U.S. imports from.--					
Russia	---	---	---	---	---
Nonsubject sources	553,210	480,248	367,470	370,748	345,434
All import sources	553,210	480,248	367,470	370,748	345,434
Apparent U.S. consumption	***	***	768,336	796,369	834,967
	Share of quantity (percent)				
U.S. producers' U.S. shipments	***	***	51.6	52.4	58.3
U.S. imports from.--					
Russia	***	***	---	---	---
Nonsubject sources	***	***	48.4	47.6	41.7
All import sources	***	***	48.4	47.6	41.7
Apparent U.S. consumption	100.0	100.0	100.0	100.0	100.0
	Share of value (percent)				
U.S. producers' U.S. shipments	***	***	52.2	53.4	58.6
U.S. imports from.--					
Russia	***	***	---	---	---
Nonsubject sources	***	***	47.8	46.6	41.4
All import sources	***	***	47.8	46.6	41.4
Apparent U.S. consumption	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 and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Statutory criteria

Section 751(c) of the Act requires Commerce and the Commission to conduct a review no later than five years after the issuance of an antidumping or countervailing duty order or the suspension of an investigation to determine whether revocation of the order or termination of the suspended investigation "would be likely to lead to continuation or recurrence of dumping or a countervailable subsidy (as the case may be) and of material injury."

Section 752(a) of the Act provides that in making its determination of likelihood of continuation or recurrence of material injury--

> *(1) IN GENERAL.-- . . . the Commission shall determine whether revocation of an order, or termination of a suspended investigation, would be likely to lead to continuation or recurrence of material injury within a reasonably foreseeable time. The Commission shall consider the likely volume, price effect, and impact of imports of the subject merchandise on the industry if the order is revoked or the suspended investigation is terminated. The Commission shall take into account--*
>
> *(A) its prior injury determinations, including the volume, price effect, and impact of imports of the subject merchandise on the industry before the order was issued or the suspension agreement was accepted,*
>
> *(B) whether any improvement in the state of the industry is related to the order or the suspension agreement,*
>
> *(C) whether the industry is vulnerable to material injury if the order is revoked or the suspension agreement is terminated, and*
>
> *(D) in an antidumping proceeding . . ., (Commerce's findings) regarding duty absorption . . ..*
>
> *(2) VOLUME.--In evaluating the likely volume of imports of the subject merchandise if the order is revoked or the suspended investigation is terminated, the Commission shall consider whether the likely volume of imports of the subject merchandise would be significant if the order is revoked or the suspended investigation is terminated, either in absolute terms or relative to production or consumption in the United States. In so doing, the Commission shall consider all relevant economic factors, including--*
>
> *(A) any likely increase in production capacity or existing unused production capacity in the exporting country,*
>
> *(B) existing inventories of the subject merchandise, or likely increases in inventories,*
>
> *(C) the existence of barriers to the importation of such merchandise into countries other than the United States, and*
>
> *(D) 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.*

(3) PRICE.--In evaluating the likely price effects of imports of the subject merchandise if the order is revoked or the suspended investigation is terminated, the Commission shall consider whether--

> *(A) there is likely to be significant price underselling by imports of the subject merchandise as compared to domestic like products, and*
> *(B) imports of the subject merchandise are likely to enter the United States at prices that otherwise would have a significant depressing or suppressing effect on the price of domestic like products.*

(4) IMPACT ON THE INDUSTRY.--In evaluating the likely impact of imports of the subject merchandise on the industry if the order is revoked or the suspended investigation is terminated, the Commission shall consider all relevant economic factors which are likely to have a bearing on the state of the industry in the United States, including, but not limited to–

> *(A) likely declines in output, sales, market share, profits, productivity, return on investments, and utilization of capacity,*
> *(B) likely negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment, and*
> *(C) likely negative effects on the existing development and production efforts of the industry, including efforts to develop a derivative or more advanced version of the domestic like product.*

The Commission shall evaluate all such relevant economic factors . . . within the context of the business cycle and the conditions of competition that are distinctive to the affected industry.

Section 752(a)(6) of the Act states further that in making its determination, "the Commission may consider the magnitude of the margin of dumping or the magnitude of the net countervailable subsidy. If a countervailable subsidy is involved, the Commission shall consider information regarding the nature of the countervailable subsidy and whether the subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement."

Organization of report

Information obtained during the course of the review that relates to the statutory criteria is presented throughout this report. A summary of current and historic trade and financial data for silicon metal as collected in the review is presented in appendix C. U.S. industry data are based on the questionnaire responses of three U.S. producers of silicon metal that are believed to have accounted for all of domestic production of silicon metal in 2018. U.S. import data and related information are based on Commerce's official import statistics and the questionnaire responses of 17 U.S. importers of silicon metal that are believed to have accounted for 81.4 percent of total U.S. imports during 2018. Information from U.S. purchasers is based on responses from 17 firms reporting purchases equivalent to 49.2 percent of apparent U.S. consumption in 2018. Foreign industry data and related information are based on the questionnaire response of the sole current Russian producer of silicon metal. Responses by U.S. producers, importers, purchasers, and foreign producers of silicon metal to a series of questions concerning the significance of the existing antidumping duty order and the likely effects of revocation of such orders are presented in appendix D.

Commerce's reviews

Administrative reviews

Commerce has not completed any administrative reviews with respect to the antidumping duty order on silicon metal from Russia, since the completion of the last five-year review. Moreover, Commerce has not completed any changed circumstances reviews, or issued anti-circumvention findings, any duty absorption findings or any company revocations or scope rulings since the imposition of the order.

Five-year reviews

Commerce has issued the final results of its expedited reviews with respect to the antidumping duty order on silicon metal from Russia. Table I-4 presents the dumping margins calculated by Commerce in its original investigation and subsequent reviews.

Table I-4
Silicon metal: Commerce's original dumping margins and subsequent review likely dumping margins for producers/exporters in Russia

Producer/exporter	Original margin (percent)	Amended	Antidumping duty order	First five-year review margin (percent)	Second five-year review margin (percent)	Third five-year review margin (percent)
Bratsk Aluminum Smelter	77.51	79.42	79.42	87.08	87.08	Up to 87.08
Zao Kremny / Sual Kremny-Ural Ltd	54.77	56.11	56.11	61.61	61.61	
Russia-wide / All other	77.51	N/A	79.42	79.42	79.42	

Note: In its final results for its third sunset review, Commerce did not provide entity-specific margins.

Source*: Antidumping Duty Order: Silicon Metal From Russia*, 68 FR 14578, March 26, 2003. *Notice of Amended Final Determination of Sales at Less Than Fair Value: Silicon Metal From the Russian Federation*, 68 FR 123037, March 13, 2003. *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 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 the Russian Federation*: *Final Results of Expedited Third Sunset Review of the Antidumping Duty Order*, 84 FR 54594, October 10, 2019.

The subject merchandise

Commerce's scope

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

> *silicon metal, which generally contains at least 96.00 percent but less than 99.99 percent silicon by weight. The merchandise covered by the Order also includes silicon metal from Russia containing between 89.00 and 96.00 percent silicon by weight, but containing more aluminum than the silicon metal which contains at least 96.00 percent but less than 99.99 percent silicon by weight. Silicon metal currently is classifiable under subheadings 2804.69.10 and 2804.69.50 of the Harmonized Tariff Schedule of the United States (HTSUS). The Order covers all silicon metal meeting the above specification, regardless of tariff classification.*[23]

Tariff treatment

Silicon is provided for in HTSUS subheading 2804.69.10 (containing by weight less than 99.99 percent but not less than 99 percent of silicon) and has a normal trade relations tariff rate of 5.3 percent ad valorem applicable to imports from Russia.[24] Silicon that is slightly less pure is provided for in subheading 2804.69.50 (containing by weight less than 99 percent of silicon); it has a normal trade relations tariff rate of 5.5 percent ad valorem applicable to imports from Russia.[25] The Harmonized System international tariff nomenclature treats imported silicon as a chemical element, rather than as a metal, when it is unworked as drawn or in the form of cylinders or rods.[26] Decisions on the tariff classification and treatment of imported goods are within the authority of U.S. Customs and Border Protection.

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[23] *Silicon Metal From the Russian Federation: Final Results of Expedited Third Sunset Review of the Antidumping Duty Order,* 84 FR 54594, October 10, 2019.

[24] Russia's designation as a beneficiary developing country under the Generalized System of Preferences was terminated on October 3, 2014. To Modify the List of Beneficiary Developing Countries Under the Trade Act of 1974, *Presidential Proclamation 9188*, October 3, 2014, 79 FR 60945, October 8, 2014.

[25] The normal trade relations tariff rates for HTS subheadings 2804.60.10 and 2804.69.50 are the same as they were during the original investigation.

[26] Under the HTSUS, silicon is classified as a nonmetal. See Explanatory Notes for Harmonized System heading 2804. When cut into wafers, discs or similar forms, imported silicon is classified in HTS heading 3818.

The product

Description and applications[27]

Silicon is a chemical element, metallic in appearance, solid in mass, and steel gray in color, that is commonly found in nature in combination with oxygen either as silica (SiO_2) or in combination with both oxygen and a metal in silicate minerals. Although commonly referred to as metal, silicon exhibits characteristics of both metals and nonmetals. Silicon metal is a polycrystalline material whose crystals have a diamond cubic structure at atmospheric pressure. Whether imported or domestic, it is usually sold in lump form typically ranging from 6 inches by ½ inch to 4 inches by ¼ inch.[28]

There are four broadly defined grades of silicon metal,[29] which are ranked in descending order of purity as: (1) semiconductor grade; (2) chemical grade; (3) a metallurgical grade used to produce primary aluminum; and (4) a metallurgical grade used to produce secondary aluminum. The silicon metal content for all four grades is typically at least 98.5 percent. ***:

- ***
- ***
- ***
- ***.[30]

[27] Except where noted, the information in this section is based on information from *Silicon Metal From Australia, Brazil, Kazakhstan, and Norway, Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final),* USITC Publication 4773, April 2018, pp. I-11-15.

[28] Measurements refer to the dimensions of the silicon lump.

[29] Semiconductor grade silicon, used in the electronics industry, is a high-purity product generally containing over 99.99 percent silicon and therefore not included within the scope of this review.

[30] ***.

Silicon metal is used in the chemical industry to produce silanes, which are used to produce a family of organic chemicals known as silicones. Silicones are used in a wide variety of applications including resins, lubricants, plastomers, anti-foaming agents, and water-repellent compounds that are employed in the chemical, pharmaceutical, automotive, and aerospace industries. Silicon metal employed in the production of primary and secondary aluminum is an alloying agent (it is a required component in aluminum casting alloys) because the silicon increases fluidity and reduces shrinkage while it enhances strength, castability, and weldability.[31]

Primary aluminum applications include the manufacture of components that require higher-purity aluminum, such as automobile wheels. Secondary-aluminum applications include other automotive castings. Other applications for silicon metal include the production of brass and bronzes, steel, copper alloys, ceramic powders, and refractory coatings. Silicon metal is used in solar panels for the generation of electricity. Silicon metal for this application is of metallurgical grade and is further refined to a purity suitable for electronic applications by the manufacturers or suppliers of the solar panels. ***.[32]

According to Globe, the differences in the chemical composition among silicon metal for primary aluminum, secondary aluminum, and chemicals are very small and while important to consumers of silicon metal, are less significant from a production standpoint. Globe stated that because the differences in customer specifications are very small, producers often try to make the purest product they can, and by doing so, meet the specifications of customers in all market segments. Globe stated that a condition of competition in the industry is that "so-called 'higher grade' silicon metal can be and often is sold for 'lower grade' applications."[33]

Globe contends that in recent years, there has been a convergence of the specifications of different customers. While it once was true that chemical industry customers had the most rigorous specifications, in terms of the maximum levels of impurities, that is no longer the case. Chemical industry customers specify maximum content levels for many more elements than other customers specify.[34] Primary aluminum producers having lower tolerances for calcium and iron, and chemical and polysilicon manufacturers having lower tolerances for aluminum content. Globe stated that, in practice, silicon metal sold to these segments is frequently

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[31] Because iron interferes with these functions, the iron content of silicon metal used in the production of aluminum is usually limited to a maximum of 1 percent or less.

[32] ***.

[33] Globe's response to Commissions questions, April 2, 2020, pp. 7-8.

[34] Globe's response to Commissions questions, April 2, 2020, p. 34.

directly interchangeable. Globe's practice of producing to the most stringent specifications means that it frequently sells silicon metal that exceeds the customers' requirements, with some of the silicon metal sold in the secondary aluminum segment meeting specifications for the other segments. Globe stated that virtually all, if not all, domestic and imported silicon metal sold in the U.S. market would be usable in the secondary aluminum segment, which has the least stringent specifications.[35] Nonetheless, Globe also stated that Rusal's primary aluminum grade silicon metal may not be interchangeable with silicon metal consumed by chemical industry purchasers that have particularly stringent limits on certain impurities.[36]

According to respondent Rusal, primary aluminum, secondary aluminum, and chemicals customers require a unique range of product specifications which are generally not interchangeable with products suitable for other markets. As a rule, chemical users require silicon to be produced according to their specifications setting out complex requirements. Producers of primary and secondary aluminum alloys also impose strict requirements as to chemical composition and physical characteristics. Only a very few grades of silicon metal can be substituted by other grades to a limited extent, but this market is very small in both Russia and in the United States. Rusal stated that silicon metal grades differ in prices based on their chemical and physical characteristic and the prices of high purity grades of silicon are generally higher than prices of lower purity grades of silicon, because the production cost of grades with higher purity is higher.[37]

Rusal does not agree with Globe's statement that higher grade is often "down-sold" for lower grade applications. In light of the price difference between higher purity and lower purity grades and because the cost of production of purer grades is higher, Rusal stated that it is not economically viable to down-sell high grades for lower purity applications. Rusal claims that its primary grade silicon cannot be substituted for U.S. chemical grade products due to specific requirements of the users (including particle size requirements and other requirements).[38]

[35] Globe's response to Commission questions, April 2, 2020, pp. 8-9.
[36] Globe's response to Commission questions, April 2, 2020, p. 35.
[37] Rusal's response to Commission questions, April 2, 2020, pp. 14-15.
[38] Rusal's response to Commission questions, April 2, 2020, p. 20.

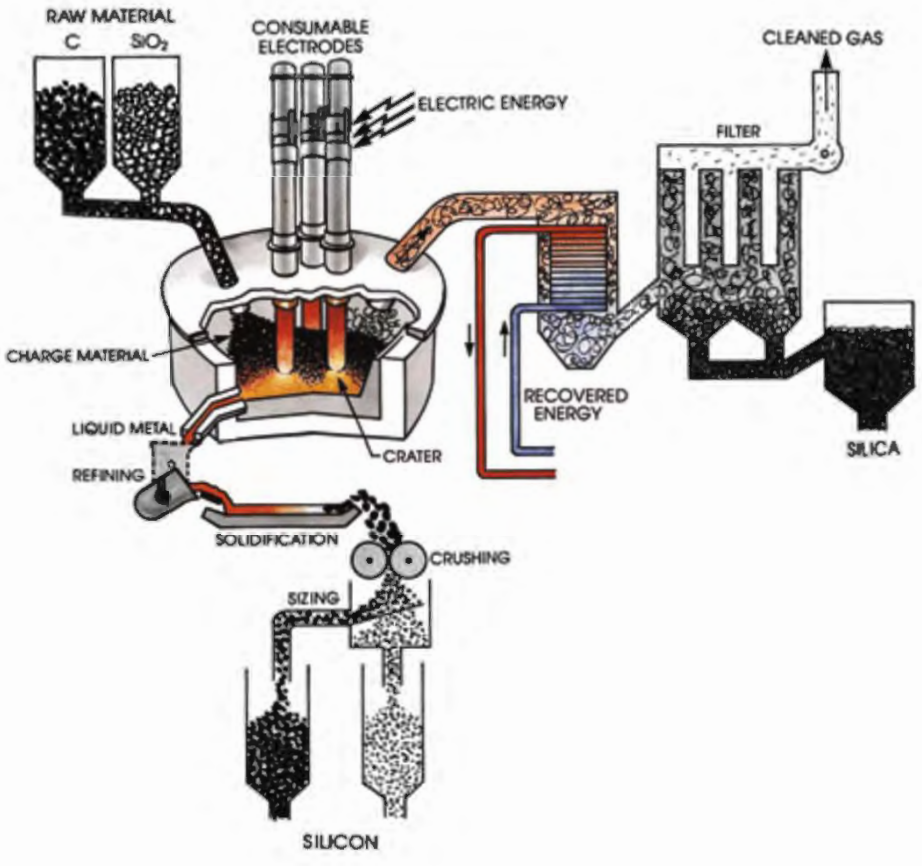
Manufacturing processes[39]

The process for producing silicon metal has been mostly unchanged for decades. Silicon metal is produced from mined quartzite (a rock consisting principally of quartz, a natural crystallized silica) which is washed, crushed, and screened. Only material containing a high percentage of silica (over 99 percent) and a low iron content (less than one percent) can be used to produce silicon metal. Quartzite is combined with a carbon-containing reducing agent (low-ash coal, petroleum coke, charcoal, or coal char) and a bulking agent such as wood chips made from hardwood trees. The charge is placed in a submerged-arc electric furnace. A transformer system delivers high-current, low-voltage electricity via electrodes. The charge is heated to approximately 3,000 degrees Fahrenheit separating the oxygen from the silica to produce silicon metal and carbon monoxide.[40] The overall chemical reaction is summarized as: SiO_2 (silica) + 2C (carbon) →Si (silicon metal) + 2CO (carbon monoxide).

[39] Except where noted, the information in this section is based on information from *Silicon Metal From Australia, Brazil, Kazakhstan, and Norway, Investigation Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final),* USITC Publication 4773, April 2018, pp. I-15-19.

[40] The process relies on electricity from a transformer system and is extremely energy-intensive.

Figure I-1 Silicon metal: Production diagram



Source: Research Gate website, https://www.researchgate.net/figure/1-Illustration-of-a-typical-silicon-metal-production-site-from-Schei-et-al-1998_fig1_265414932, retrieved July 15, 2019.

The molten metal is poured into iron molds or onto beds of silicon metal fines for cooling, and is then shaped into ingots or crushed to the desired size for shipping. Lumps of chemical-grade silicon are of smaller size (about 1 inch maximum) compared with lumps for the metallurgical grades. Additionally, the more refined grades of silicon metal require an oxidative refining step that is not required to produce secondary aluminum. There are differences in the costs of production of the more refined grades versus the secondary aluminum grade, assuming that the oxidative refining step is eliminated in producing the latter. Differences in costs may also arise because some forms of silicon metal (e.g., low-iron grades) require more costly raw materials.

Production capability is limited by the system requirements of the producing facility such as the size and number of furnaces, electrical characteristics, cooling capability, and

environmental factors. Once the engineering limits are reached, capacity expansion can only be achieved by adding additional units.

Silicon furnaces are fundamentally similar worldwide. Physical differences are in the size of furnaces and the electrodes. Purities of the raw materials and the carbon sources used can vary widely. Some characteristics that silicon production facilities share worldwide include, for example, quartz sources need to be reasonably near the silicon furnace given the large amounts of quartz required to produce silicon metal. In addition, silicon production facilities require large amounts of electricity and proximity to a power source is essential.[41]

Some producers of silicon metal also produce ferrosilicon, which is used in the production of steel (especially stainless and heat-resisting steel) and cast iron.[42] 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. In addition, certain furnace designs are more efficient at producing one product than another, leading to efficiency loss when switching production to the other product.[43] The conversion would require removal of the material from the furnace, the replacement of the electrodes, and possibly some modifications to the supporting materials.

According to Globe, silicon metal and ferrosilicon are produced using virtually identical production processes. The only differences in the production processes for the two products are that (1) ferrosilicon production requires the consumption of less quartz and less electricity than silicon metal, and requires a source of iron, and (2) ferrosilicon is "tapped" (i.e., removed from the furnace) every two hours for 20 minutes at a time, while silicon metal can be tapped

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[41] ***.

[42] 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.

[43] In the United States, Globe and CC Metals & Alloys (CCMA) are the two ferroalloy producers, operating three plants as of 2019. There are three ferrosilicon producers in Russia: Russian FerroAlloys (RFA), Mechel (owner of the Bratsk smelter since 2007), and NLMK with the total capacity of approximately *** short tons per year. RFA is the biggest Russian ferrosilicon producer with production sites in Serov, Chelyabinsk and Kuznetsk. In 2017, RFA acquired U.S. ferrosilicon producer CCMA, in Calvert City, Kentucky with a capacity of approximately *** per year. Rusal's response to Commission questions, April 8, 2020, p. 7 and Silicon chapter of 2018 Minerals Yearbook chapter, U.S. Geological Survey, accessed at https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/atoms/files/myb1-2018-simet-adv.xlsx.

either intermittently or continuously. In addition, ferrosilicon and silicon metal can be produced on identical production equipment (as Globe does at its Beverly, Ohio plant).[44]

Globe stated that ferrosilicon producers can use either pre-baked or self-baking electrodes. The time and cost required to switch from ferrosilicon production to silicon metal production depends on the type of electrodes being used. If a furnace is producing ferrosilicon using pre-baked electrodes, the transition could be made in approximately 3-7 days and the total cost of this transition, including materials, labor, overhead, and margin loss on high iron silicon metal, would range from approximately $*** to $***. If the furnace is producing ferrosilicon using self-baking electrodes, there would be approximately 10 to 14 days of lost production to change the electrode columns to pre-baked and the cost would be approximately $***. The amount of time required to recover the cost of the conversion would depend on the profitability of producing silicon metal at the time of the conversion.[45]

Rusal stated that it is extremely costly and time-consuming to shift ferrosilicon production to silicon metal production. The conversion requires modifications such as disassembling self-baking electrodes and assembling electrode columns from baked electrodes. In some cases, the entire lining of furnace baths needs to be replaced if the iron contamination is too serious. This process can cost as much as $*** for a single furnace with the silicon metal production capacity of 11,023 short tons per year and take from 6 to 9 months. Moreover, unlike ferrosilicon production, Rusal stated that silicon metal production requires a special type of quartzite. Rusal stated that it is already consuming most of this quartzite available in Russia and nearby regions. Therefore, no ferrosilicon production in Russia can be shifted to silicon metal production without adversely affecting Rusal's silicon metal production.[46]

[44] Globe's response to Commission questions, April 2, 2020, pp. 24-25.
[45] Globe's response to Commission questions, April 2, 2020, pp. 25-26.
[46] Rusal's response to Commission questions, April 2, 2020, p. 20.

Domestic like product issues

The domestic like product is defined as the domestically produced product or products, which are like, or in the absence of like, most similar in characteristics and uses with, the subject merchandise. The domestic industry is defined as the U.S. producers as a whole of the domestic like product, or those producers whose collective output of the domestic like product constitutes a major proportion of the total domestic production of the product. Under the related parties' provision, the Commission may exclude a related party for purposes of its injury determination if "appropriate circumstances" exist.[47]

In its original determination, the expedited first five-year review, and the full second review, the Commission defined the domestic like product as 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 differences in prices between the grades of silicon metal.[48] This is coextensive with Commerce's scope.[49]

In the original determination, the expedited first-year review and the full second review, the Commission defined the domestic industry as consisting of all domestic producers of silicon metal.[50] Globe, Mississippi Silicon LLC ("Mississippi Silicon"), and Dow Corning Alabama ("DC Alabama") are the only current known U.S. producers of the domestic like product.

In its notice of institution for this review, the Commission solicited comments from interested parties regarding the appropriate definitions of the domestic like product and domestic industry and inquired as to whether any related party issues existed. According to their responses to the notice of institution, the domestic interested party and the respondent interested party agreed with the Commission's definition of the domestic like product and domestic industry as provided in the notice of institution and reflected in the prior proceedings.[51] The domestic interested party did not cite any potential related party issues.[52]

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[47] Section 771(4)(B) of the Tariff Act of 1930, 19 U.S.C. § 1677(4)(B).

[48] *Silicon Metal from Russia, Inv. No. 731-TA-991 (Second Review)*, USITC Publication 4471, June 2014, p. 6. ("Second review publication").

[49] Second review publication, pp. 6-7.

[50] Second review publication, p. 7.

[51] *Domestic interested party response to the notice of institution,* June 3, 2019, p. 29; *Respondent interested party response to the notice of institution*, June 3, 2019, p. 12.

[52] *Domestic interested party response to the notice of institution,* June 3, 2019, p. 29.

U.S. market participants

U.S. producers

During the final phase of the original investigation, the Commission reported that, at the time, there were three firms (Elkem, Globe, and SIMCALA) that produced silicon metal in the United States.[53] The Commission collected data from these U.S. producers of silicon metal that accounted for *** of U.S. production in 2001. In 2001, Elkem was the largest U.S. producer of silicon metal, accounting for *** of all domestic production. Globe and SIMCALA accounted for *** and *** percent of 2001 domestic silicon metal production, respectively.[54]

During the expedited first five-year review, there had been two major changes in the structure of the domestic industry. The first major change occurred in June 2003 when U.S. silicon metal producer SIMCALA was purchased by Dow Corning. Then in December 2005, Elkem sold its silicon metal assets to Globe, which continued to operate the plant as a silicon metal production facility. Globe indicated in its response in the first review that there were two U.S. producers of silicon metal (i.e., Globe and SIMCALA) and that neither producer was related to Russian producers or exporters of the subject merchandise.[55]

During the second five-year review, the Commission determined to conduct a full review. The Commission sent questionnaires to two U.S. producers of silicon metal (Globe and DC Alabama), both of which provided the Commission with information on their silicon metal operations. These producers were believed to account for all domestic production in 2013.[56]

In the current proceeding, the Commission issued U.S. producers' questionnaires to three firms, each of which provided the Commission with information on their product operations. These firms – which now include Mississippi Silicon -- are believed to account for all production of U.S. production of silicon metal in 2018. Table I-5 presents a list of current domestic producers of silicon metal and each company's position on continuation of the order, production locations, and share of reported production of silicon metal in 2018. Table I-6 presents U.S. producer affiliation and ownership information.

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[53] *Investigation No. 731-TA-991 (Review): Silicon Metal from Russia—Staff Report*, INV-FF-063, June 2, 2008, ("First review confidential report"), p. I-24.

[54] First review confidential report, p. I-24.

[55] First review confidential report, p. I-24.

[56] *Investigation No. 731-TA-991 (Second Review): Silicon Metal from Russia— Final Consolidated Staff Report and Views*, INV-MM-043, May 9, 2014, INV-MM-046, May 15, 2014 ("Second review confidential report"), p. 6.

Table I-5
Silicon metal: U.S. producers, positions on order, location of production, and share of reported production, 2018

Firm	Position on continuation of order	Production location(s)	Share of production (percent)
DC Alabama	***	Mt. Meigs, AL	***
Globe	***	Beverly, OH Niagara Falls, NY Selma, AL Alloy, WV	***
Mississippi Silicon	***	Burnsville, MS	***
Total			***

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.

Table I-6
Silicon metal: U.S. producers of silicon metal ownership, related and/or affiliated firms

Item / Firm	Firm Name	Affiliated/Ownership
Ownership:		
***	***	***
***	***	***
***	***	***
***	***	***
Related importers/exporters:		
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
Related producers:		
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***

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

As indicated in table I-6, three U.S. producers are related to foreign producers of silicon metal and three are related to U.S. importers of silicon metal from sources other than Russia. In addition, as discussed in greater detail in Part III, no U.S. producers directly import the subject merchandise and none purchase the subject merchandise from U.S. importers.

U.S. importers

During the final phase of the original investigation, the Commission received U.S. importer questionnaires from *** that imported silicon metal from Russia which accounted for approximately *** percent of total U.S. imports of silicon metal from Russia.[57] Additionally, the Commission received U.S. importer questionnaires from 11 firms that imported silicon metal from all other sources.

In its response to the Commission's notice of institution in the first five-year review, Globe reported that U.S. imports from Russia essentially ceased after Commerce's preliminary determination was published in September 2002.[58] According to official import statistics,[59] there were no imports of silicon metal from Russia during 2003-04 and 2006-07; there were imports of only 22 short tons in 2005.[60]

During the second review, the Commission received U.S. importer questionnaires from seven firms, which accounted for approximately *** percent of total U.S. imports of silicon metal during 2013.[61]

In the current proceeding, the Commission issued U.S. importers' questionnaires to 50 firms believed to be importers of silicon metal, as well as to all U.S. producers of silicon metal. Usable questionnaire responses were received from 17 firms, representing 81.4 percent of U.S. imports from nonsubject countries. Table I-7 lists all responding U.S. importers of silicon metal, their locations, and their shares of U.S. imports by source in 2018.

[57] Second review confidential report, p. I-26.

[58] First review confidential report, p. I-31.

[59] Silicon metal is currently classified under subheading 2804.69.10 and 2804.69.50 of the Harmonized Tariff Schedule of the United States.

[60] First review confidential report, p. I-31.

[61] Second review confidential report, p. 6.

Table I-7
Silicon metal: U.S. importers, source(s) of imports, U.S. headquarters, and shares of imports in 2018

Firm	Headquarters	Share of imports by source (percent)		
		Russia	Nonsubject sources	All import sources
BIT Metals	Amstelveen, Amsterdam	***	***	***
CCMA	Amherst, NY	***	***	***
Dow Silicones	Midland, MI	***	***	***
Elkem Materials	Moon Township, PA	***	***	***
First Continental	Glen Rock, NJ	***	***	***
Grupo FerroAtlántica	Madrid, Spain,	***	***	***
Laurand Associates	Great Neck, NY	***	***	***
Medima	Clarence, NY	***	***	***
Mitsubishi Polycrystalline	Theodore, AL	***	***	***
MPM Silicones	Waterford, NY	***	***	***
Polymet Alloys	Birmingham, AL	***	***	***
REC	Moses Lake, WA	***	***	***
Simcoa	Wellesley, Western Australia	***	***	***
Tennant	Chesterfield UK	***	***	***
Traxys	New York, NY	***	***	***
TST	Fontana, CA	***	***	***
Wacker	Charleston, TN	***	***	***
Total		---	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. purchasers

The Commission received seventeen usable questionnaire responses from firms that bought silicon metal since January 1, 2014. Three responding purchasers are distributors, two are primary aluminum producers, six are secondary aluminum producers, four are polysilicon and/or chemical producers, and two are other. In general, responding U.S. purchasers were located in the Northeast, Midwest, Southeast, Mountains, and Pacific Coast. The responding purchasers represented firms in a variety of domestic industries, including aluminum, chemical, and polysilicon industries. Large purchasers of silicon metal include ***.

Apparent U.S. consumption

Data concerning apparent U.S. consumption of silicon metal are presented in table I-8 and figure I-2. Imports from nonsubject sources increased from 2016 to 2017 by 4,838 short tons. From 2017 to 2018 imports from nonsubject countries decreased by 38,871 short tons. Imports from nonsubject countries were 20,949 short tons higher in January-September 2019 than in January-September 2018. The three largest nonsubject import sources for silicon metal in order are Brazil, Canada, and Norway.

Table I-8
Silicon metal: Apparent U.S. consumption, 2016-18, January to September 2018, and January to September 2019

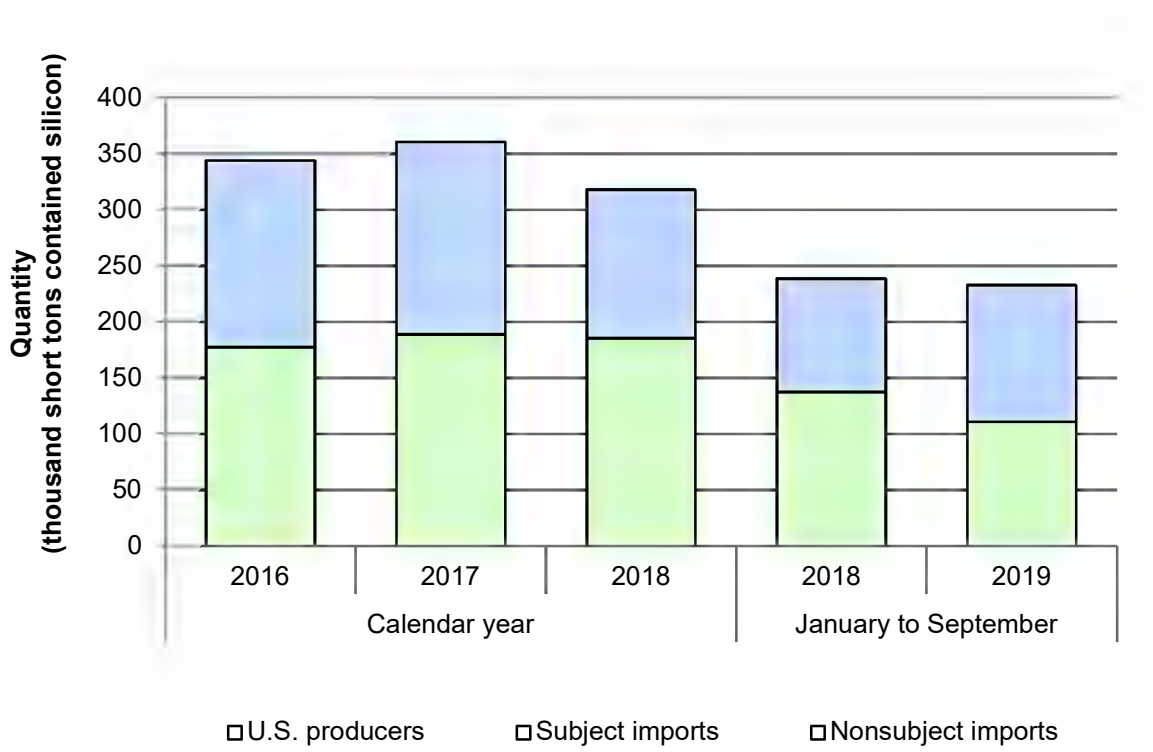
Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	177,475	188,981	185,493	137,413	110,760
U.S. imports from.--					
Russia	---	---	---	---	---
China	339	259	240	151	186
Brazil	68,340	77,579	40,764	31,836	42,379
Norway	14,419	15,292	21,358	18,297	15,010
Australia	18,459	20,780	4,344	1,582	5,341
Kazakhstan	10,365	10,360	3,045	2,079	8,369
Canada	21,542	25,188	29,914	21,060	26,148
Thailand	748	8,656	18,439	14,781	5,030
South Africa	24,196	1,624	78	52	424
All other sources	8,266	11,774	14,456	11,248	19,151
Countries currently under order	339	259	240	151	186
Countries recently investigated	111,583	124,010	69,512	53,795	71,099
Nonsubject sources	166,673	171,511	132,640	101,088	122,036
All import sources	166,673	171,511	132,640	101,088	122,036
Apparent consumption	344,148	360,492	318,133	238,501	232,796
	Value (1,000 dollars)				
U.S. producers' U.S. shipments	400,866	425,621	489,533	365,611	265,484
U.S. imports from.--					
Russia	---	---	---	---	---
China	453	378	349	231	247
Brazil	158,897	177,842	107,071	85,362	104,483
Norway	29,792	29,146	55,104	47,102	33,248
Australia	34,601	41,366	11,163	4,252	12,782
Kazakhstan	17,347	17,466	6,064	4,288	14,870
Canada	52,122	60,356	82,733	57,846	65,862
Thailand	1,216	18,397	50,536	40,576	11,789
South Africa	56,427	3,001	137	91	942
All other sources	16,616	22,796	32,277	25,731	38,357
Countries currently under order	453	378	349	231	247
Countries recently investigated	240,636	265,820	179,402	141,003	165,382
Nonsubject sources	367,470	370,748	345,434	265,478	282,579
All import sources	367,470	370,748	345,434	265,478	282,579
Apparent consumption	768,336	796,369	834,967	631,089	548,063

Note.—Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.
Note.--Russia and China are currently under order. Countries recently investigated include Brazil, Norway, Australia and Kazakhstan.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Figure I-2 presents apparent U.S. consumption by source. There were no silicon metal imports from Russia during from 2016 to 2019.

Figure I-2
Silicon metal: Apparent U.S. consumption, 2016-18, January to September 2018, and January to September 2019



Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

U.S. market share data are presented in table I-9.

Table I-9
Silicon metal: Market shares, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Share of quantity (percent)				
U.S. producers' U.S. shipments	51.6	52.4	58.3	57.6	47.6
U.S. imports from.--					
Russia	---	---	---	---	---
China	0.1	0.1	0.1	0.1	0.1
Brazil	19.9	21.5	12.8	13.3	18.2
Norway	4.2	4.2	6.7	7.7	6.4
Australia	5.4	5.8	1.4	0.7	2.3
Kazakhstan	3.0	2.9	1.0	0.9	3.6
Canada	6.3	7.0	9.4	8.8	11.2
Thailand	0.2	2.4	5.8	6.2	2.2
South Africa	7.0	0.5	0.0	0.0	0.2
All other sources	2.4	3.3	4.5	4.7	8.2
Countries currently under order	0.1	0.1	0.1	0.1	0.1
Countries recently investigated	32.4	34.4	21.8	22.6	30.5
Nonsubject sources	48.4	47.6	41.7	42.4	52.4
All import sources	48.4	47.6	41.7	42.4	52.4
	Share of value (percent)				
U.S. producers' U.S. shipments	52.2	53.4	58.6	57.9	48.4
U.S. imports from.--					
Russia	---	---	---	---	---
China	0.1	0.0	0.0	0.0	0.0
Brazil	20.7	22.3	12.8	13.5	19.1
Norway	3.9	3.7	6.6	7.5	6.1
Australia	4.5	5.2	1.3	0.7	2.3
Kazakhstan	2.3	2.2	0.7	0.7	2.7
Canada	6.8	7.6	9.9	9.2	12.0
Thailand	0.2	2.3	6.1	6.4	2.2
South Africa	7.3	0.4	0.0	0.0	0.2
All other sources	2.2	2.9	3.9	4.1	7.0
Countries currently under order	0.1	0.0	0.0	0.0	0.0
Countries recently investigated	31.3	33.4	21.5	22.3	30.2
Nonsubject sources	47.8	46.6	41.4	42.1	51.6
All import sources	47.8	46.6	41.4	42.1	51.6

Note.—Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.
Note.--Russia and China are currently under order. Countries recently investigated include Brazil, Norway, Australia and Kazakhstan.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Part II: Conditions of competition in the U.S. market

U.S. market characteristics

Silicon metal is a polycrystalline material typically sold in lump form. Chemical producers, primary aluminum producers, and secondary aluminum producers are the principal end users of silicon metal. Demand for silicon metal is derived from the demand for the silicon-based chemicals and aluminum alloys in which it is used as an input.

Apparent U.S. consumption of silicon metal decreased during 2014-18. Overall, apparent U.S. consumption in 2018 was *** percent lower than in 2014, and U.S. producers' shipments as a share of apparent U.S. consumption increased from *** percent of the U.S. market in 2014 to *** percent in 2018. Imports from nonsubject countries supplied the remainder of the U.S. market as there were no imports of silicon metal from Russia.

As discussed in Part I, on March 8, 2017, U.S. imports of silicon metal from Australia, Brazil, Kazakhstan, and Norway became subject to antidumping and countervailing duty investigations that continued until April 10, 2018, when the Commission issued a negative determination.[1] The share of apparent U.S. consumption held by imports from Australia, Brazil, Kazakhstan, and Norway decreased by 10.6 percentage points between 2016 and 2018.

Two of three U.S. producers and 9 of 13 U.S. importers reported that there have been no changes in the product range, product mix, or marketing of silicon metal since 2014. Both responding U.S. producers and 10 of 12 U.S. importers reported that they do not anticipate changes to the product mix, marketing, or range in the future.

Channels of distribution

U.S. producers and importers of silicon metal reported primarily shipping silicon metal to polysilicon and chemical producers during January 2016-September 2019 (table II-1). There were no U.S. imports of silicon metal from Russia.[2] Imports of silicon metal from other countries were primarily to the polysilicon and chemical sector, followed by the secondary aluminum sector. Shipments to the secondary aluminum sector fell from *** percent of U.S. shipments by importers in 2016 to *** percent in 2018.

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[1] *Silicon Metal From Australia, Brazil, Kazakhstan, and Norway*, 83 FR 16382, April 16, 2018.

[2] In the original investigation, importers from Russia reported shipping a majority of imported silicon metal to secondary aluminum producers with some shipments to chemical producers and primary aluminum producers. *Silicon Metal from Russia*, Inv. No. 731-TA-991 (Final), USITC Publication 3584, March 2003, p. 7.

Table II-1

Silicon metal: U.S. producers' and importers' quantity of reported U.S. shipments, by sources and channels of distribution, 2016-18, January to September 2018, and January to September 2019

* * * * * * *

Note: ***.

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

Geographic distribution

U.S. producers 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.

Although there were no imports of silicon metal from Russia during the period for which data were collected in the current review, during the second review, sales of silicon metal imported from Russia were concentrated in ***.[3]

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

Region	U.S. producers
Northeast	2
Midwest	3
Southeast	3
Central Southwest	2
Mountain	2
Pacific Coast	3
Other	---
All regions (except Other)	2
Reporting firms	3

Note: Other is all other U.S. markets, including AK, HI, PR, and VI.

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

[3] *Silicon Metal from Russia Inv. No. 731-TA-991 (Second Review)*—Staff Report INV-MM-043, May 9, 2014, p. I-12.

Supply and demand considerations

U.S. supply

Table II-3 provides a summary of the supply factors regarding silicon metal from U.S. producers and from Russia.

Table II-3
Silicon metal: Supply factors that affect the ability to increase shipments to the U.S. market

	Capacity (1,000 short tons)		Capacity utilization (percent)		Ratio of inventories to total shipments (percent)		Shipments by market, 2018 (percent)		Able to shift to alternate products
Country	2016	2018	2016	2018	2016	2018	Home market shipments	Exports to non-U.S. markets	No. of firms reporting "yes"
United States	201	213	86.4	88.2	***	***	***	***	2 of 3
Russia	***	***	***	***	***	***	***	***	0 of 1

Note: Responding U.S. producers accounted for all U.S. production of silicon metal in 2018. There were no U.S. imports of silicon metal from Russia during 2018, but Russian producer Rusal accounted for all known production of silicon metal in Russia, and silicon metal exports to countries other than the United States. For additional data on the number of responding firms and their share of U.S. production and Russian production / exports, please refer to Part I, "Summary Data and Data Sources."

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

Domestic production

Based on available information, U.S. producers of silicon metal have the ability to respond to changes in demand with small-to-moderate changes in the quantity of shipments of U.S.-produced silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness of supply are some available unused capacity, limited alternative markets, and limited inventories. Capacity increased very slightly and production increased between 2016 and 2018.

Another product that producers reportedly can (and in the case of *** do) produce on the same equipment as silicon metal is ferrosilicon.[4] Factors affecting U.S. producers' ability to shift production include significant investments in machinery and equipment.

*** U.S. producers, 9 of 16 responding importers, and 12 of 15 purchasers reported changes in the availability of U.S.-produced silicon metal in the U.S. market since 2014. Most firms cited the addition of Mississippi Silicon, but other firms reported reduced availability of

[4] ***.

Globe's U.S.-produced product at several locations in 2018 and antidumping and countervailing duty cases.

Subject imports from Russia

The sole producer of silicon metal from Russia (Joint Stock Company Kremny and LLC Rusal Ural Silicon, collectively known as "Rusal", a leading global aluminum producer based in Russia) submitted a response to the Commission's questionnaire. Rusal reported no exports of silicon metal to the United States since 2014. Rusal produced a total of *** short tons of silicon metal in 2018, which accounted for *** percent of Russian silicon metal production.[5] Rusal reported that it is operating at *** capacity and *** switch production ***.

Imports from nonsubject sources

U.S. imports of silicon metal during the current review period were exclusively from nonsubject sources. The largest sources of silicon metal imports during 2018 were Brazil, Canada, and Norway. Combined, these countries accounted for 69.4 percent of the quantity of U.S. imports of silicon metal in 2018.

*** U.S. producers and 7 of 13 importers reported changes in the availability of silicon metal imported from nonsubject sources since 2014. Firms reported new production or increased production in Bosnia, Iceland, Kazakhstan, Malaysia, Norway, and Thailand and curtailed production in Brazil, Canada, France, Spain, and South Africa. Importer *** reported that changes depended on availability and price, while *** reported expecting additional imports due to inability of U.S. producers to fulfill supply.

Supply constraints

*** U.S. producers and 5 of 14 importers reported experiencing supply constraints since 2014. Importers *** reported supply constraints because of "high anti-dumping costs." Importer *** reported that U.S. producers do not supply ***. *** reported that ***. Seven of 17 purchasers reported experiencing supply constraints since 2014. Most reported that U.S. producer Globe was not able to supply desired quantities on time or meet purchaser specifications. Importer/purchaser *** reported general production issues, and purchasers *** reported no availability from Mississippi Silicon in 2016 and 2018, respectively. Purchasers also reported adding, maintaining, or changing suppliers due to supplier diversification needs.

[5] In the final phase of the original investigation, ***.

New suppliers

Thirteen of 16 purchasers indicated that new suppliers entered the U.S. market since January 1, 2014, and 5 of 15 purchasers expect additional entrants. Purchasers reported that Mississippi Silicon entered the market and *** reported plans by Hi-Test Sands, Inc. to build a silicon smelter in Newport, Washington in 2022 despite "significant opposition from Globe." Purchasers also reported that PMB Silicon (Malaysia), Tau Ken Temir (Bosnia), PRC Bakki and PCC Silicon (Iceland), SICA, Liasas, and MetalX entered the market.

U.S. demand

Based on available information, the overall demand for silicon metal is likely to experience small changes in response to changes in price. Silicon metal accounts for a small share of the total cost of its end-use products, and 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 by aluminum producers as an alloying agent. Available information indicates silicon metal accounts for a small share of the cost of the end-use products in which it is used. Purchaser *** reported aluminum alloying as an end use and that ***. End uses previously identified by firms include aluminum alloys, aluminum billet used in a direct extrusion process, aluminum casting, aluminum die-casting, die cast alloys, elastomers, foundry alloys, high silicon aluminum alloys, ingot, molten metal, primary aluminum, secondary aluminum, secondary aluminum alloys, and secondary aluminum ingot, chlorosilanes, polycrystalline silicon, polysilicon, sealants, silicones, and silicone adhesive sealants.[6] All responding U.S. producers and importers reported no changes in the end uses of silicon metal since January 1, 2014 and stated that they do not anticipate changes in the end uses of silicon metal.

[6] *Silicon Metal from Russia, Inv. No. 731-TA-991 (Second Review)*—Staff Report INV-MM-043, May 9, 2014, p. II-9.

Business cycles

*** U.S. producers, 6 of 15 importers, and 8 of 17 purchasers indicated that the market was subject to business cycles or distinctive conditions of competition.

Importers *** reported that demand for silicon metal follows demand for automotive production. *** also cited GDP as a driver of demand for the silicones market and solar and electronic growth for the polysilicon market. *** reported demand for end-use products such as aluminum, silicones, and solar drove demand for silicon metal. *** also mentioned that demand for silicon metal was dependent on aluminum and silicones. Purchasers *** reported the automotive industry is a distinct condition of competition, while *** reported antidumping/countervailing duty investigations as a distinct condition.[7] *** responding U.S. producers, five responding U.S. importers, and five of eight responding purchasers reported changes to business cycles or conditions of competition for silicon metal since 2014. Purchaser *** reported changes due to "market power," while *** reported changes were due to "antidumping/countervailing duty investigations." *** also reported plant closures, including those in China due to environmental concerns, and changes in polysilicon production in the United States, while *** also reported yearly changes due to cost of production, energy, quality, and transportation.

Business cycles may be disrupted due to the recent COVID-19 pandemic, although additional data are not yet available. U.S. Representative Miller of West Virginia noted COVID-19 has caused statewide economic uncertainty.[8] Initial reports stated that silicon metal and ferrosilicon prices increased because of reduced supply from China, "benefitting Ferroglobe."[9] However, since COVID-19 has since spread worldwide, the market is expected to be affected by a downturn in demand for downstream products, namely in the chemical sector. Lower demand for primary aluminum is expected to be reflected in a decrease in secondary aluminum prices. Furthermore, the automotive industry is expected to reduce production.[10] Additional issues include labor availability and transportation availability.[11]

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[7] For additional information on previous and related silicon metal investigations, please see Table I-1 in Part I.

[8] Letter from U.S. Representative Carol D. Miller, 3rd District, West Virginia to Chairman Johanson dated March 30, 2020.

[9] Respondent Rusal's prehearing brief, Exhibit 1, (from Argus, "Ferroglobe eyes recovery after 'worse ever' results", March 3, 2020).

[10] Petitioner Globe's response to Commission Questions, April 2, 2020, p. 3.

[11] Argus, "Coronavirus could end silicon rally it helped to start", February 28, 2020.

Demand trends

Most U.S. producers and importers reported that overall demand in the United States had decreased, as has demand in the polysilicon and chemical and aluminum sectors (table II-4).[12] One U.S. producer reported that demand increased and one reported that there was no change in demand in other sectors, while most importers reported no change in other sectors. Most purchasers reported that overall demand fluctuated in the United States, while an equal number reported constant and fluctuating demand in the polysilicon and chemical sector. Half of purchasers reported no change in demand in the aluminum sector or other sectors, and a plurality of purchasers reported an increase in demand for their final products.

U.S. producers were split on anticipated overall and sector-specific demand trends in the United States. Four of 11 importers reported no change for anticipated overall demand, and 5 of 12 purchasers reported an anticipated fluctuation in overall demand in the United States. A plurality of U.S. importers reported a decrease in demand for the aluminum sector, and 4 of 6 reported no change in demand for other sectors. Four of 10 U.S. importers and 4 of 6 purchasers reported an anticipated increase in future demand for the polysilicon and chemical sector. Four of 12 purchasers reported an increase in future demand for the aluminum sector. *** stated that demand trends, expectations, and projections have already begun to shift due to a possible economic slowdown from COVID-19.[13]

[12] Responses to questionnaires were due on January 21, 2020, and provided before the COVID-19 pandemic.

[13] Petitioner Globe's response to Commission Questions, April 2, 2020, p. 4.

Table II-4
Silicon metal: Firms' responses regarding U.S. demand since January 1, 2014, and anticipated demand

Item	Increase	No change	Decrease	Fluctuate
Demand in the United States: Overall				
U.S. producers	---	---	2	1
Importers	1	3	4	4
Purchasers	3	3	1	5
Foreign producers	1	---	---	---
Demand in the United States: Polysilicon and chemical:				
U.S. producers	---	---	2	1
Importers	2	2	5	3
Purchasers	1	2	1	2
Foreign producers	1	---	---	---
Demand in the United States: Aluminum sectors:				
U.S. producers	---	---	2	---
Importers	1	2	5	1
Purchasers	2	6	---	4
Foreign producers	1	---	---	---
Demand in the United States: Other sectors:				
U.S. producers	1	1	---	---
Importers	1	4	---	2
Purchasers	---	2	---	---
Foreign producers	---	1	---	---
Anticipated future demand in the United States: Overall				
U.S. producers	1	---	1	1
Importers	3	4	1	3
Purchasers	4	3	---	5
Foreign producers	1	---	---	---
Anticipated future demand in the United States: Polysilicon and chemical:				
U.S. producers	1	---	1	1
Importers	4	2	2	2
Purchasers	4	1	---	1
Foreign producers	1	---	---	---
Anticipated future demand in the United States: Aluminum sector:				
U.S. producers	1	1	---	---
Importers	3	4	1	1
Purchasers	4	3	1	4
Foreign producers	1	---	---	---
Anticipated future demand in the United States: Other sectors:				
U.S. producers	---	1	---	---
Importers	1	4	---	1
Purchasers	---	1	---	---
Foreign producers	---	---	---	---
Demand for purchasers' final products: Purchasers	**6**	**2**	**2**	**3**

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

Impact of 232 tariffs

Most importers and purchasers reported either not knowing of any impact or that there was no impact from the implementation of tariff remedies in the section 232 investigation on aluminum imports, while *** producers reported no impact from the section 232 tariffs, and *** reported not knowing of any impact.[14]

Substitute products

Substitutes for silicon metal are limited. Importer/purchaser *** reported ferrosilicon could be used as a substitute and *** reported scrap containing silicon could be used as a substitute, but that price changes have not affected the price for silicon metal. While producer/purchaser *** reported there were no substitutes for silicon metal, ***. *** U.S. producers and the vast majority of importers and purchasers reported that no products can be substituted for silicon metal and did not anticipate any future changes in substitutes.

Substitutability issues

The degree of substitution between domestic and imported silicon metal depends upon such factors as relative prices, quality (e.g., grade standards, defect rates, etc.), and conditions of sale (e.g., price discounts/rebates, lead times between order and delivery dates, reliability of supply, product services, etc.). Based on available data, staff believes that there is high degree of substitutability between domestically produced silicon metal and silicon metal imported from Russia.

[14] Beginning in 2018, pursuant to Section 232 of the *Trade Expansion Act of 1962*, as amended, *ad valorem* import duties of 10 percent were placed on aluminum articles.

Lead times

Silicon metal is primarily produced-to-order. U.S. producer Mississippi Silicon reported that *** percent of its sales were produced-to-order, while Globe reported *** percent of its sales were produced-to-order and further elaborated that ***. ***. U.S. producer DC Alabama reported that *** percent of its sales were from inventory, with a lead time of *** days. Globe reported that *** percent of its sales were from inventory, with a lead time of *** days. There were no importers of silicon metal from Russia to report lead times.

Knowledge of country sources

Fifteen purchasers indicated they had marketing/pricing knowledge of the domestic product, 3 of Russian product, and 11 of product from other countries.

As shown in table II-5, purchasers reported that their customers "never" make purchasing decisions based on the producer or the country of origin of the silicon metal. Purchasers' responses regarding their purchasing decisions were mixed and wide-ranging, with most purchasers reporting either "always" or "never" making purchasing decisions based on the producer and country of origin. Of the six purchasers that reported that they always make decisions based the producer, *** cited consistent quality and technical specifications, and *** cited supply and price risk management. Other reasons cited include pre-qualification (***) and timely delivery (***).

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	1	3	7
Purchaser's customers make decision based on producer	---	---	1	9
Purchaser makes decision based on country	4	1	4	8
Purchaser's customers make decision based on country	---	---	---	9

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

Seven purchasers reported that they or their customers specifically order silicon metal from one country over other possible sources of supply. *** prefers silicon metal produced in Australia due to supply/risk diversification; *** reported that it prefers domestically produced silicon metal because of supply, logistics, and delivery method; *** reported that it prefers silicon metal from Iceland ***; ***

reported it prefers Brazilian product because ***; *** reported that it prefers *** in Norway because of specifications, low fines, high recovery, and service/terms; and *** reported preferring domestically produced because of quality assurance, proximity, and existing relationships.

Factors affecting purchasing decisions

The most often cited top three factors firms consider in their purchasing decisions for silicon metal were price/cost (17 firms), quality (15 firms), and availability/supply (12 firms), as shown in table II-6. Availability/supply was the most frequently cited first-most important factor (cited by six firms), followed by price/cost (five firms); quality was the most frequently reported second-most important factor (seven firms); and price/cost was the most frequently reported third-most important factor (10 firms). Five purchasers also reported factors that they consider in their purchasing decisions in addition to their top three factors. These factors include: on time delivery/delivery (2 purchasers), payment terms, diversity of supply options/risk diversification (1), service (1), price (1), and social sustainability (1).

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

Factor	First	Second	Third	Total
Availability/ Supply	6	5	1	12
Price/Cost	5	2	10	17
Quality	4	7	4	15
All other factors	2	3	2	NA

Note: Other factors include customer service, delivery, and supplier diversification.

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

Eight of 17 purchasers reported that they usually purchase the lowest-priced product. Six of 15 purchasers reported that certain types of silicon metal were only available from a single source. Purchaser *** reported that only a few firms in Brazil and China and firms in France and Spain can produce high quality silicon metal for chemical use, ***, and added that only a few firms in China can produce silicon metal for polysilicon production. Purchaser *** reported that low fine grade Silloy 170 is only available from Norway, *** reported that 1502 Spec Grade is readily available from Simcoa in Australia, while *** reported lower quality silicon metal was only available from Brazil.

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 (17), chemistry/specific product specifications and product consistency (15 each), reliability of supply (14), quality meets industry standards (12), price and delivery time (11 each), and delivery terms (9).

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	17	---	---
Chemistry/specific product specifications	15	2	---
Delivery terms	9	7	1
Delivery time	11	6	---
Discounts offered	5	7	5
Extension of credit	4	7	5
Minimum quantity requirements	5	6	6
Packaging	5	11	1
Payment terms	5	10	2
Price	11	5	---
Product consistency	15	2	---
Product range	3	8	6
Quality meets industry standards	12	4	1
Quality exceeds industry standards	7	5	5
Reliability of supply	14	1	---
Technical support/service	5	9	3
U.S. transportation costs	4	10	3

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

Supplier certification

Thirteen of 17 responding purchasers require their suppliers to become certified or qualified to sell silicon metal to their firm. Purchasers reported that the time to qualify a new supplier ranged from 30 to 720 days, but most purchasers reported between 60 and 120 days. When qualifying a supplier, purchasers look at product chemistry and consistency, ISO certifications, and conduct sample analyses and material trials to assess product quality. Purchaser *** reported that it has a ***. Five of 16 purchasers reported that a producer had failed in its attempt to qualify product or had lost its approved status since January 1, 2014. Purchaser ***. Purchaser *** reported that NT Ruddock failed due to incorrect size and product contamination. Both *** and *** reported issues with Mississippi Silicon, specifically with particle size (***) and low metal recovery and product chemistry ***). *** reported a

supplier in Laos failed to qualify, while *** reported firms' inability to meet specifications for product from Australia (Simcoa), Brazil (Liasa), and Norway (Elkem) combined with antidumping and countervailing duty investigations on Brazil, Australia, and Norway.

Changes in purchasing patterns

Purchasers were asked about changes in their purchasing patterns from different sources since 2014 (table II-8). Reasons reported for increasing purchases of U.S.-produced silicon metal included antidumping and countervailing duty investigations (***), the addition of Mississippi Silicon, market turbulence, and supplier diversification. Reasons reported for decreasing purchases of U.S.-produced silicon metal and increasing purchases of silicon metal from other countries included product specifications *** (***) and price (***).

Thirteen of 17 purchasers reported that they had changed suppliers since 2014, and identified a variety of reasons for these changes. Firms reported changing suppliers mainly because of price, but also reported other reasons such as supplier diversification, mergers, delivery, potential antidumping and countervailing duties, quality,[15] and plant closures and openings. ***.[16] *** reported that suppliers can be changed and added from one year to another without being "completely dropped." Purchaser *** reported dropping Simcoa as a supplier because of potential antidumping and countervailing duties on silicon metal from Australia.

[15] ***.

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	1	5	5	---	5
Russia	14	---	---	---	---
All other countries	---	4	5	2	6
Sources unknown	7	2	---	2	1

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

Importance of purchasing domestic product

All 17 purchasers reported that most or all of their purchases did not require purchasing U.S.-produced product. One reported other preferences for domestic product (***).

Comparisons of domestic products, subject imports, and imports from other countries

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

While no purchaser reported purchasing Russian silicon metal since 2014, most purchasers reported that U.S.-produced and Russian silicon metal were comparable on extension of credit, minimum quantity requirements, packaging, and product range. Most purchasers also reported that U.S.-produced silicon metal is superior to Russian silicon metal on availability, delivery terms, delivery time, and technical support/service. However, two purchasers (***) reported U.S.-produced silicon metal was inferior to Russian silicon metal on discounts offered and price. Most purchasers reported that U.S.-produced silicon metal is comparable to silicon metal produced in other countries on all factors except for delivery time. Most purchasers reported that silicon metal from Russia was comparable to product from other countries for all factors except for quality exceeds industry standards (three purchasers reported that silicon metal produced in the U.S. was superior).

U.S. purchasers stated that silicon metal produced in the United States was comparable with that of other countries and superior to silicon metal produced in Russia on availability, which was ranked as a very important factor by all purchasers. Chemistry/specific product specifications and product consistency were also ranked as very important by many purchasers, for which U.S.-produced silicon metal was considered by most purchasers as comparable to other countries and Russia.

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

Factor	U.S. vs. Russia			U.S. vs. other countries			Russia vs. other countries		
	S	C	I	S	C	I	S	C	I
Availability	4	2	---	3	12	1	---	4	2
Chemistry/specific product specifications	3	3	---	1	13	2	---	5	1
Delivery terms	4	2	---	4	12	---	---	6	---
Delivery time	5	1	---	8	8	---	---	5	1
Discounts offered	1	2	2	1	7	5	1	4	---
Extension of credit	2	3	---	1	11	1	---	4	1
Minimum quantity requirements	1	5	---	2	13	---	---	6	---
Packaging	2	4	---	3	13	---	---	6	---
Payment terms	2	3	1	1	12	2	---	5	1
Price	1	2	2	1	9	6	1	4	---
Product consistency	3	3	---	3	12	1	---	5	1
Product range	2	4	---	3	10	2	---	5	1
Quality meets industry standards	3	3	---	2	12	---	---	4	2
Quality exceeds industry standards	3	3	---	3	11	1	---	3	3
Reliability of supply	3	3	---	4	12	---	---	4	2
Technical support/service	6	---	---	5	11	---	---	4	2
U.S. transportation costs	3	2	---	4	10	1	---	6	---

Note: A rating of superior means that price/U.S. transportation costs 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 imports from Russia, U.S. producers, importers, and purchasers were asked whether the products can always, frequently, sometimes, or never be used interchangeably. As shown in table II-10, *** U.S. producers reported that silicon metal from Russia is "always" interchangeable with silicon metal from the U.S. and other countries. The majority of U.S. importers reported that silicon metal from all sources is "always" or "frequently" interchangeable, while *** importers reported that silicon metal from other sources is sometimes interchangeable. Purchaser responses were mixed with respect to Russia; less than half (7 of 15) of purchasers reported that silicon metal from the United States is "always" interchangeable with silicon metal from other sources. Purchasers *** generally reported that U.S.-produced silicon metal could be interchangeable with that of other countries, but that silicon metal produced in Russia was not interchangeable because it does not meet particular specifications, including trace element requirements (e.g., boron, calcium, iron, phosphorus).

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

Country pair	Number of U.S. producers reporting				Number of U.S. importers reporting				Number of purchasers reporting			
	A	F	S	N	A	F	S	N	A	F	S	N
United States vs. Russia:	***	***	***	***	5	---	2	---	2	2	2	---
United States vs. Other:	***	***	***	***	6	4	3	---	7	4	4	---
Russia vs. Other:	***	***	***	***	4	---	2	---	3	1	2	---

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

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

As can be seen from table II-11, eight responding purchasers reported that domestically produced product always met minimum quality specifications. Ten responding purchasers reported that silicon metal from nonsubject sources always met minimum quality specifications, while one purchaser reported silicon metal from Russia usually met minimum quality specifications.

Most purchasers also reported that nonsubject silicon metal from Australia, Bosnia, Brazil, Canada, South Africa, and Thailand “always” met minimum quality specifications.

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

Source	Always	Usually	Sometimes	Rarely or never
United States	8	6	1	---
Russia	---	1	---	---
Nonsubject	10	7	1	---

Note: 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, U.S. 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 other countries. As seen in table II-12, *** U.S. producers reported that differences other than price were *** a significant factor in their sales. ***. Most U.S. importers reported that differences other than price were "never" or "sometimes" significant. One importer, ***, reported that there was a perception that silicon metal produced in Russia did not meet the same standards on quality, logistics, product range, and technical support. Many purchasers reported differences other than price were "sometimes" significant in sales of silicon metal from the United States versus other countries.

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	Number of U.S. producers reporting				Number of U.S. importers reporting				Number of purchasers reporting			
	A	F	S	N	A	F	S	N	A	F	S	N
U.S. vs. subject countries:												
U.S. vs. Russia	***	***	***	***	1	1	1	3	2	2	1	1
U.S. vs. Other	***	***	***	***	2	1	4	3	3	---	9	3
Subject countries comparisons:												
Russia vs. Other	***	***	***	***	1	1	1	3	2	2	1	1

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; parties were encouraged to comment on these estimates. No party submitted comments on the estimates.

U.S. supply elasticity

The domestic supply elasticity 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 adjust capacity, producers' ability to shift to or from production of other products, the existence of inventories, and the availability of alternate markets for U.S.-produced silicon metal. Earlier analysis of these factors above indicates that the U.S. industry has a small-to-moderate ability to increase or decrease shipments to the U.S. market; an estimate in the range of 2 to 5 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 the silicon metal in the production of any downstream products. Based on the available information, the aggregate demand for silicon metal is likely to be in the range of -.25 to -.50.

Substitution elasticity

The elasticity of substitution depends upon the extent of product differentiation between the domestic and imported products.[17] 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 likely to be in the range of 3 to 5.

[17] 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: Condition of the U.S. industry

Overview

The information in this section of the report was compiled from responses to the Commission's questionnaires. Table III-1 summarizes industry events and company changes based on publicly available information. Three firms, which accounted for all known U.S. production of silicon metal since 2014, supplied information on their operations producing silicon metal. These firms are Dow Alabama, Mississippi Silicon, and Globe. Mississippi Silicon began production of silicon metal in 2015. In that same year, a merger between Globe Specialty Metals ("GSM") (the parent company of Globe Metallurgical) and Grupo FerroAtlántica of Spain resulted in the formation of 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.[1] [2] As discussed below, however, North American production has been taken offline since the merger.[3] [4]

[1] 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.

[2] 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.

[3] "Ferroglobe to stop production at Niagara Falls, NY facility, impacting 100 jobs." Marketwatch.com, December 27, 2018, retrieved February 25, 2020, https://www.marketwatch.com/story/ferroglobe-to-stop-production-at-niagara-falls-ny-facility-impacting-100-jobs-2018-12-27, retrieved February 25, 2020.

[4] "Ferroglobe announces additional production cuts," https://seekingalpha.com/news/3504103-ferroglobe-announces-additional-production-cuts, retrieved February 24, 2020.

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 (purchaser)	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	HiTest Sand	***.[7]
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. The case terminated on November 3, 2017, after the CITT determined that imports of silicon from these countries had not harmed or threatened to cause injury to the domestic industry. [8] [9]

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	September	Wacker Chemie AG (purchaser)	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.[10] [11]
2018	April	USITC final negative determinations for AD/CVD investigations of silicon metal from Australia, Brazil, Kazakhstan, and Norway	The USITC determined 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 from Australia, Brazil, Kazakhstan, and Norway.[12]
2018	October	Ferroglobe PLC	Shut down its Niagara Falls plant idling 100 employees. The plant has a production capacity of 27,000 tons annually. Additionally, Ferroglobe idled two furnaces at its plant at Selma, Alabama, and one furnace at its plant in Beverly, Ohio.[13]
2019	November	Wacker Chemie AG (purchaser)	Wacker Chemie AG's new silicon-metal production plant started operations at the Holla site in Norway following two and a half years of construction. The new furnace is one of the largest of its kind in the world and increases the Holla site's silicon metal production capacity by more than 40 percent.[14]
2020	January	HiTest Sand/PacWest Silicon	According to news reports, the HiTest Sand silicon smelter project (now known as PacWest Silicon) in Washington is on hold for "the immediate future" because of regulatory and community challenges. No startup date has been released. [15]

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

[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,* https://seekingalpha.com/article/4114373-ferroglobe-gsm-investor-presentation-slideshow*,* retrieved March 24, 2017.

[3] Ferroglobe PLC*, "Investor Presentation, January 2017," p.7,* https://seekingalpha.com/article/4114373-ferroglobe-gsm-investor-presentation-slideshow*,* 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.

[9] *Canada: AD & CVD investigations of certain silicon metal imported from seven countries (terminated,* Global Trade Alert, retrieved March 3, 2020, at https://www.globaltradealert.org/intervention/56570/anti-dumping/canada-ad-cvd-investigations-of-certain-silicon-metal-imported-from-seven-countries-terminated.

[10] "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.

[11] "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.

[12] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway, Inv. Nos. 701-TA-567-569 and 731-TA-1343-1345* (Final), USITC Publication 4773, April 2018.

[13] "Ferroglobe announces additional production cuts." Retrieved February 24, 2020. https://seekingalpha.com/news/3504103-ferroglobe-announces-additional-production-cuts.

[14] "WACKER starts up new silicon-metal production facility in Norway." Wacker Chemie AG, November 15, 2019. https://www.wacker.com/cms/en-us/about-wacker/press-and-media/press/press-releases/archive-2019/archiv-2019-detail-131457.html?from_all_summary=true, retrieved April 15, 2020.

[15] "PacWest: Plans for proposed Newport smelter on hold." The Spokane Review, January 20, 2020. https://www.spokesman.com/stories/2020/jan/21/pacwest-puts-plans-for-proposed-newport-smelter-on/, retrieved April 15, 2020.

Changes experienced by the industry

Domestic producers were asked to indicate whether their firms had experienced any plant openings, relocations, expansions, acquisitions, consolidations, closures, or prolonged shutdowns because of strikes or equipment failure; curtailment of production because of shortages of materials or other reasons, including revision of labor agreements; or any other change in the character of their operations or organization relating to the production of silicon metal since 2014. All three of domestic producers indicated that they had experienced such changes; their responses are presented in table III-2.

Table III-2
Silicon metal: Changes in the character of U.S. operations since January 1, 2014

Item / Firm	Reported changed in operations
Plant openings:	
***	***
Prolonged shutdowns or curtailments:	
***	***
***	***
***	***

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

Anticipated changes in operations

The Commission asked domestic producers to report anticipated changes in the character of their operations relating to the production of silicon metal. Only one domestic producer identified an anticipated change. The firm's response appears table III-3.

Table III-3
Silicon metal: Anticipated changes in the character of U.S. operations

Item / Firm	Anticipated change in operations
***	***

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

U.S. production, capacity, and capacity utilization

Table III-4 and figure III-1 present U.S. producers' production, capacity, and capacity utilization. U.S. producers' capacity increased from 2016 to 2017 by 12,430 short tons and remained relatively stable from 2017 to 2018. U.S. producers' production capacity was 43,914 short tons lower in January-September 2019 than in January-September 2018. Fluctuations in capacity largely reflected ***.[5]

Domestic production increased from 2016 to 2017 by 20,409 short tons, while from 2017 to 2018 domestic production decreased by 6,045 short tons. Production of silicon metal was 29,966 short tons lower in January-September 2019 than in January-September 2018.

Average capacity utilization increased from 2016 to 2017 by 4.5 percentage points and from 2017 to 2018 capacity utilization decreased by 2.7 percentage points.[6] Capacity utilization was 6.4 percentage points higher in January-September 2019 than January-September 2018, as the reduction in the combined capacity of the U.S. producers exceeded the reduction in the combined production level.

[5] ***. *** producer questionnaire section, II-2.

[6] In the fourth quarter of 2018, U.S. producers operated at 96.5 percent capacity utilization, producing 48,188 short tons with 49,935 short tons of capacity.

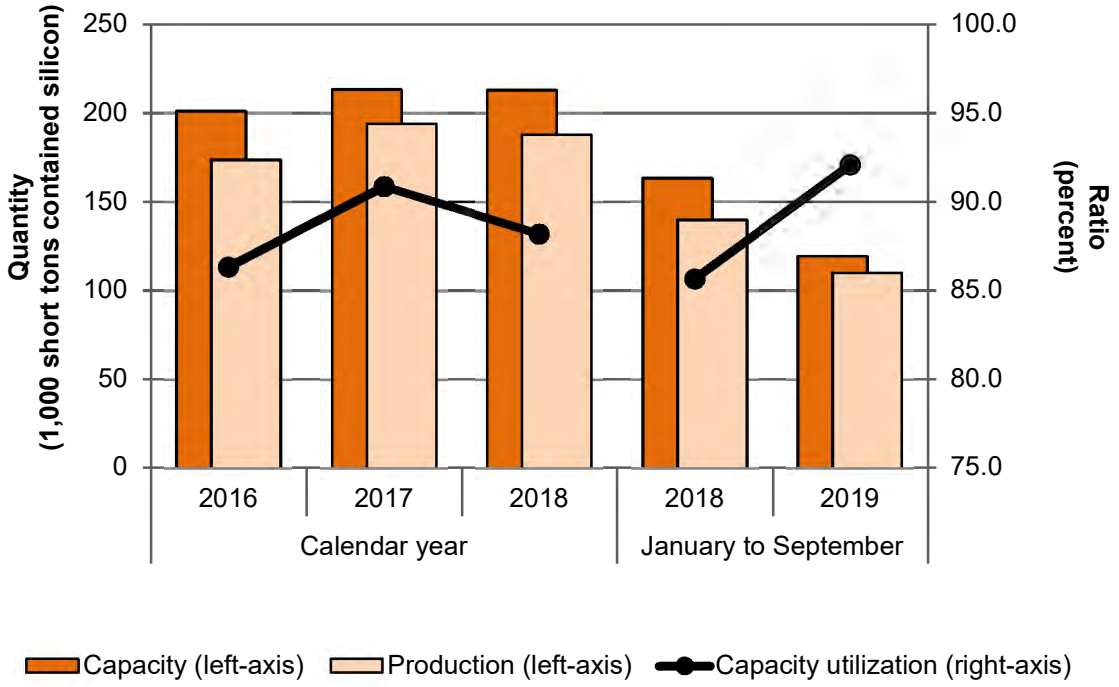
Table III-4
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Capacity (short tons contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
All firms	201,027	213,457	213,088	163,153	119,239
	Production (short tons contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
All firms	173,594	194,003	187,958	139,770	109,804
	Share of production (percent)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
All firms	100.0	100.0	100.0	100.0	100.0
	Capacity utilization (percent)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
All firms	86.4	90.9	88.2	85.7	92.1

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.

Figure III-1
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2016-18, January-September 2018, and January-September 2019



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

Table III-5 presents U.S. producers' overall capacity on equipment used to produce silicon metal. U.S. producers reported that a majority of their production consisted of silicon metal. Production of silicon metal accounted for 89.8 percent of total production during 2018. Two firms, ***, reported that they do not produce products other than silicon metal on the same equipment or using the same employees, while *** reported ferrosilicon and magnesium ferrosilicon. Production of products other than silicon metal (principally ferrosilicon) accounted for *** percent of total U.S. production during 2018.[7]

Table III-5
Silicon metal: U.S. producers' overall capacity and production on the same machinery as Silicon metal on same machinery, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons)				
Overall capacity	232,907	216,413	233,699	176,351	156,645
Production:					
Silicon metal	173,594	194,003	187,958	139,770	109,804
Weight of other elements	***	***	***	***	***
Silicon metal total weight	***	***	***	***	***
Ferrosilicon	***	***	***	***	***
All other products	***	***	***	***	***
Total out-of-scope merchandise	***	***	***	***	***
Total production	203,104	198,027	209,349	154,138	144,402
	Ratios and shares (percent)				
Capacity utilization	87.2	91.5	89.6	87.4	92.2
Production:					
Silicon metal	85.5	98.0	89.8	90.7	76.0
Weight of other elements	***	***	***	***	***
Silicon metal total weight	***	***	***	***	***
Ferrosilicon	***	***	***	***	***
All other products	***	***	***	***	***
Total out-of-scope merchandise	***	***	***	***	***
Total production	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.

[7] ***. *** producer questionnaire response section, II-3f.

Constraints on capacity

All three responding U.S. producers reported constraints in the manufacturing process. Table III-6 presents constraints reported by each producer.

Table III-6
Silicon metal: U.S. producers' reported production constraints

Item / Firm	Reported production constraints
***	***
***	***
***	***

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

U.S. producers' U.S. shipments and exports

Table III-7 presents U.S. producers' U.S. shipments, export shipments, and total shipments of silicon metal. In general, nearly all shipments by the U.S. producers were within the United States; exports shipments consistently accounted for less than one percent of total shipments.

Table III-7
Silicon metal: U.S. producers' U.S. shipments, exports shipments, and total shipments, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
Commercial U.S. shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
U.S. shipments	177,475	188,981	185,493	137,413	110,760
Export shipments	***	***	***	***	***
Total shipments	***	***	***	***	***
	Value (1,000 dollars)				
Commercial U.S. shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
U.S. shipments	400,866	425,621	489,533	365,611	265,484
Export shipments	***	***	***	***	***
Total shipments	***	***	***	***	***
	Unit value (dollars per short ton contained silicon)				
Commercial U.S. shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
U.S. shipments	2,259	2,252	2,639	2,661	2,397
Export shipments	***	***	***	***	***
Total shipments	***	***	***	***	***
	Share of quantity (percent)				
Commercial U.S. shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
U.S. shipments	***	***	***	***	***
Export shipments	***	***	***	***	***
Total shipments	100.0	100.0	100.0	100.0	100.0
	Share of value (percent)				
Commercial U.S. shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
U.S. shipments	***	***	***	***	***
Export shipments	***	***	***	***	***
Total shipments	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. producers' U.S. shipments increased by 6.5 percent from 177,475 short tons in 2016 to 188,981 short tons in 2017, then decreased by 1.8 percent to 185,493 short tons in 2018. U.S. shipments during January-September 2019 were 19.4 percent lower than those reported in the comparable period in 2018. The unit values of U.S. producers' U.S. shipments decreased by 0.3 percent from 2016 to 2017 , and increased most in noticeably in 2018 by 17.2 percent. The unit value of U.S. producers' U.S. shipments were 9.9 percent lower in January-September 2019 compared to January-September 2018.

Commercial U.S. shipments by share of quantity increased by *** percentage points from 2016 to 2018. Commercial U.S. shipments by share of quantity during January-September 2019 were *** percentage points lower than those reported in the comparable period in 2018. Commercial U.S. shipments by share of value increased by *** percentage points from 2016 to 2018. Commercial U.S. shipments by share of quantity during January-September 2019 were *** percentage points lower than those reported in the comparable period in 2018.

Transfers to related firms in share of quantity decreased by *** percentage points from 2016 to 2018. Transfers to related firms in share of quantity during January-September 2019 were *** percentage points higher than those reported in the comparable period in 2018. Transfers to related firms in share of value decreased by *** percentage points from 2016 to 2018. Transfers to related firms share of value during January-September 2019 were *** percent higher than those reported in the comparable period in 2018.

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. U.S. producers' end-of-period inventories increased by *** percent from 2016 to 2017 and increased by *** percent from 2017 to 2018. U.S. producers' end-of-period inventories during January-September 2019 were *** percent lower than those reported in the comparable period in 2018.

Table III-8
Silicon metal: U.S. producers' inventories, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' end-of-period inventories	***	***	***	***	***
	Ratio (percent)				
Ratio of inventories to.--					
U.S. production	***	***	***	***	***
U.S. shipments	***	***	***	***	***
Total shipments	***	***	***	***	***

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. producers' imports and purchases

Table III-9 presents data on individual U.S. producers' reported imports of silicon metal from nonsubject sources as well as the ratio of such imports to U.S. production.

U.S. producers *** and *** reported purchases of silicon metal in the United States during 2016-18 and the interim periods in 2018 and 2019. ***. ***.[8]

[8] *** U.S. producer questionnaire response, section II-8.

Table III-9
Silicon metal: U.S. producers' U.S. production, imports, and import ratios to U.S. production, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
***	***	***	***	***	***
***	***	***	***	***	***
	Ratio (percent)				
***	***	***	***	***	***
	Narrative				
***	***				
	Quantity (short tons contained silicon)				
***	***	***	***	***	***
***	***	***	***	***	***
	Ratio (percent)				
***	***	***	***	***	***
	Narrative				
***	***				
	Quantity (short tons contained silicon)				
***	***	***	***	***	***
***	***	***	***	***	***
	Ratio (percent)				
***	***	***	***	***	***
	Narrative				
***	***				

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

U.S. employment, wages, and productivity

Table III-10 presents U.S. producers' employment-related data during 2016-18, January-September 2018, and January-September 2019. The number of production and related workers ("PRWs") employed by U.S. silicon metal producers increased from 2016 to 2018 by 22.1 percent to reach 739 PRWs.[9] The number of PRWs employed during January-September 2019, however, was 24.6 percent lower than January-September 2018.[10] Hourly wages remained stable between 2016 to 2018 and were 4.6 percent higher in January-September 2019 compared to January-September 2018. Productivity decreased by 6.3 percent from 2016 to 2018 and but was 4.5 percent higher in January-September 2019 compared to January-September 2018. Unit labor costs decreased from 2016 to 2017 by 7.8 percent, but from 2017 to 2018 increased by 16.3 percent. Unit labor costs in January-September 2018 remained consistent in January-September 2019.

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, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
Production and related workers (PRWs) (number)	605	664	739	745	562
Total hours worked (1,000 hours)	1,413	1,448	1,632	1,237	930
Hours worked per PRW (hours)	2,336	2,181	2,208	1,660	1,655
Wages paid ($1,000)	39,798	41,007	46,193	34,152	26,857
Hourly wages (dollars per hour)	$28.17	$28.32	$28.30	$27.61	$28.88
Productivity (short tons contained silicon per 1,000 hours)	122.9	134.0	115.2	113.0	118.1
Unit labor costs (dollars per short tons contained silicon)	$229	$211	$246	$244	$245

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

[9] ***. *** producer questionnaire, section II-7.
[10] ***. *** producer questionnaire, section II-7.

Financial experience of U.S. producers

Background

Three firms, DC Alabama, Globe, and Mississippi Silicon, reported financial results on U.S. silicon metal operations.[11] [12] During January 2016-September 2019, Globe accounted for *** percent of total silicon metal sales quantity, DC Alabama accounted for *** percent, and Mississippi Silicon accounted for *** percent.

In 2015, Mississippi Silicon established its silicon metal operations.[13] Events/activity impacting the silicon metal operations of U.S. producers include ***.[14] The manner in which these events/activity impacted the industry's financial results are described below.

Operations on silicon metal

Income-and-loss data for the U.S. producers' operations on silicon metal and corresponding changes in average per short ton values are presented in table III-11 and table

[11] All three U.S. producers reported their silicon metal financial results on a GAAP basis and for calendar-year periods.

[12] Globe's silicon metal operations are part of parent company Ferroglobe's Electrometallurgy—North America segment. Ferroglobe 2018 20-F, p. 70. Ferroglobe itself was created pursuant to the merger of Globe Specialty Metals and FerroAtlantica on December 23, 2015. Ferroglobe 2018 20-F, p. 36. Dow Silicones, which owns/operates DC Alabama, is the successor company to Dow Corning and is part of Dow's Performance Materials & Coatings segment. Dow 2019 10-Q, p. 64. Mississippi Silicon is a privately-held company, whose holding company (Mississippi Silicon Holdings is owned by ***. Submission with attachment from Counsel on behalf of Mississippi Silicon to USITC staff, February 10, 2020.

[13] ***. Ibid.

[14] *** U.S. producer questionnaires, responses to II-2. *** U.S. producer questionnaire, response to III-10. ***.

III-12, respectively. Table III-13 and table III-14 present a variance analysis and selected company-specific financial information, respectively.[15]

Net sales

On a value basis, *** represent the majority of the U.S. industry's overall silicon metal revenue (*** percent of total sales quantity). ***, which were reported by *** and ***, represent the remainder (*** percent). *** accounted for the majority of reported ***.[16]

Quantity

Total silicon metal sales quantity increased in 2017, declined in 2018, and then was lower in January-September 2019 compared to January-September 2018. On a company-specific basis, U.S. producers reported somewhat different patterns with respect to changes in sales quantity. *** total sales quantity increased throughout the full-year period followed by lower sales quantity in January-September 2019 compared to January-September 2018. In contrast, *** both reported higher sales quantity in 2017 followed by declines in 2018 and then higher sales quantity in January-September 2019 compared to January-September 2018.

[15] The Commission's traditional variance analysis is calculated in three parts: sales variance, cost of goods sold ("COGS") variance, and selling, general, and administrative ("SG&A") expenses variance. Each part consists of a price variance (in the case of the sales variance) or a cost or expense variance (in the case of the COGS and SG&A expense variances), and a volume variance. The sales or cost/expense variance is calculated as the change in unit price or per-unit cost/expense times the new volume, while the volume variance is calculated as the change in volume times the old unit price or per-unit cost/expense. As summarized at the bottom of the table, the price variance is from sales, the cost/expense variance is the sum of those items from COG and SG&A variances, respectively, and the volume variance is the sum of the volume components of the net sales, COGS, and SG&A expenses variances. The Commission's variance analysis is generally more meaningful when product mix and/or customer mix remain the same throughout the period. ***. Submission with attachment from *** to USITC staff, February 6, 2020. ***. Submission with attachment from *** to USITC staff, February 10, 2020.

[16] ***. Submission with attachment from *** to USITC staff, February 6, 2020.

Table III-11
Silicon metal: Results of operations of U.S. producers, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
Commercial shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Total net sales	178,292	189,083	185,575	137,495	110,826
	Value (1,000 dollars)				
Commercial shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Total net sales	402,490	425,726	489,700	365,778	265,579
Cost of goods sold.--					
Raw materials	179,803	194,829	202,755	151,277	115,586
Electricity	100,284	100,490	101,119	76,336	58,013
Direct labor	48,222	48,373	57,661	43,670	33,373
Other factory costs[1]	97,213	99,551	108,661	78,645	123,488
Less: Byproduct revenue	24,629	24,282	27,935	20,291	16,432
Total COGS	400,893	418,961	442,261	329,637	314,028
Gross profit	1,597	6,765	47,439	36,141	(48,449)
SG&A expense	27,417	25,238	29,933	20,688	16,025
Operating income or (loss)	(25,820)	(18,473)	17,506	15,453	(64,474)
Interest expense	***	***	***	***	***
All other expenses	***	***	***	***	***
All other income	***	***	***	***	***
Net income or (loss)	(33,212)	(25,085)	10,976	10,708	(70,494)
Depreciation/amortization	40,526	41,349	42,803	32,257	31,991
Cash flow	7,314	16,264	53,779	42,965	(38,503)
	Ratio to net sales (percent)				
Cost of goods sold.--					
Raw materials	44.7	45.8	41.4	41.4	43.5
Electricity	24.9	23.6	20.6	20.9	21.8
Direct labor	12.0	11.4	11.8	11.9	12.6
Other factory costs[1]	24.2	23.4	22.2	21.5	46.5
Less: Byproduct Revenue	6.1	5.7	5.7	5.5	6.2
Total COGS	99.6	98.4	90.3	90.1	118.2
Gross profit	0.4	1.6	9.7	9.9	(18.2)
SG&A expense	6.8	5.9	6.1	5.7	6.0
Operating income or (loss)	(6.4)	(4.3)	3.6	4.2	(24.3)
Net income or (loss)	(8.3)	(5.9)	2.2	2.9	(26.5)

Table continued on next page.

Table III-11—Continued
Silicon metal: Results of operations of U.S. producers, by firm, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Ratio to COGS (percent)				
Cost of goods sold before byproduct offset.--					
Raw materials	42.3	44.0	43.1	43.2	35.0
Electricity	23.6	22.7	21.5	21.8	17.6
Direct labor	11.3	10.9	12.3	12.5	10.1
Other factory costs[1]	22.8	22.5	23.1	22.5	37.4
Total COGS	100.0	100.0	100.0	100.0	100.0
	Unit value (dollars per short ton contained silicon)				
Commercial shipments	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Total net sales	2,257	2,252	2,639	2,660	2,396
Cost of goods sold.--					
Raw materials	1,008	1,030	1,093	1,100	1,043
Electricity	562	531	545	555	523
Direct labor	270	256	311	318	301
Other factory costs[1]	545	526	586	572	1,114
Less: Byproduct revenue	138	128	151	148	148
Average COGS	2,249	2,216	2,383	2,397	2,834
Gross profit	9	36	256	263	(437)
SG&A expense	154	133	161	150	145
Operating income or (loss)	(145)	(98)	94	112	(582)
Net income or (loss)	(186)	(133)	59	78	(636)
	Number of firms reporting				
Operating losses	***	***	***	***	***
Net losses	***	***	***	***	***
Data	3	3	3	3	3

[1] ***.

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

Table III-12
Silicon metal: Changes in AUVs, 2016-18, January-September 2018, and January-September 2019

Item	Between calendar years			January to September
	2016-18	2016-17	2017-18	2018-19
	Changes in unit values (dollars per short ton contained silicon)			
Commercial shipments	***	***	***	***
Transfers to related firms	***	***	***	***
Total net sales	▲381	▼(6)	▲387	▼(264)
Cost of goods sold.--				
Raw materials	▲84	▲22	▲62	▼(57)
Electricity	▼(18)	▼(31)	▲13	▼(32)
Direct labor	▲40	▼(15)	▲55	▼(16)
Other factory costs	▲40	▼(19)	▲59	▲542
Less: Byproduct Revenue	▲12	▼(10)	▲22	▲1
Average COGS	▲135	▼(33)	▲167	▲436
Gross profit	▲247	▲27	▲220	▼(700)
SG&A expense	▲8	▼(20)	▲28	▼(6)
Operating income or (loss)	▲239	▲47	▲192	▼(694)
Net income or (loss)	▲245	▲54	▲192	▼(714)

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

Table III-13
Silicon metal: Variance analysis of financial results, 2016-18, January-September 2018, and January-September 2019

Item	Between calendar years			January to September
	2016-18	2016-17	2017-18	2018-19
	Value (1,000 dollars)			
Net sales:				
Price variance	70,769	(1,124)	71,872	(29,251)
Volume variance	16,441	24,360	(7,898)	(70,948)
Net sales variance	87,210	23,236	63,974	(100,199)
Cost of sales:				
Cost/expense variance	(24,992)	6,196	(31,073)	(48,329)
Volume variance	(16,376)	(24,264)	7,773	63,938
Total cost of sales variance	(41,368)	(18,068)	(23,300)	15,609
Gross profit variance	45,842	5,168	40,674	(84,590)
SG&A expenses:				
Cost/expense variance	(1,396)	3,838	(5,163)	650
Volume variance	(1,120)	(1,659)	468	4,013
Total SG&A expense variance	(2,516)	2,179	(4,695)	4,663
Operating income variance	43,326	7,347	35,979	(79,927)
Summarized as:				
Price variance	70,769	(1,124)	71,872	(29,251)
Net cost/expense variance	(26,388)	10,034	(36,236)	(47,678)
Net volume variance	(1,055)	(1,563)	343	(2,997)

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

Table III-14
Silicon metal: Financial results of U.S. producers, by firm, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Net sales quantity (short tons contained silicon)				
DC Alabama (commercial sales)	***	***	***	***	***
DC Alabama (transfers)	***	***	***	***	***
DC Alabama (total sales)	***	***	***	***	***
Globe (commercial sales)	***	***	***	***	***
Globe (transfers)	***	***	***	***	***
Globe (total sales)	***	***	***	***	***
Mississippi Silicon (commercial sales)	***	***	***	***	***
Mississippi Silicon (transfers)	***	***	***	***	***
Mississippi Silicon (total sales)	***	***	***	***	***
Total net sales quantity	178,292	189,083	185,575	137,495	110,826
	Net sales value (1,000 dollars)				
DC Alabama (commercial sales)	***	***	***	***	***
DC Alabama (transfers)	***	***	***	***	***
DC Alabama (total sales)	***	***	***	***	***
Globe (commercial sales)	***	***	***	***	***
Globe (transfers)	***	***	***	***	***
Globe (total sales)	***	***	***	***	***
Mississippi Silicon (commercial sales)	***	***	***	***	***
Mississippi Silicon (transfers)	***	***	***	***	***
Mississippi Silicon (total sales)	***	***	***	***	***
Total net sales value	402,490	425,726	489,700	365,778	265,579
	COGS (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total COGS	400,893	418,961	442,261	329,637	314,028
	Gross profit or (loss) (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total gross profit or (loss)	1,597	6,765	47,439	36,141	(48,449)

Table continued on next page.

Table III-14—Continued
Silicon metal: Financial results of U.S. producers, by firm, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	SG&A expenses (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total SG&A expenses	27,417	25,238	29,933	20,688	16,025
	Operating income or (loss) (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total operating income or (loss)	(25,820)	(18,473)	17,506	15,453	(64,474)
	Net income or (loss) (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total net income or (loss)	(33,212)	(25,085)	10,976	10,708	(70,494)
	COGS to net sales value (percent)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average COGS to sales	99.6	98.4	90.3	90.1	118.2
	SG&A expenses to net sales value (percent)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average SG&A expenses to sales	6.8	5.9	6.1	5.7	6.0
	Operating income or (loss) to net sales value (percent)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average operating income or (loss) to sales	(6.4)	(4.3)	3.6	4.2	(24.3)
	Net income or (loss) to net sales value (percent)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average net income or (loss) to sales	(8.3)	(5.9)	2.2	2.9	(26.5)

Table continued on next page.

Table III-14—Continued
Silicon metal: Financial results of U.S. producers, by firm, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Unit net sales value (dollars per short ton contained silicon)				
DC Alabama (commercial sales)	***	***	***	***	***
DC Alabama (transfers)	***	***	***	***	***
DC Alabama (total sales)	***	***	***	***	***
Globe (commercial sales)	***	***	***	***	***
Globe (transfers)	***	***	***	***	***
Globe (total sales)	***	***	***	***	***
Mississippi Silicon (commercial sales)	***	***	***	***	***
Mississippi Silicon (transfers)	***	***	***	***	***
Mississippi Silicon (total sales)	***	***	***	***	***
Average unit net sales value	2,257	2,252	2,639	2,660	2,396
	Unit raw materials (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit raw materials	1,008	1,030	1,093	1,100	1,043
	Unit electricity (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit electricity	562	531	545	555	523
	Unit direct labor (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit direct labor	270	256	311	318	301
	Unit other factory costs (dollars per short ton contained silicon)				
DC Alabama[1]	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit other factory costs	545	526	586	572	1,114
	Unit byproduct revenue (dollars per short ton contained silicon)				
DC Alabama[2]	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit other factory costs	138	128	151	148	148

Table continued on next page.

Table III-14—Continued
Silicon metal: Financial results of U.S. producers, by firm, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Unit COGS (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit COGS	2,249	2,216	2,383	2,397	2,834
	Unit gross profit or (loss) (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit gross profit or (loss)	9	36	256	263	(437)
	Unit SG&A expense (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit SG&A expense	154	133	161	150	145
	Unit operating income or (loss) (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit operating income or (loss)	(145)	(98)	94	112	(582)
	Unit net income or (loss) (dollars per short ton contained silicon)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Average unit net income or (loss)	(186)	(133)	59	78	(636)

1 ***.
2 ***.

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

While *** indicated that demand for silicon metal has declined since 2016, the negative impact was reportedly exacerbated by increasing levels of silicon metal imports. In addition to the restart of its Selma, Alabama plant and higher corresponding sales volume, higher 2018 silicon metal revenue for parent company Ferroglobe's Electrometallurgy-North America segment was attributed to improved market conditions and a higher average selling price.[17] According to ***, the pattern of declining silicon metal demand in the U.S. reflected ***. ***.[18] While noting that there were changes in overall silicon metal demand during the period, *** indicated that its silicon metal sales were not directly impacted because most reflect ***.[19]

Value

Average per short ton sales value declined somewhat in 2017 and then increased to its highest level of the period in 2018. At the end of the period, average sales value was lower in January-September 2019 compared to January-September 2018. On a company-specific basis, *** reported the same directional pattern of change in average sales value during the full-year period (declining in 2017 and then increasing in 2018). In contrast, *** average sales value increased throughout the full-year period. Although magnitudes varied, *** of the U.S. producers reported lower average sales values in January-September 2019 compared to January-September 2018.

[17] Ferroglobe 2018 20-F, p. 71.
[18] Submission with attachment from *** to USITC staff, February 10, 2020. ***. Ibid.
[19] ***. Email with attachment from *** to USITC staff, February 24, 2020.

At the end of the period, *** attributed its lower average sales value primarily to a higher level of low-priced imports, but also noted an increasing share of sales to ***.[20] *** noted that, because a large share of its sales are made pursuant to ***, its average sales values do not always correspond directly to the market. With regard to its *** average sales value in 2018 specifically, *** attributed this to reduced import pressure in 2017 and 2018, during the pendency of antidumping and countervailing duty investigations against Australia, Brazil, Kazakhstan, and Norway. According to ***, import pressure subsequently increased and prices declined following the conclusions of these investigations.[21]

Transfer value

Transfers reported by *** represent sales to related downstream affiliates, while the transfers reported by *** primarily represent *** sales to ***. Reflecting different reporting structures and operations, the underlying transfer valuations adopted by *** were based on somewhat different

[20] Submission with attachment from *** to USITC staff, February 6, 2020. ***. Ibid.

[21] Submission with attachment from *** to USITC staff, February 10, 2020.

assumptions.[22] As shown in table III-14, *** average transfer value was higher compared to its average commercial sales value and was also higher than the average commercial sales values reported by ***.[23]

Cost of goods sold and gross profit

U.S producers vary in terms of the number and age of their underlying facilities. Mississippi Silicon, whose facility began operations in 2015, has the newest silicon metal facility. In terms of vertical integration, *** U.S. producer that reported input purchases from related suppliers.[24] In addition to facility restart and idling reported by ***, *** converted two furnaces to ferrosilicon production. As described by ***, furnace conversion costs were reportedly *** and were charged entirely to ***.[25] The impact of idling on the financial results of *** are described further below. In 2019, *** recognized ***.[26]

[22] ***. Submission with attachment from *** to USITC staff, February 6, 2020. ***. Email with attachment from *** to USITC staff.

[23] ***. Ibid.

[24] ***. *** U.S. producer questionnaire, response to III-7. ***. Ibid.

[25] Submission with attachment from *** to USITC staff, February 6, 2020.

[26] *** U.S. producer questionnaire, response to III-10. Notes to table III-11 and table III-14 in this section of the report present calculated pro forma January-September 2019 gross and operating results excluding ***.

Raw materials

Raw material cost is the largest component of COGS, ranging from *** percent of COGS (prior to byproduct deduction) (January-September 2019) to *** percent (2017). Primary raw material inputs include ***.

While reporting some variability, *** average per short ton raw material costs remained within relatively narrow ranges during the full-year period and were lower in January-September 2019 compared to January-September 2018. In contrast, *** average raw material cost, which was lowest on a company-specific basis throughout the period, increased *** in 2018 and was somewhat higher in January-September 2019 compared to January-September 2018.

*** noted that *** of its raw material costs increased in 2018 and 2019, in particular ***.[27] *** reported that while declines in *** partially offset price increases for other inputs, the decline in its average raw material cost was attributable to ***.[28] Among its raw material inputs, *** indicated that *** increased by the largest amount and was due to ***. According to ***, it was insulated by one year from *** increases because it entered into a *** in 2017, which limited the ***.[29]

Electricity

As a share of total COGS, electricity cost remained within a narrow range during the full-year period but declined somewhat at the end of the period. For the period as whole, electricity ranged from *** percent of COGS (prior to byproduct deduction) (January-September 2019) to *** percent (2016).[30]

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[27] Email with attachment from *** to USITC staff. ***. Ibid.

[28] Submission with attachment from *** to USITC staff, February 6, 2020.

[29] Submission with attachment from *** to USITC staff, February 10, 2020. ***. Ibid.

[30] With regard to electricity costs in general and its U.S. operations, Ferroglobe's 2018 20-F states ". . . we attempt to enter into long-term electric supply contracts that value our ability to interrupt load to achieve reasonable rates. Our power supply contracts have, in the past, resulted in stable price structures. In West Virginia, we have a contract with Brookfield Renewable Power to provide, on average, 45% of our power needs, from a dedicated hydroelectric facility, through December 2021 at a fixed rate. Our power needs for the non-hydroelectric component of West Virginia, Ohio, and Alabama are primarily sourced through special contracts that provide competitive rates whereas a portion of the power is also priced at market rates. At our Niagara Falls, New York plant, we have been granted a public sector package including 18.4 megawatts of hydro power through December 2021." Ferroglobe 2018 20-F, p. 49.

On a company-specific basis, average electricity cost reflects somewhat different patterns: *** average electricity cost fluctuated somewhat during the full-year period and then were lower and higher, respectively, in January-September 2019 compared to January-September 2018.[31] *** average electricity cost declined *** in 2017 and was also lower in January-September 2019 compared to January-September 2018.[32]

Direct labor and other factory costs

Direct labor as a share of COGS fluctuated somewhat but remained within a relatively narrow range throughout the period (*** percent of COGS (prior to byproduct deduction) (January-September 2019) and *** percent (January-September 2018)). The share of overall other factory costs (*** percent of COGS (prior to byproduct deduction) (2017) and *** percent (January-September 2019)) varied more notably. In addition to the *** and included in other factory costs, the higher share of COGS accounted for by other factory costs in January-September 2019 also reflects somewhat lower average raw material costs.

[31] ***. Submission with attachment from *** to USITC staff, February 6, 2020.
[32] ***. Submission with attachment from *** to USITC staff, February 10, 2020.

On a company-specific basis, ***, whose average per short ton other factory costs increased throughout the period, reported a large increase in other factory costs in January-September 2019 compared to January-September 2018. The majority of this increase was attributed to ***.[33] *** average other factory costs declined in 2017 and 2018.[34] [35] At the end of the period, *** higher average direct labor and average other factory costs reflect the net effect of the ***.[36] In contrast, *** average other factory costs increased between 2016 and 2018 and then was

[33] *** U.S. producer questionnaire, response to III-10. ***. Email with attachment from *** to USITC staff, February 24, 2020.

[34] ***. *** U.S. producer questionnaire, response to III-10.

[35] ***. Submission with attachment from *** to USITC staff, February 6, 2020.

[36] ***. Ibid. ***.

somewhat lower in January-September 2019 compared to January-September 2018.[37] Changes in *** other factory costs were attributed primarily to increased ***, related to the company's *** (see footnote 37), as well as ***. As described in footnote 41, ***.

Byproducts

*** reported similar byproducts (***) generated during the production of silicon metal.[38] As a ratio to COGS, the deduction for net byproduct revenue did not change substantially during the period.[39]

[37] ***. Submission with attachment from *** to USITC staff, February 10, 2020. ***. Ibid.

[38] 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. Given differences in the way byproduct revenue can be recognized and in order to maintain consistency, the Commission's income statement format classified net byproduct revenue as a separate line item deduction to determine total COGS.

[39] ***. Email with attachment from *** to USITC staff, February 24, 2020. USITC auditor notes.

Cost of goods sold

Average COGS declined in 2017, increased in 2018, and then was higher in January-September 2019 compared to January-September 2018. *** average COGS increased throughout the period and reached its highest level of January-September 2019 in conjunction with ***. *** average COGS remained within a relatively narrow range throughout the period.[40] According to ***, its lower average COGS in January-September 2019 compared to January-September 2018 was due to a combination of lower average ***.[41]

Gross profit or loss

The U.S. industry began the period with its lowest level of gross profit in 2016, followed by somewhat higher gross profit in 2017, and its highest level of gross profit in 2018. The period ended with a gross loss in January-September 2019. The relatively large increase in gross profit in 2018 corresponded with a higher average per short ton sales value, which was partially offset by higher average COGS.

[40] ***. See submission with attachment from *** to USITC staff, February 6, 2020.
[41] ***. Submission with attachment from *** to USITC staff, February 10, 2020.

While *** reported gross losses in 2016 and 2017, the gross losses reported by *** were higher than ***. As noted below in the *Operating income or loss section*, ***.[42] In 2018, *** companies transitioned to a gross profit. In contrast, *** reported positive but declining gross profit during the full-year period.[43] At the end of the period, *** reported declines in their gross results: *** reporting a large gross loss in conjunction with an ***; *** reporting a gross loss in January-September 2019; and *** reporting a decline to essentially breakeven gross profit.[44]

[42] ***.

[43] ***. Email with attachment from *** to USITC staff, February 24, 2020.

[44] ***. Submission with attachment from *** to USITC staff, February 6, 2020.

SG&A expenses and operating income or loss

SG&A expenses

On a company-specific basis, U.S. producers reported a range of SG&A expense ratios (total SG&A expenses divided by total revenue) with ***, which reported ***, reporting the lowest SG&A expense ratios throughout the period. ***, whose SG&A expense ratios were the highest throughout the period, reported its highest SG&A expense ratio in 2018 followed by a lower SG&A expense ratio in January-September 2019 compared to January-September 2018.[45] *** SG&A expense ratios declined somewhat during the full-year period and then were higher in in January-September 2019 compared to January-September 2018.[46]

Operating income or loss

During the full-year period, the decline in SG&A expense ratio in 2017 amplified the positive impact of higher gross profit. In 2018, the modest increase in the SG&A expense ratio partially offset the higher level of total gross profit. At the end of the period, the somewhat higher SG&A expense ratio in January-September 2019 compared to January-September 2018 amplified the negative effect of the industry's transition to a gross loss. Given the relatively modest range within which SG&A expense ratios moved, the pattern of overall operating results was largely determined by the factors impacting financial results at the gross level.

[45] ***. Submission with attachment from *** to USITC staff, February 10, 2020.
[46] ***. Submission with attachment from *** to USITC staff, February 6, 2020.

On a company-specific basis, *** reported operating income in 2018 *** (full-year, interim period), while *** reported operating losses of varying magnitude throughout the period. *** attributed the pattern of its operating results to depressed pricing during most of the period, cost-related issues such as increased ***, partially offset by cancellation of *** for part of the period, and high levels of *** associated with its ***.[47] *** stated that the ***, indicating that the impact of *** (directly and/or indirectly) on operating results was limited (see footnote 13). *** generated positive but declining operating results during the full-year period and, in conjunction with its transition to a gross loss, reported an operating loss in January-September 2019. The level of *** operating loss in January-September 2019 was substantially amplified by ***.

Interest expense, other expenses, and net income or loss

While *** reported interest expense throughout the period, *** accounted for the majority of such expenses.[48] Other expenses were reported by *** throughout the period and by *** in 2016 only. *** reported no other

[47] ***. Submission with attachment from *** to USITC staff, February 10, 2020.
[48] ***. Email with attachment from *** to USITC staff, February 24, 2020.

expenses.[49] While *** and *** also reported other income, the majority was reported by ***.[50]

While absolute amounts differed due to the presence of net interest expense and net other income and expenses, the trend of operating results and net results was directionally the same throughout the period.

Capital expenditures and research and development expenses

Table III-15 presents capital expenditures and research and development ("R&D") expenses by firm. During January 2016-September 2019, *** accounted for *** percent of total capital expenditures, followed by *** (*** percent), and *** (*** percent). *** capital expenditures were at their highest level in 2016 and *** were at their *** level in 2017.[51] [52] ***, consistent with the *** size of its operations, reported *** capital expenditure amounts compared to ***. *** capital expenditures were at their *** full-year level in 2016. For the industry as a whole, total depreciation exceeded reinvestment in the form of capital expenditures throughout the period.

Table III-15 shows that *** U.S. producer reported R&D expenses.

[49] ***. *** U.S. producer questionnaire, response to III-10.
[50] ***. *** U.S. producer questionnaire, response to III-10.
[51] ***. Email with attachment from *** to USITC staff, February 24, 2020.
[52] ***. *** U.S. producer questionnaire, response to III-13 (note 1).

Table III-15
Silicon metal: Capital expenditures and R&D expenses of U.S. producers, 2016-18, January-September 2018, and January-September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Capital expenditures (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total capital expenditures	***	***	***	***	***
	Research and development expenses (1,000 dollars)				
DC Alabama	***	***	***	***	***
Globe	***	***	***	***	***
Mississippi Silicon	***	***	***	***	***
Total R&D expenses	***	***	***	***	***

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

Assets and return on assets

Table III-16 presents data on the U.S. producers' total assets and their operating return on assets ("ROA").[53]

Table III-16
Silicon metal: U.S. producers' total assets and operating return on assets, 2016-18, January-September 2018, and January-September 2019

Firm	Calendar year		
	2016	2017	2018
	Total net assets (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
Mississippi Silicon	***	***	***
Total net assets	587,781	573,625	583,498
	Operating return on assets (percent)		
DC Alabama	***	***	***
Globe	***	***	***
Mississippi Silicon	***	***	***
Average operating return on assets	(4.4)	(3.2)	3.0

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

[53] With regard to a company's overall operations, staff notes that a 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 current and non-current assets, which, in many instances, are not product specific. For some producers, allocation factors were presumably necessary to report total asset values specific to their silicon metal operations. The ability of U.S. producers to assign total asset values to discrete product lines affects the meaningfulness of operating return on net assets.

Part IV: U.S. imports and the foreign industry

U.S. imports

Overview

The Commission issued questionnaires to 50 potential importers of silicon metal, as well as to all U.S. producers of silicon metal. Seventeen firms provided data and information in response to the questionnaires, while two firms indicated that they had not imported silicon metal since January 2014. U.S. import data and related information are based on Commerce's official import statistics and the questionnaire responses of 17 U.S. importers of silicon metal that are believed to have accounted for 81.4 percent of U.S. imports of silicon metal in 2018 (there were no imports from Russia in 2018 or throughout the period of which data were collected).

Imports from subject and nonsubject countries

Table IV-1 presents information on U.S. general imports of silicon metal during 2016-18, January to September 2018, and January to September 2019.[1] [2] Imports of silicon metal from nonsubject sources by quantity decreased by 34,033 short tons (contained silicon) from 2016 to 2018, and have decreased by $22.0 million. During January to September 2019 imports of silicon metal from all other sources by quantity were 20,949 short tons and $17.1 million higher than the comparable 2018 period. The top three countries of imports of silicon metal in 2018 were Brazil, Canada, and Norway.

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[1] General Imports measures 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 Foreign Trade Zones ("FTZs") under Customs custody. U.S. import statistics presented in this report are based on General 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 FTZs for their importation of silicon metal. Since U.S. import statistics are presented on the basis of General Imports, values are reported on a CIF (cost, insurance, freight) value basis, as opposed to a LDPV (landed, duty-paid value) basis.

[2] General imports have exceeded imports for consumption in each full year between 2014 and 2018, by quantities ranging from 11,203 to 60,625 short tons (contained silicon). The differentials generally reflect imports into foreign trade zones (FTZs), primarily by ***, importer questionnaire section, II-6a.

Table IV-1
Silicon metal: U.S. imports by source, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. imports from.--					
Russia	---	---	---	---	---
China	339	259	240	151	186
Brazil	68,340	77,579	40,764	31,836	42,379
Norway	14,419	15,292	21,358	18,297	15,010
Australia	18,459	20,780	4,344	1,582	5,341
Kazakhstan	10,365	10,360	3,045	2,079	8,369
Canada	21,542	25,188	29,914	21,060	26,148
Thailand	748	8,656	18,439	14,781	5,030
South Africa	24,196	1,624	78	52	424
All other sources	8,266	11,774	14,456	11,248	19,151
Countries currently under order	339	259	240	151	186
Countries recently investigated	111,583	124,010	69,512	53,795	71,099
Nonsubject sources	166,673	171,511	132,640	101,088	122,036
All import sources	166,673	171,511	132,640	101,088	122,036
	Value (1,000 dollars)				
U.S. imports from.--					
Russia	---	---	---	---	---
China	453	378	349	231	247
Brazil	158,897	177,842	107,071	85,362	104,483
Norway	29,792	29,146	55,104	47,102	33,248
Australia	34,601	41,366	11,163	4,252	12,782
Kazakhstan	17,347	17,466	6,064	4,288	14,870
Canada	52,122	60,356	82,733	57,846	65,862
Thailand	1,216	18,397	50,536	40,576	11,789
South Africa	56,427	3,001	137	91	942
All other sources	16,616	22,796	32,277	25,731	38,357
Countries currently under order	453	378	349	231	247
Countries recently investigated	240,636	265,820	179,402	141,003	165,382
Nonsubject sources	367,470	370,748	345,434	265,478	282,579
All import sources	367,470	370,748	345,434	265,478	282,579

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Table IV-1—Continued
Silicon metal: U.S. imports by source, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Unit value (dollars per short ton contained silicon)				
U.S. imports from.--					
Russia	---	---	---	---	---
China	1,336	1,460	1,455	1,523	1,329
Brazil	2,325	2,292	2,627	2,681	2,465
Norway	2,066	1,906	2,580	2,574	2,215
Australia	1,875	1,991	2,570	2,687	2,393
Kazakhstan	1,674	1,686	1,991	2,062	1,777
Canada	2,420	2,396	2,766	2,747	2,519
Thailand	1,626	2,125	2,741	2,745	2,344
South Africa	2,332	1,848	1,749	1,748	2,222
All other sources	2,010	1,936	2,233	2,288	2,003
Countries currently under order	1,336	1,460	1,455	1,523	1,329
Countries recently investigated	2,157	2,144	2,581	2,621	2,326
Nonsubject sources	2,205	2,162	2,604	2,626	2,316
All import sources	2,205	2,162	2,604	2,626	2,316
	Share of quantity (percent)				
U.S. imports from.--					
Russia	---	---	---	---	---
China	0.2	0.2	0.2	0.1	0.2
Brazil	41.0	45.2	30.7	31.5	34.7
Norway	8.7	8.9	16.1	18.1	12.3
Australia	11.1	12.1	3.3	1.6	4.4
Kazakhstan	6.2	6.0	2.3	2.1	6.9
Canada	12.9	14.7	22.6	20.8	21.4
Thailand	0.4	5.0	13.9	14.6	4.1
South Africa	14.5	0.9	0.1	0.1	0.3
All other sources	5.0	6.9	10.9	11.1	15.7
Countries currently under order	0.2	0.2	0.2	0.1	0.2
Countries recently investigated	66.9	72.3	52.4	53.2	58.3
Nonsubject sources	100.0	100.0	100.0	100.0	100.0
All import sources	100.0	100.0	100.0	100.0	100.0

Table continued on next page

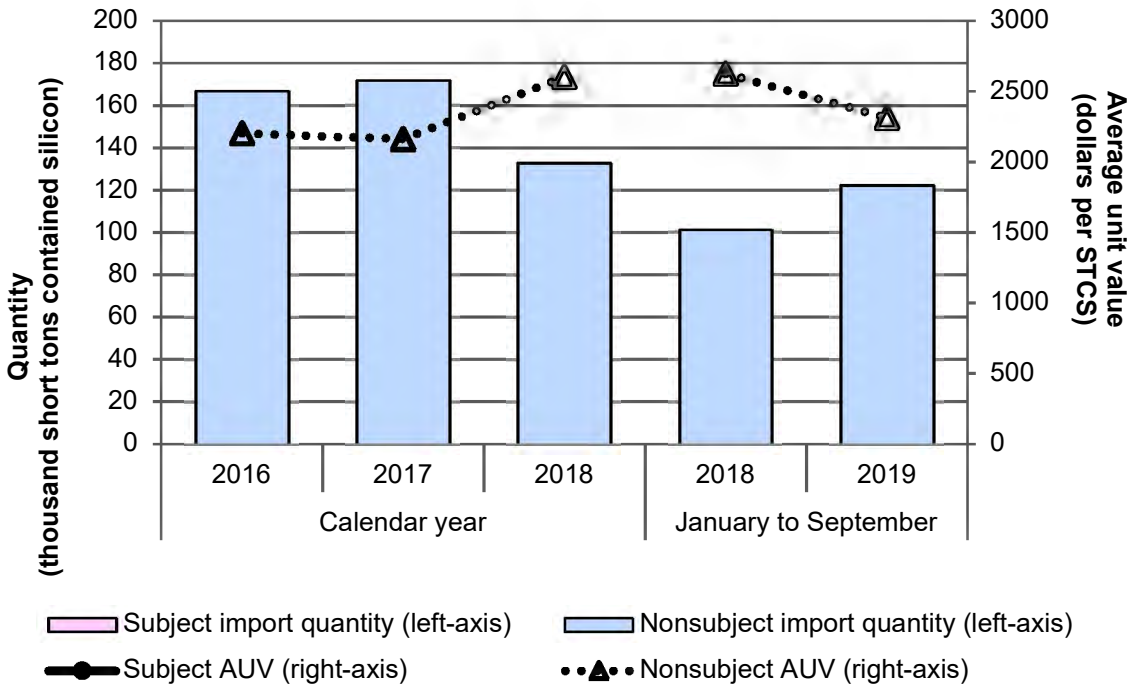
Table IV-1—Continued
Silicon metal: U.S. imports by source, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Share of value (percent)				
U.S. imports from.--					
Russia	---	---	---	---	---
China	0.1	0.1	0.1	0.1	0.1
Brazil	43.2	48.0	31.0	32.2	37.0
Norway	8.1	7.9	16.0	17.7	11.8
Australia	9.4	11.2	3.2	1.6	4.5
Kazakhstan	4.7	4.7	1.8	1.6	5.3
Canada	14.2	16.3	24.0	21.8	23.3
Thailand	0.3	5.0	14.6	15.3	4.2
South Africa	15.4	0.8	0.0	0.0	0.3
All other sources	4.5	6.1	9.3	9.7	13.6
Countries currently under order	0.1	0.1	0.1	0.1	0.1
Countries recently investigated	65.5	71.7	51.9	53.1	58.5
Nonsubject sources	100.0	100.0	100.0	100.0	100.0
All import sources	100.0	100.0	100.0	100.0	100.0
	Ratio to U.S. production (percent)				
U.S. imports from.--					
Russia	---	---	---	---	---
China	0.2	0.1	0.1	0.1	0.2
Brazil	39.4	40.0	21.7	22.8	38.6
Norway	8.3	7.9	11.4	13.1	13.7
Australia	10.6	10.7	2.3	1.1	4.9
Kazakhstan	6.0	5.3	1.6	1.5	7.6
Canada	12.4	13.0	15.9	15.1	23.8
Thailand	0.4	4.5	9.8	10.6	4.6
South Africa	13.9	0.8	0.0	0.0	0.4
All other sources	4.8	6.1	7.7	8.0	17.4
Countries currently under order	0.2	0.1	0.1	0.1	0.2
Countries recently investigated	64.3	63.9	37.0	38.5	64.8
Nonsubject sources	96.0	88.4	70.6	72.3	111.1
All import sources	96.0	88.4	70.6	72.3	111.1

Note.—Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.
Note.--Russia and China are currently under order. Countries recently investigated include Brazil, Norway, Australia and Kazakhstan.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Figure IV-1
Silicon metal: U.S. import quantity and average unit value, 2016-18, January to September 2018, and January to September 2019



Official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 31, 2019.

U.S. importers' imports subsequent to September 30, 2019

The Commission requested importers to indicate whether they had imported or arranged for the importation of silicon metal for delivery after September 30, 2019. None of the importers had arranged imports from Russia, while 11 importers reported arranged imports from nonsubject sources for delivery after September 30, 2019.

Table IV-2
Silicon metal: U.S. importers' arranged imports

Arranged U.S. imports from	Period				
	Oct-Dec 2019	Jan-Mar 2020	Apr-Jun 2020	Jul-Sep 2020	Total
Russia	---	---	---	---	---
Nonsubject sources	22,674	19,268	24,083	19,608	85,633
All import sources	22,674	19,268	24,083	19,608	85,633

Source: Compiled from data submitted in response to Commission Questionnaires

U.S. importers' inventories

Table IV-3 presents data for inventories of U.S. imports of silicon metal held in the United States. No importer reported inventories for silicon metal from Russia, however the importer inventories for nonsubject countries decreased from 2016 to 2018 by 20.9 percent, but were higher by 16.8 percent in January to September 2019 than in January to September 2018, reflecting in part the level of inventories held by ***.

Table IV-3
Silicon metal: U.S. importers' end-of-period inventories of imports, by source, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Inventories (short tons contained silicon); Ratios (percent)				
Imports from Russia:					
Inventories	---	---	---	---	---
Ratio to U.S. imports	---	---	---	---	---
Ratio to U.S. shipments of imports	---	---	---	---	---
Ratio to total shipments of imports	---	---	---	---	---
Imports from nonsubject sources:					
Inventories	16,862	13,925	13,335	16,041	18,728
Ratio to U.S. imports	10.3	10.1	12.4	14.3	14.3
Ratio to U.S. shipments of imports	9.5	9.0	11.1	13.2	13.8
Ratio to total shipments of imports	9.4	9.0	11.1	13.2	13.8
Imports from all import sources:					
Inventories	16,862	13,925	13,335	16,041	18,728
Ratio to U.S. imports	10.3	10.1	12.4	14.3	14.3
Ratio to U.S. shipments of imports	9.5	9.0	11.1	13.2	13.8
Ratio to total shipments of imports	9.4	9.0	11.1	13.2	13.8

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.

The industry Russia

Overview

During the final phase of the original investigation, the Commission received foreign producer questionnaires from three firms, which accounted for all known production of silicon metal in Russia in 2001:***;[3] ***; and ***. *** shared common ownership through ***. *** accounted for *** percent of silicon metal production in Russia in 2001, *** accounted for *** percent, and SKU accounted for *** percent.[4]

During the first expedited five-year review, *** indicated in its response to the Commission's notice of institution that there is only one producer of silicon metal in Russia (Rusal).[5] No foreign producers or exporters of silicon metal from Russia submitted a response to the Commission's questionnaires.

During the second full five-year review, no foreign producers or exporters of silicon metal from Russia submitted a response to the Commission's questionnaire and thus there was limited information on the Russian silicon metal industry. The evidence indicated that only two Russian producers existed: ***, ***.[6] ***.[7] Russian production ***. ***.[8] In 2012, LLC SUAL-Kremny-Ural and JSC Kremny produced a total of *** short tons of silicon metal, which accounted for *** percent of Russian silicon metal production for that year.[9] The Commission received one importer questionnaire from ***, reported importing *** short tons of silicon metal from Russia in ***.[10]

Along with being the *** leading silicon metal producer in the world in 2018, Russia was a leading global producer of ferrosilicon.[11] In 2018 (the most recent year for which data are available), Russia was the world's second largest producer of ferrosilicon. There are currently six ferrosilicon producing plants in Russia, with a total estimated ferrosilicon production

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[3] Bratsk began switch from silicon metal to ferrosilicon production in 2003 and was acquired by the Mechel Group in 2007. Mechel website, http://www.mechel.com/sector/steel/bratsk_ferroalloy_plant/history/, accessed April 15, 2020.

[4] First review confidential report, p. IV-4.

[5] First review confidential report, p. I-33.

[6] Second review confidential report, p. IV-4.

[7] Second review confidential report, p. IV-4.

[8] Attachment to Globe's U.S. producers questionnaire response, *** October 2013, pp. 19 and 33.

[9] Second review confidential report, pp. II-7, IV-4.

[10] Second review confidential report, p. II-7.

[11] ***.

capacity of *** short tons per year. One of the Russian ferrosilicon producers is Bratsk Ferroalloy Plant, produced silicon metal until the order was issued in 2003 and was a respondent in the original antidumping investigation.[12] In 2003, after the U.S. antidumping duty order was issued, the smelter was sold, renamed Bratsk Ferroalloy Plant, and switched from silicon metal production to ferrosilicon production.[13]

The Commission issued foreign producers' or exporters' questionnaires to one firm, Rusal, believed to produce and/or export all silicon metal from Russia.[14] Rusal is the largest Russian silicon metal producer. It is also the fifth largest global producer.[15] [16] In 2015, Rusal invested $10 million in high-grade silicon production for alloys by increasing its capacity by 1,000 tonnes per year.[17] On January 27, 2019, the U.S. Department of the Treasury's Office of Foreign Asset Controls lifted sanctions on UC Rusal following an earlier notification submitted to Congress on December 19, 2018.[18] Table IV-4 presents information on the silicon metal operations of Rusal.

Table IV-4
Silicon metal: Summary data for producers in Russian producer / exporter Rusal, 2018

Firm	Production (short tons contained silicon)	Share of reported production (percent)	Exports to the United States (short tons contained silicon)	Share of reported exports to the United States (percent)	Total shipments (short tons contained silicon)	Share of firm's total shipments exported to the United States (percent)
Rusal	***	***	***	***	***	***
Total	***	***	***	***	***	***

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

[12] Globe's prehearing briefs, March 24, 2020, p. 19.

[13] Globe's response to the notice of institution, p. 11; Globe's prehearing briefs, March 24, 2020, p. 19.

[14] Rusal foreign producer questionnaire response.

[15] Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon Portugal, p. 6.

[16] Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon Portugal, p. 6.

[17] Metal Bulletin, "Rusal will invest $10m in high-grade silicon production for alloys," December 9, 2014, https://www.metalbulletin.com/Article/3408487/R,usal-will-invest-10m-in-high-grade-silicon-production-for-alloys.html, retrieved February 26, 2020.

[18] U.S. Department of the Treasury, OFAC Delists En+, Rusal, and EuroSibEnergo, https://home.treasury.gov/news/press-releases/sm592, January 27, 2018.

Changes in operations

As presented in table IV-5 Rusal reported several operational and organizational changes since January 1, 2014.

Table IV-5
Silicon metal: Russian producer / exporter Rusal's reported changes in operations, since January 1, 2014

Item / Firm	Narrative
Other:	
***	***

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

Operations on silicon metal

Table IV-6 presents information on the silicon metal operations of the responding producer in Russia for 2016-18, January through September 2018, and January through September 2019. Aggregate capacity for the Russian producer of silicon metal decreased by *** short tons from 2016 to 2018. Aggregate capacity for the Russian producer / exporter Rusal was *** short tons lower in January-September 2019 than January-September 2018. Production decreased by *** short tons from 2016 to 2018, and was *** short tons lower in January-September 2019 than January-September 2018. Capacity utilization increased by *** percentage points from 2016 at *** percent to 2018 at ***.[19] Capacity utilization was *** percentage points lower in January-September 2019 than January-September 2018. End-of-period inventories increased by *** percent from 2016 to 2018 but were *** percent lower in January-September 2019 than January-September 2018. Total shipments of the Russian producer / exporter Rusal decreased by *** percent from 2016 to 2018, but were *** percent higher in January-September 2019 than January-September 2018. Russian producer / exporter Rusal's exports were primarily to the European Union. ***[20]

[19] Rusal foreign producer questionnaire section, II-2.
[20] ***.

Table IV-6
Silicon metal: Russian producer / exporter Rusal's capacity, production, shipments, and inventories, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
Capacity	***	***	***	***	***
Production	***	***	***	***	***
End-of-period inventories	***	***	***	***	***
Shipments: Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to: United States	***	***	***	***	***
European Union	***	***	***	***	***
Asia	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Value (1,000 dollars)				
Shipments: Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to: United States	***	***	***	***	***
European Union	***	***	***	***	***
Asia	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

Table continued on next page

Table IV-6—Continued
Silicon metal: Russian producer / exporter Rusal's capacity, production, shipments, and inventories, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Unit value (dollars per short ton contained silicon)				
Shipments: Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to: United States	***	***	***	***	***
European Union	***	***	***	***	***
Asia	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Inventories/production	***	***	***	***	***
Inventories/total shipments	***	***	***	***	***
Share of total shipments: Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to: United States	***	***	***	***	***
European Union	***	***	***	***	***
Asia	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

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

As shown in table IV-7, Russian producer / exporter Rusal produced no other products on the same equipment and machinery used to produce silicon metal.

Table IV-7
Silicon metal: Russian producer / exporter Rusal's overall capacity and production on the same equipment as subject production, 2016-18, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (Short tons)				
Overall capacity	***	***	***	***	***
Production:					
Silicon metal	***	***	***	***	***
Weight of other elements	***	***	***	***	***
Silicon metal total weight	***	***	***	***	***
Ferrosilicon	***	***	***	***	***
All other products	***	***	***	***	***
Out-of-scope production	***	***	***	***	***
Total production	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Share of production:					
Silicon metal	***	***	***	***	***
Weight of other elements	***	***	***	***	***
Silicon metal total weight	***	***	***	***	***
Ferrosilicon	***	***	***	***	***
All other products	***	***	***	***	***
Out-of-scope production	***	***	***	***	***
Total production	***	***	***	***	***

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

Exports

According to GTA, exports of silicon metal from Russia increased from 21,677 short tons in 2016 to 27,193 short tons in 2018 (table IV-8). During 2018, Jersey [21] was the top export market for silicon metal from Russia, accounting for 58.3 percent of exports, followed by the Germany, accounting for 19.8 percent of exports. The unit value of Russia's exports increased from $1,590 per short ton in 2016 to $1,911 per short tons in 2018.

Table IV-8
Silicon metal: Exports from Russia by destination market, 2016-18

Destination market	Calendar year		
	2016	2017	2018
	Quantity (short tons contained silicon)		
United States	---	---	---
Jersey	13,833	10,981	15,840
Germany	5,813	4,975	5,382
Netherlands	1,767	595	4,894
Belarus	155	258	674
Sweden	---	287	220
Ukraine	87	43	57
Armenia	22	---	44
Uzbekistan	---	---	44
All other destination markets	0	16	37
Total exports	21,677	17,155	27,193
	Value (1,000 dollars)		
United States	---	---	---
Jersey	20,418	15,909	29,624
Germany	11,269	9,300	11,367
Netherlands	2,382	834	9,047
Belarus	224	404	1,095
Sweden	---	471	467
Ukraine	143	86	118
Armenia	33	---	87
Uzbekistan	---	---	78
All other destination markets	0.4	40	96
Total exports	34,470	27,044	51,979

Table continued on next page.

[21] The Bailiwick of Jersey is a Crown dependency located near the coast of Normandy, France. The Crown dependencies are three island territories off the coast of Great Britain that are self-governing possessions of the Crown, which include the Bailiwick of Guernsey, the Bailiwick of Jersey, and the Isle of Man. Jersey is part of a customs union with the United Kingdom and the two do not impose import tariffs on goods passing between them. Jersey also has a trade relationship with the European Union, the Island is treated as part of the European Union for the purposes of free trade in goods, but otherwise is not a part of the EU. Response to the notice of institution, July 3, 2019, pp. 66-68.

Table IV-8—Continued
Silicon metal: Russia exports by destination market, 2016-18

Destination market	Calendar year		
	2016	2017	2018
	Unit value (dollars per short ton contained silicon)		
United States	---	---	---
Jersey	1,476	1,449	1,870
Germany	1,939	1,869	2,112
Netherlands	1,348	1,401	1,849
Belarus	1,443	1,568	1,624
Sweden	---	1,644	2,116
Ukraine	1,647	2,006	2,092
Armenia	1,497	---	1,969
Uzbekistan	---	---	1,774
All other destination markets	13,952	2,545	2,589
Total exports	1,590	1,576	1,911
	Share of quantity (percent)		
United States	---	---	---
Jersey	63.8	64.0	58.3
Germany	26.8	29.0	19.8
Netherlands	8.2	3.5	18.0
Belarus	0.7	1.5	2.5
Sweden	---	1.7	0.8
Ukraine	0.4	0.2	0.2
Armenia	0.1	---	0.2
Uzbekistan	---	---	0.2
All other destination markets	0.0	0.1	0.1
Total exports	100.0	100.0	100.0

Note.—The Bailiwick of Jersey is a Crown dependency located near the coast of Normandy, France. The Crown dependencies are three island territories off the coast of Great Britain that are self-governing possessions of the Crown, which include the Bailiwick of Guernsey, the Bailiwick of Jersey, and the Isle of Man.
Note.—Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2018 data.

Source: Official exports statistics under HS subheading 2804.69 as reported by Customs Committee of Russia in the Global Trade Atlas database, accessed January 2, 2020.

Antidumping or countervailing duty orders in third-country markets

On July 5, 2017, the Canada Border Services Agency ("CBSA") terminated its investigation with regard to Silicon Metal from Russia[22] because "the volume of goods imported from that country during the CBSA's period of investigation was found to be negligible for the purposes of SIMA."[23]

Global market

Although information on the global silicon metal market is not usually readily available, Ferroglobe (a leading producer of silicon metal) estimated global production of silicon metal was 3 million tons and global silicon metal consumption was estimated at 2.9 million tons in 2018.[24] As presented in figure IV-1, global supply and demand changes have displayed a seasonal pattern since 2015. Supply and demand (consumption) quantities, typically, rose in the spring and summer quarters and fell in the fall and winter quarters. Additionally, Ferroglobe published CRU's silicon metal prices in three major markets including the United States, the EU, and China. As presented in figure IV-3, each of the prices followed a similar trend rising in 2017, peaking in early 2018, and subsequently falling into year's end.

Lastly, the industry experienced an increase in production costs from 2017 to 2018 due to increasing input costs such as coal, quartz, oil/natural gas, and electrodes. As presented in figure IV-4, the industry is expecting input costs increases that will force prices for silicon metal to rise as well.

World silicon metal production in 2016 was estimated at 2.7 million metric tons. China remained the dominant force in the market; accounting for around 75 percent of global capacity and 65 percent of world production. Global silicon metal capacity utilization was estimated at 51 percent in 2016.[25]

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[22] Canadian International Trade Tribunal, Silicon Metal, Inquiry No. NQ-2017-001, Reasons issued, Friday, November 17, 2017, http://www.citt.gc.ca/en/node/8185, retrieved July 17, 2019.

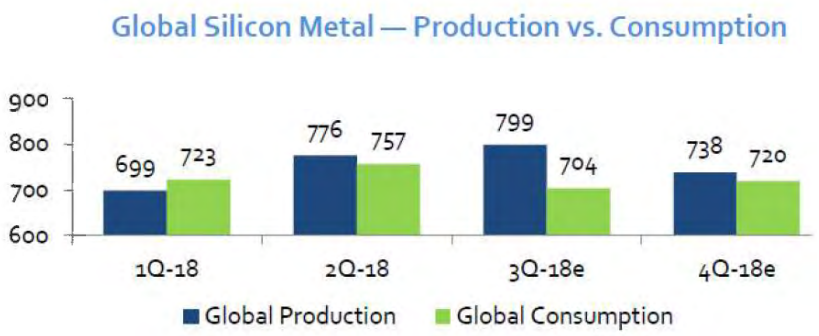
[23] The *Special Import Measures Act* or "SIMA" is a trade remedy law designed to protect Canadian industry from injury caused by the dumping and subsidizing of imported goods.

[24] Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon, Portugal, p. 18.

[25] Roskill (a market research firm) estimated Chinese production of silicon metal, capacity and utilization rates. "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.

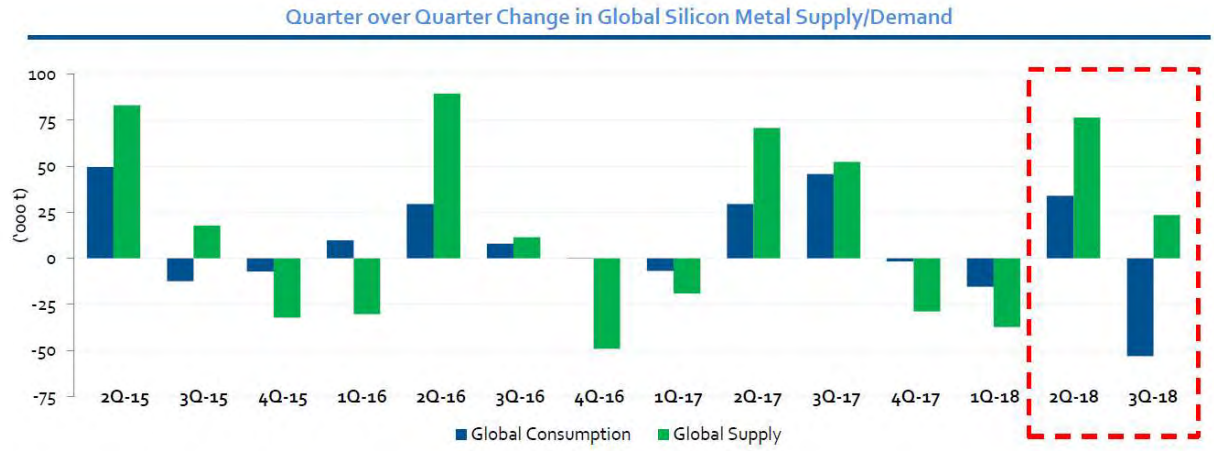
Recent global developments associated with the Coronavirus-19 pandemic have created some uncertainty in forecasts for consumption and production of silicon metal in the near future. ***[26]

Figure IV-1
Silicon metal: Comparison of global production and consumption



Source: Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon, Portugal, p. 18.

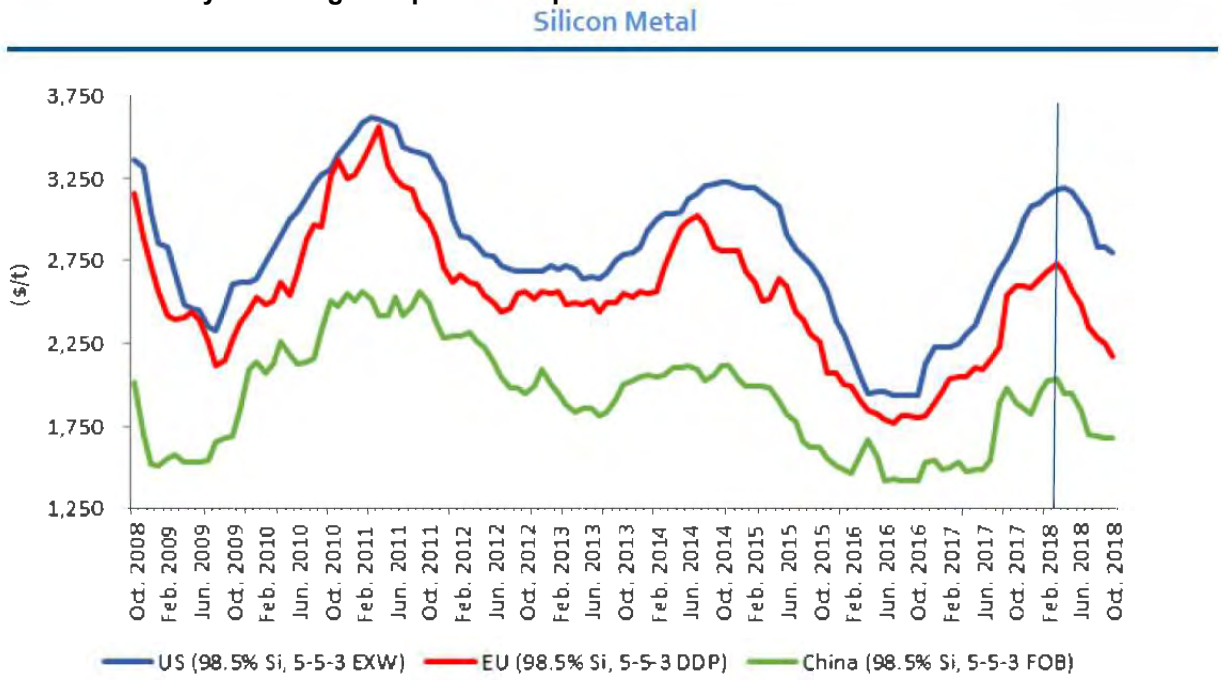
Figure IV-2
Silicon metal: Change in global supply and demand



Source: Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon, Portugal, p. 14.

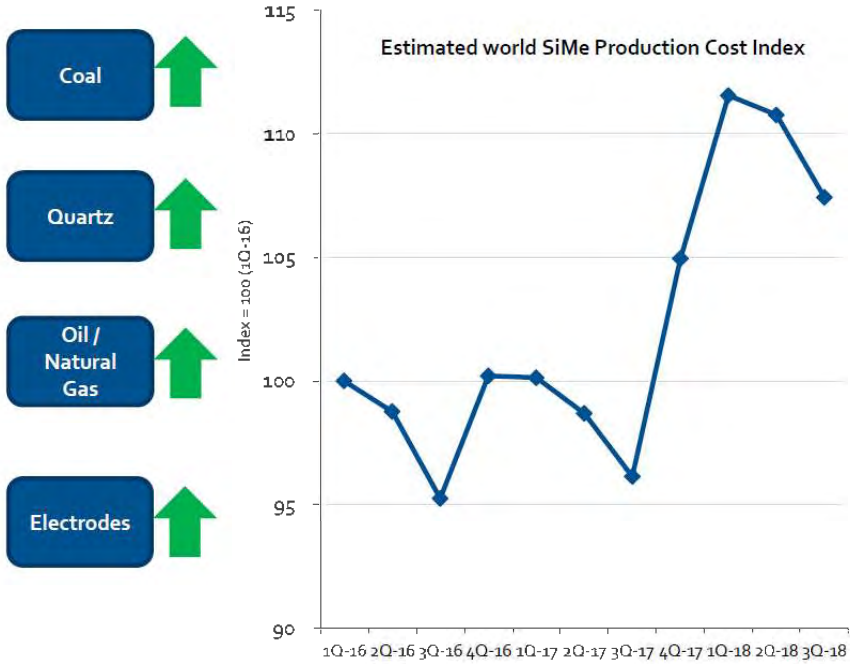
[26] ***.

Figure IV-3
Silicon metal: 10-year changes in prices comparison



Source: Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon, Portugal, p. 13.

Figure IV-4
Silicon metal: Input price changes since 2016



Source: Ferroglobe, "Ferroglobe PLC presentation at CRU silicon metal conference Lisbon," presentation at the CRU silicon market forum Portugal 2018, November 14, 2018, in Lisbon, Portugal, p. 20.

Part V: Pricing data

Factors affecting prices

Raw material costs

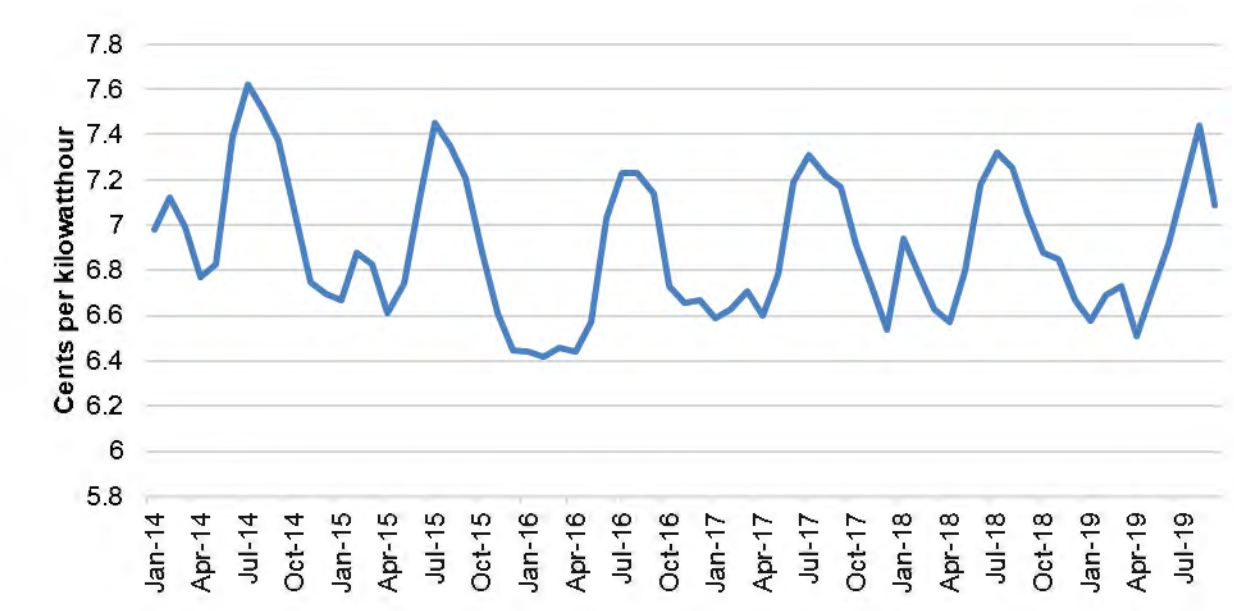
Silicon metal is produced from mined quartzite and consists almost entirely of elemental silicon with very small amounts of impurities (such as iron, calcium, and aluminum). U.S. producers reported that raw materials as a share of cost of goods sold increased from 42.3 percent in 2016 to 43.1 percent in 2018. However, during January-September 2019, raw materials as a share of cost of goods sold accounted for only 35.0 percent of the cost of goods sold.

U.S. producers *** and *** reported that prices for quartz, charcoal, wood chips, and electrodes have increased since 2014 but were offset by a decrease in coal prices. *** added that electrode prices increased significantly in 2017 and 2018 but decreased in 2019. Overall, U.S. importers reported that raw material prices either increased or fluctuated and expect them to continue to do so in the future. Importer *** reported prices of raw materials and inputs increased at the rate of inflation, but that these prices do not affect the sales price for silicon metal. Importer *** reported that raw material prices "significantly" affect the cost of production and sales prices for silicon metal.

With regard to electricity prices, Mississippi Silicon reported that its ***, while Globe reported that the electricity cost for its silicon metal plants *** since 2014. *** producers reported that electricity price decreases have not had an effect on selling prices for silicon metal. Electricity prices were highest in 2014 compared to the same months in other years; they decreased between July 2018 and January 2019 then increased before dropping in September 2019 (figure V-1). *** reported that it expects electricity prices to be stable. According to estimates by ***, electricity as a share of net operating costs is expected to experience a slight increase (***) for most facilities in the United States.[1]

[1] Attachment to *** U.S. Importer questionnaire response, ***.

Figure V-1
U.S. average retail price of electricity, Industrial, monthly, January 2014-September 2019



Source: U.S. Energy Information Administration, retrieved February 21, 2020.

Transportation costs to the U.S. market

In 2012, the last year for which transportation costs were available, transportation costs for silicon metal from Russia were approximately 5.1 percent of the total delivered cost of imported silicon metal from Russia to the U.S. market.[2] No firms reported importing silicon metal from Russia during the period for which data were collected; accordingly, there is no more recent information on the cost per short ton to ship typical volumes of silicon metal from Russia to the United States.

U.S. inland transportation costs

Two responding U.S. producers and one responding importer reported that they typically arrange transportation to their customers. U.S. producers reported that their U.S. inland transportation costs ranged from *** percent of the total delivered cost. There were no importers reporting imports from Russia to report U.S. inland transportation costs.

[2] The estimated transportation costs were obtained by comparing the customs and c.i.f. values during 2012, the last year with reported imports from Russia, for HTS subheadings 2804.69.10 and 2804.69.50.

Pricing practices

Pricing methods

As presented in table V-1, U.S. producers and importers use transaction-by-transaction negotiations and contracts for determining their sales prices for silicon metal. *** U.S. producers reported using transaction-by-transaction negotiations. U.S producer Globe also reported using ***. Nine importers reported using transaction-by-transaction negotiations, seven importers reported using contracts, and five importers reported using both methods (***).

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

Method	U.S. producers	Importers
Transaction-by-transaction	3	9
Contract	2	7
Set price list	---	1
Other	1	3
Responding firms	3	13

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 most of silicon metal under annual contracts. As shown in table V-1, U.S. producers reported their 2018 U.S. commercial shipments of silicon metal by type of sale.

Table V-2
Silicon metal: U.S. producers' shares of U.S. commercial shipments by type of sale, 2018

Type of sale	U.S. producers
Long-term contracts	***
Annual contracts	***
Short-term contracts	***
Spot sales	***
Total	***

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

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

Three purchase weekly, four purchase monthly, two purchase quarterly, and three purchase annually.[3] Fifteen of 16 responding purchasers reported that they did not expect their purchasing patterns to change in the next two years. Purchasers most often included contacting two to four suppliers before making a purchase in their ranges.

Published price indices are readily available to purchasers, and form part of contract negotiations with suppliers (figure V-2). There are no published price series data for chemical or polysilicon grade silicon metal, but purchasers in all sectors reference these indices.[4]

Figure V-2
Silicon metal: Published price index of silicon metal, *, average price reported, cents per pound, for all transactions during the month, January 2014-January 2020**

* * * * * * *

Source: ***.

Sales terms and discounts

The majority of responding U.S. producers quote prices on a delivered basis. All U.S. importers reporting sales of silicon metal reported having no discount policy; similarly, all U.S. producers reported having no discount policy.

[3] No purchasers reported purchasing daily.

[4] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway, Investigation Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final)*, USITC Publication 4773, April 2018, p. V-5.

Price leadership

All purchasers reporting price leaders identified Ferroglobe as the dominant price leader. Purchaser *** reported that Ferroglobe is the world's largest producer of silicon metal. It added that "for more than 25 years Globe has pursued a strategy aimed at establishing a virtual monopoly in its key markets by unfairly erecting trade barriers against imports from all countries (other than those, like South Africa, where Globe has its own facilities) and then unreasonably raising prices." Purchaser *** reported that "Ferro Globe controls almost 90 percent of silicon production in North America," and *** reported that in 2018, Ferroglobe's quoted prices were higher than prevailing market and Platts published price levels. *** reported that Mississippi Silicon tries to price close to Ferroglobe's prices, and that Elkem prices based on a differentiated product.[5]

[5] Globe Specialty Metals, Inc. is owned by Ferroglobe PLC. For additional information on ownership, please refer to Part I.

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 2016-September 2019.

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; lumps. Do not include fines or dust in the quantity and value data reported for this product.

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; lumps. Do not include fines or dust in the quantity and value data reported for this product.

Product 3.-- Sold to chemical and 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; lumps and/or powder. Do not include fines or dust in the quantity and value data reported for this product.

Three U.S. producers and no U.S. importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all products for all quarters.[6] Pricing data reported by these firms accounted for approximately *** percent of U.S. producers' shipments of silicon metal in 2018. Price data for products 1-3 are presented in table V-3 and figure V-3.

[6] 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.

Table V-3
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic products 1, 2, and 3, by quarter, January 2016-September 2019

* * * * * * *

Note: 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; lumps. Do not include fines or dust in the quantity and value data reported for this product.
Note: 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; lumps. Do not include fines or dust in the quantity and value data reported for this product.
Note: Product 3: Sold to chemical and 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; lumps and/or powder. Do not include fines or dust in the quantity and value data reported for this product.

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

Figure V-3
Silicon metal: Weighted-average prices and quantities of domestic products, by quarter, January 2016-September 2019

* * * * * * *

Note: 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; lumps. Do not include fines or dust in the quantity and value data reported for this product.
Note: 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; lumps. Do not include fines or dust in the quantity and value data reported for this product.
Note: Product 3: Sold to chemical and 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; lumps and/or powder. Do not include fines or dust in the quantity and value data reported for this product.

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

Price trends

As shown in the Table V-4, which summarizes price trends by product, the domestic price for product 1 decreased by *** percent during January 2016 through September 2019, as prices for U.S.-produced silicon metal sold to primary aluminum producers (product 1) peaked in the first quarter of 2016. Prices for U.S.-produced silicon metal sold to secondary aluminum producers (product 2) increased from 2016 to 2018 before decreasing, with prices in third quarter 2019 relatively the same as in first quarter 2016. Product 3 peaked in the first quarter of 2018, before decreasing *** percent compared to prices in the first quarter of 2016.

Table V-4
Silicon metal: Summary of weighted-average f.o.b. prices for products 1-3 from the United States

* * * * * * *

Note: Percentage change from the first quarter in which data were available to the last quarter in which price data were available.

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

Purchasers were asked how the prices of silicon metal from the United States had changed relative to the prices of silicon metal from Russia since January 1, 2014. The vast majority of purchasers reported that there has been a change in the price of silicon metal produced in the United States, while only *** purchasers reported a price change for silicon metal from Russia. Most purchasers reported that the price of silicon metal produced in the United States is now relatively higher than the price of imported silicon metal from Russia.

Price comparisons

No price comparisons were available because there were no imports of silicon metal from Russia during the period for which data were collected. In the original investigations, subject imports from Russia were priced lower than domestic product in 24 of 30 price comparisons, with underselling margins ranging from *** to *** percent. For U.S. producer price data, silicon metal sold primarily to chemical producers was on average *** per pound more expensive than silicon metal sold to primarily aluminum producers, and silicon metal sold to primary aluminum producers was on average *** per pound more expensive than silicon metal sold primarily to secondary aluminum producers. In the second review, subject imports from Russia were below those of U.S.-produced silicon metal in ***.[7]

[7] *Silicon Metal from Russia, Inv. No. 731-TA-991 (Second Review)*—Staff Report INV-MM-043, May 9, 2014, p. V-14.

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
68 FR 6885, February 11, 2003	*Commerce's antidumping duty order on silicon metal from*	https://www.federalregister.gov/documents/2003/02/11/03-3408/notice-of-final-determination-of-sales-at-less-than-fair-value-silicon-metal-from-the-russian
68 FR 12037 March 13, 2005	*Commerce's antidumping duty order on silicon metal from Russia (Amended)*	https://www.federalregister.gov/documents/2003/03/13/03-6089/notice-of-amended-final-determination-of-sales-at-less-than-fair-value-silicon-metal-from-the
84 FR 25561 June 3, 2019	*Commission's institution of five-year reviews*	https://www.federalregister.gov/documents/2019/06/03/2019-11344/silicon-metal-from-russia-institution-of-a-five-year-review
84 FR 257141 June 4, 2019	*Commerce's initiation of five-year reviews*	https://www.federalregister.gov/documents/2019/06/04/2019-11655/initiation-of-five-year-sunset-reviews
84 FR 49763 September 23, 2019	*Commission's determinations to conduct full five-year review*	https://www.federalregister.gov/documents/2019/09/23/2019-20463/silicon-metal-from-russia-notice-of-commission-determination-to-conduct-a-full-five-year-review
84 FR 54594 October 10, 2019	*Commerce's final results of expedited five-year reviews of the antidumping duty order*	https://www.federalregister.gov/documents/2019/10/10/2019-22213/silicon-metal-from-the-russian-federation-final-results-of-expedited-third-sunset-review-of-the

Citation	Title	Link
84 FR 67475 December 10, 2019	*Commission's scheduling of the reviews*	https://www.federalregister.gov/documents/2019/10/10/2019-22213/silicon-metal-from-the-russian-federation-final-results-of-expedited-third-sunset-review-of-the

Note.–The press release announcing the Commission's determinations concerning adequacy and the conduct of a full or expedited review can be found at http://www.usitc.gov/investigations/701731/2011/silicon_metal_china/third_review_expedited.htm

Commission's explanation of its determinations can be found at *http://pubapps2.usitc.gov/sunset/caseProf/list?sort=caseTitle&order=asc*.

APPENDIX B

LIST OF HEARING WITNESSES

CALENDAR OF HEARING

Those listed below participated in the United States International Trade Commission's hearing:

Subject: Silicon Metal from Russia

Inv. No.: 731-TA-991 (Third Review)

Dates: March 30- April 9, 2020

The hearing was opened by Chairman David S. Johanson via teleconference and the schedule for written submissions was provided as follows:

Monday, March 30, 2020 by 5:15 p.m.: Parties submitted and served witness testimony.
Tuesday, March 31, 2020 at 12 noon: Commission staff sent a first set of questions to parties.
Thursday, April 2, 2020 by 5:15 p.m.: Parties submitted and served responses to first set of questions.
Monday, April 6, 2020 by 5:15 p.m.: Commission staff sent a second set of questions to parties.
Wednesday, April 8, 2020 by 5:15 p.m.: Parties submitted and served posthearing briefs and responses to the second set of questions
Thursday, April 9, 2020 at 9:30 a.m.: Closing Arguments and Rebuttal Remarks

EMBASSY APPEARANCE:

Ministry of Economic Development of the Russian Federation

Oleg Plaksin, Deputy Director, Development and Regulation of Foreign Economic Activity Department

In Support of the Continuation of the Antidumping Duty Order:

DLA Piper LLP (US)
Washington, DC
on behalf of

Globe Specialty Metals, Inc. ("Globe")

J. Marlin Perkins, Vice President – Sales, Globe

Jessica B. Woods, President of Local 8-89, United Steelworkers Union, Globe's Alloy, West Virginia Plant

In Support of the Continuation of the Antidumping Duty Order (continued):

Jennifer Lutz, Vice President, Economic Consulting Services, LLC

William D. Kramer)
Mary E. Gately) – OF COUNSEL
Martin Schaefermeier)

In Opposition to the Continuation of the Antidumping Duty Order:

Crowell Moring LLP
Washington, DC
on behalf of

Joint Stock Company Kremny
Limited Liability Company RUSAL Ural Silicon

Dmitry Kubar, Head of Sales Division, Rusal

Robert L. LaFrankie)
Elena Klonitskaya) – OF COUNSEL
Pierce Lee)

The Bristol Group PLLC
Washington, DC
on behalf of

Mississippi Silicon LLC ("Mississippi Silicon")

Braulio M. Lage, Director, Mississippi Silicon

Adam H. Gordon)
Jennifer Smith)
) – OF COUNSEL
Ping Gong)
Lauren Fraid)

CLOSING REMARKS/REBUTTAL ON APRIL 9, 2020 AT 9:30 A.M.

Opening Remarks (Chairman David S. Johanson, USITC)

Closing Arguments by Those in Support of Continuation
Mary E. Gately, DLA Piper LLP (US)

Closing Arguments by Those in Opposition to Support
Robert L. LaFrankie, Crowell Moring LLP

Rebuttal Remarks by Those in Support of Continuation
Jennifer Lutz, Economic Consulting Services, LLP

Rebuttal Remarks by Those in Opposition to Continuation
Robert L. LaFrankie, Crowell Moring LLP

Closing Remarks (Chairman David S. Johanson, USITC)

-END-

APPENDIX C
SUMMARY DATA

Table C-1
Silicon metal: Summary data concerning the U.S. market, 2016-18, January to September 2018, and January to September 2019

(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per short ton contained silicon; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Comparison years			Jan-Sep
	2016	2017	2018	2018	2019	2016-18	2016-17	2017-18	2018-19
U.S. consumption quantity:									
Amount	344,148	360,492	318,133	238,501	232,796	▼(7.6)	▲4.7	▼(11.8)	▼(2.4)
Producers' share (fn1)	51.6	52.4	58.3	57.6	47.6	▲6.7	▲0.9	▲5.9	▼(10.0)
Importers' share (fn1):									
Russia	---	---	---	---	---	---	---	---	---
Nonsubject sources	48.4	47.6	41.7	42.4	52.4	▼(6.7)	▼(0.9)	▼(5.9)	▲10.0
All import sources	48.4	47.6	41.7	42.4	52.4	▼(6.7)	▼(0.9)	▼(5.9)	▲10.0
U.S. consumption value:									
Amount	768,336	796,369	834,967	631,089	548,063	▲8.7	▲3.6	▲4.8	▼(13.2)
Producers' share (fn1)	52.2	53.4	58.6	57.9	48.4	▲6.5	▲1.3	▲5.2	▼(9.5)
Importers' share (fn1):									
Russia	---	---	---	---	---	---	---	---	---
Nonsubject sources	47.8	46.6	41.4	42.1	51.6	▼(6.5)	▼(1.3)	▼(5.2)	▲9.5
All import sources	47.8	46.6	41.4	42.1	51.6	▼(6.5)	▼(1.3)	▼(5.2)	▲9.5
U.S. imports from:									
Russia:									
Quantity	---	---	---	---	---	---	---	---	---
Value	---	---	---	---	---	---	---	---	---
Unit value	---	---	---	---	---	---	---	---	---
Ending inventory quantity	---	---	---	---	---	***	***	***	***
Nonsubject sources:									
Quantity	166,673	171,511	132,640	101,088	122,036	▼(20.4)	▲2.9	▼(22.7)	▲20.7
Value	367,470	370,748	345,434	265,478	282,579	▼(6.0)	▲0.9	▼(6.8)	▲6.4
Unit value	$2,205	$2,162	$2,604	$2,626	$2,316	▲18.1	▼(2.0)	▲20.5	▼(11.8)
Ending inventory quantity	16,862	13,925	13,335	16,041	18,728	▼(20.9)	▼(17.4)	▼(4.2)	▲16.8
All import sources:									
Quantity	166,673	171,511	132,640	101,088	122,036	▼(20.4)	▲2.9	▼(22.7)	▲20.7
Value	367,470	370,748	345,434	265,478	282,579	▼(6.0)	▲0.9	▼(6.8)	▲6.4
Unit value	$2,205	$2,162	$2,604	$2,626	$2,316	▲18.1	▼(2.0)	▲20.5	▼(11.8)
Ending inventory quantity	16,862	13,925	13,335	16,041	18,728	▼(20.9)	▼(17.4)	▼(4.2)	▲16.8
U.S. producers':									
Average capacity quantity	201,027	213,457	213,088	163,153	119,239	▲6.0	▲6.2	▼(0.2)	▼(26.9)
Production quantity	173,594	194,003	187,958	139,770	109,804	▲8.3	▲11.8	▼(3.1)	▼(21.4)
Capacity utilization (fn1)	86.4	90.9	88.2	85.7	92.1	▲1.9	▲4.5	▼(2.7)	▲6.4
U.S. shipments:									
Quantity	177,475	188,981	185,493	137,413	110,760	▲4.5	▲6.5	▼(1.8)	▼(19.4)
Value	400,866	425,621	489,533	365,611	265,484	▲22.1	▲6.2	▲15.0	▼(27.4)
Unit value	$2,259	$2,252	$2,639	$2,661	$2,397	▲16.8	▼(0.3)	▲17.2	▼(9.9)
Export shipments:									
Quantity	***	***	***	***	***	▼***	▼***	▼***	▼***
Value	***	***	***	***	***	▼***	▼***	▲***	▼***
Unit value	***	***	***	***	***	▲***	▼***	▲***	▼***
Ending inventory quantity	***	***	***	***	***	▲***	▲***	▲***	▼***
Inventories/total shipments (fn1)	***	***	***	***	***	▲***	▲***	▲***	▲***
Production workers	605	664	739	745	562	▲22.1	▲9.8	▲11.3	▼(24.6)
Hours worked (1,000s)	1,413	1,448	1,632	1,237	930	▲15.5	▲2.5	▲12.7	▼(24.8)
Wages paid ($1,000)	$39,798	$41,007	$46,193	$34,152	$26,857	▲16.1	▲3.0	▲12.6	▼(21.4)
Hourly wages	$28.17	$28.32	$28.30	$27.61	$28.88	▲0.5	▲0.5	▼(0.1)	▲4.6
Productivity (short tons contained silicon per 1,000 hours)	122.9	134.0	115.2	113.0	118.1	▼(6.3)	▲9.1	▼(14.0)	▲4.5
Unit labor costs	$229	$211	$246	$244	$245	▲7.2	▼(7.8)	▲16.3	▲0.1

Table continued on next page.

Table C-1--Continued
Silicon metal: Summary data concerning the U.S. market, 2016-18, January to September 2018, and January to September 2019

(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per short ton contained silicon; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year			January to September		Comparison years			Jan-Sep
	2016	2017	2018	2018	2019	2016-18	2016-17	2017-18	2018-19
Net sales:									
Quantity	178,292	189,083	185,575	137,495	110,826	▲4.1	▲6.1	▼(1.9)	▼(19.4)
Value	402,490	425,726	489,700	365,778	265,579	▲21.7	▲5.8	▲15.0	▼(27.4)
Unit value	$2,257	$2,252	$2,639	$2,660	$2,396	▲16.9	▼(0.3)	▲17.2	▼(9.9)
Cost of goods sold (COGS)	400,893	418,961	442,261	329,637	314,028	▲10.3	▲4.5	▲5.6	▼(4.7)
Gross profit of (loss)	1,597	6,765	47,439	36,141	(48,449)	▲2,870.5	▲323.6	▲601.2	▼***
SG&A expenses	27,417	25,238	29,933	20,688	16,025	▲9.2	▼(7.9)	▲18.6	▼(22.5)
Operating income or (loss) (fn2)	(25,820)	(18,473)	17,506	15,453	(64,474)	▲***	▲***	▲***	▼***
Net income or (loss) (fn2)	(33,212)	(25,085)	10,976	10,708	(70,494)	▲***	▲***	▲***	▼***
Capital expenditures	***	***	***	***	***	▼***	▼***	▲***	▼***
Unit COGS	$2,249	$2,216	$2,383	$2,397	$2,834	▲6.0	▼(1.5)	▲7.6	▲18.2
Unit SG&A expenses	$154	$133	$161	$150	$145	▲4.9	▼(13.2)	▲20.8	▼(3.9)
Unit operating income or (loss) (fn2)	($145)	($98)	$94	$112	($582)	▲***	▲***	▲***	▼***
Unit net income or (loss) (fn2)	($186)	($133)	$59	$78	($636)	▲***	▲***	▲***	▼***
COGS/sales (fn1)	99.6	98.4	90.3	90.1	118.2	▼(9.3)	▼(1.2)	▼(8.1)	▲28.1
Operating income or (loss)/sales (fn1)	(6.4)	(4.3)	3.6	4.2	(24.3)	▲10.0	▲2.1	▲7.9	▼(28.5)
Net income or (loss)/sales (fn1)	(8.3)	(5.9)	2.2	2.9	(26.5)	▲10.5	▲2.4	▲8.1	▼(29.5)

Note.--Shares and ratios shown as "0.0" percent represent non-zero values less than "0.05" percent (if positive) and greater than "(0.05)" percent (if negative). Zeroes, null values, and undefined calculations are suppressed and shown as "---". Shares preceded by a "▲" represent an increase, while shares preceded by a "▼" represent a decrease.

fn1.--Reported data are in percent and period changes are in percentage points.

fn2.--Percent changes only calculated when both comparison values represent profits; The directional change in profitability provided when one or both comparison values represent a loss.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 31, 2019.

SUMMARY DATA COMPILED FROM PREVIOUS PROCEEDINGS

Table C-1
Silicon metal: Summary data concerning the U.S. market, 1999-2001, January-September 2001, and January-September 2002

(Quantity=*short tons of contained silicon*; value=*$1,000*; unit values, labor costs, and unit expenses are *per short ton* of contained silicon; period changes=*percent*, except where noted)

Item	Calendar year			January-September		Period changes			
	1999	2000	2001	2001	2002	1999-2001	1999-2000	2000-2001	Jan.-Sept. 2001--Jan.-Sept. 2002
U.S. consumption quantity: Amount	324,202	329,502	278,197	208,615	204,876	-14.2	1.6	-15.6	-1.8
Producers' share[1]	62.2	57.0	54.6	55.4	39.7	-7.6	-5.1	-2.5	-15.7
Importers' share:[1]									
Russia	7.8	7.5	12.3	9.9	15.9	4.5	-0.3	4.8	6.0
Other sources	30.1	35.5	33.2	34.6	44.4	3.1	5.4	-2.3	9.7
Total	37.8	43.0	45.4	44.6	60.3	7.6	5.1	2.5	15.7
U.S. consumption value: Amount	424,244	405,491	335,989	254,431	233,131	-20.8	-4.4	-17.1	-8.4
Producers' share[1]	65.0	60.5	58.4	58.7	43.4	-6.6	-4.6	-2.0	-15.3
Importers' share:[1]									
Russia	6.2	6.3	10.5	9.0	13.0	4.3	0.1	4.2	4.0
Other sources	28.8	33.2	31.1	32.3	43.6	2.3	4.4	-2.2	11.3
Total	35.0	39.5	41.6	41.3	56.6	6.6	4.6	2.0	15.3
U.S. imports from-- Russia: Quantity	25,158	24,643	34,153	20,718	32,643	35.8	-2.0	38.6	57.6
Value	26,201	25,529	35,325	22,936	30,272	34.8	-2.6	38.4	32.0
Unit value	$1,041	$1,036	$1,034	$1,107	$927	-0.7	-0.5	-0.2	-16.2
Ending inventory	8,871	5,516	9,814	3,518	7,296	10.6	-37.8	77.9	107.4
Other sources:									
Quantity	97,499	116,908	92,279	72,226	90,875	-5.4	19.9	-21.1	25.8
Value	122,231	134,819	104,420	82,064	101,608	-14.6	10.3	-22.5	23.8
Unit value	$1,254	$1,153	$1,132	$1,136	$1,118	-9.7	-8.0	-1.9	-1.6
Ending inventory	6,071	3,053	5,013	3,335	1,774	-17.4	-49.7	64.2	-46.8
U.S. imports from--									
All sources Quantity	122,657	141,551	126,431	92,945	123,519	3.1	15.4	-10.7	32.9
Value	148,432	160,349	139,745	105,000	131,881	-5.9	8.0	-12.8	25.6
Unit value	$1,210	$1,133	$1,105	$1,130	$1,068	-8.7	-6.4	-2.4	-5.5
Ending inventory	14,942	8,569	14,827	6,853	9,070	-0.8	-42.7	73.0	32.4

Table continued on next page.

Table C-1--*Continued*
Silicon metal: Summary data concerning the U.S. market, 1999-2001, January-September 2001, and January-September 2002

(Quantity=*short tons of contained silicon*; value=*$1,000*; unit values, labor costs, and unit expenses are *per short ton* of contained silicon; period changes=*percent*, except where noted)

Item	Calendar year			January-September		Period changes			
	1999	2000	2001	2001	2002	1999-2001	1999-2000	2000-2001	Jan.-Sept. 2001--Jan.-Sept. 2002
U.S. producers'--									
Capacity quantity	243,667	215,245	198,363	148,123	144,450	-18.6	-11.7	-7.8	-2.5
Production quantity	209,376	195,660	145,324	112,638	85,824	-30.6	-6.6	-25.7	-23.8
Capacity utilization[1]	85.9	90.9	73.3	76.0	59.4	-12.7	5.0	-17.6	-16.6
U.S. shipments:									
Quantity	201,545	187,951	151,766	115,670	81,357	-24.7	-6.7	-19.3	-29.7
Value	275,812	245,142	196,244	149,431	101,250	-28.8	-11.1	-19.9	-32.2
Unit value	$1,368	$1,304	$1,293	$1,292	$1,245	-5.5	-4.7	-0.9	-3.7
Export shipments:									
Quantity	***	***	***	***	***	-75.9	-38.2	-61.0	90.2
Value	***	***	***	***	***	-78.2	-43.1	-61.7	68.6
Unit value	***	***	***	***	***	-9.4	-8.0	-1.6	-11.3
Ending inventory quantity	9,135	11,110	2,306	5,462	3,940	-74.8	21.6	-79.2	-27.9
Inventories/total shipments[1]	***	***	***	***	***	-2.9	1.4	-4.3	0.0
Production workers	719	637	523	531	407	-27.3	-11.4	-17.9	-23.4
Hours worked (*1,000 hours*)	1,632	1,471	1,210	970	793	-25.9	-9.9	-17.7	-18.2
Wages paid (*1,000 dollars*)	32,438	29,055	23,675	17,692	13,979	-27.0	-10.4	-18.5	-21.0
Hourly wages	$19.88	$19.75	$19.57	$18.24	$17.63	-1.6	-0.6	-0.9	-3.4
Productivity (*lbs. per hour*)	128.3	133.0	120.1	116.1	108.2	-6.4	3.7	-9.7	-6.8
Unit labor costs	$155	$148	$163	$157	$163	5.2	-4.2	9.7	3.7
Net sales:									
Quantity	207,173	202,463	169,520	116,758	83,426	-18.2	-2.3	-16.3	-28.5
Value	293,831	267,227	219,034	150,763	103,496	-25.5	-9.1	-18.0	-31.4
Unit value	$1,418	$1,320	$1,292	$1,291	$1,241	-8.9	-6.9	-2.1	-3.9
COGS	251,913	242,020	214,672	152,054	106,554	-14.8	-3.9	-11.3	-29.9
Gross profit or (loss)	41,918	25,207	4,362	(1,291)	(3,058)	-89.6	-39.9	-82.7	136.9
SG&A expenses	16,743	15,964	14,703	11,459	8,703	-12.2	-4.7	-7.9	-24.1
Operating income	25,175	9,243	(10,341)	(12,750)	(11,761)	-141.0	-63.3	-211.9	-7.8
Capital expenditures	***	9,457	7,773	5,411	8,830	***	***	-17.8	63.2
Unit COGS	$1,216	$1,195	$1,266	$1,302	$1,277	4.1	-1.7	5.9	-1.9
Unit SG&A expenses	$81	$79	$87	$98	$104	7.3	-2.4	10.0	6.3
Unit operating income	$122	$46	($61)	($109)	($141)	-150.2	-62.4	-233.6	29.1
COGS/sales[1]	85.7	90.6	98.0	100.9	103.0	12.3	4.8	7.4	2.1
Operating income or (loss)/sales[1]	8.6	3.5	-4.7	-8.5	-11.4	-13.3	-5.1	-8.2	-2.9

[1] Period changes are in percentage points.
[2] Not meaningful.

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

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

Table I-4--*Continued*
Silicon metal: U.S. producers' trade, employment, and financial data, 1999-2001, January-September 2001, January-September 2002, and 2002-07

(Quantity=*short tons of contained silicon*; unit values and unit labor costs=*$/short ton of contained silicon*)

Item	1999	2000	2001	Jan.-Sept. 2001	Jan.-Sept. 2002	2002	2003	2004	2005	2006	2007
Net sales (*$1,000*)	293,831	267,227	219,034	150,763	103,496	([1])	([1])	([1])	([1])	([1])	([1])
Cost of goods sold ($*1,000*)	251,913	242,020	214,672	152,054	106,554	([1])	([1])	([1])	([1])	([1])	([1])
Gross profit or (loss) ($*1,000*)	41,918	25,207	4,362	(1,291)	(3,058)	([1])	([1])	([1])	([1])	([1])	([1])
SG&A (*$1,000*)	16,743	15,964	14,703	11,459	8,703	([1])	([1])	([1])	([1])	([1])	([1])
Operating income or (loss) (*$1,000*)	25,175	9,243	(10,341)	(12,750)	(11,761)	([1])	([1])	([1])	([1])	([1])	([1])
COGS/sales (*percent*)	85.7	90.6	98.0	100.9	103.0	([1])	([1])	([1])	([1])	([1])	([1])
Operating income (loss)/sales (*percent*)	8.6	3.5	(4.7)	(8.5)	(11.4)	([1])	([1])	([1])	([1])	([1])	([1])

[1] Not available.
[2] Capacity figure presented for 2007 was calculated by ITC staff from ***. Capacity utilization figure presented for 2007 was calculated using this 2008 capacity figure and the production figure provided by Globe in its response for 2007.
[3] Calculated U.S. shipments equal total shipments as reported in *USGS 2003-06 Minerals Yearbooks* minus exports as reported by *Global Trade Atlas*.
[4] Gross weight.

Source: *Staff Report on Silicon Metal From Russia, Investigation No. 731-TA-991 (Final),* February 24, 2003 (INV-AA-017), tables III-2, III-4, III-7, III-8, and VI-1 (data for 1999-2001, January-September 2001, and January-September 2002); Corathers, Lisa A., "Silicon," *U.S. Geological Survey 2003-06 Minerals Yearbooks* (production data, total shipment data, and inventory data for 2002-06); *Global Trade Atlas* (export data for 2002-07); and *Response* of Globe, March 24, 2008, p. 28 (production and shipment data for 2007).

Table I-5
Silicon metal: U.S. imports, by source, 1999-2007[1]

Source	1999	2000	2001	2002	2003	2004	2005	2006	2007
Quantity (*short tons of contained silicon*)									
Russia	25,158	24,643	34,153	32,643	0	0	22	0	0
Other[2]	97,499	116,908	92,279	125,697	137,221	177,282	165,282	158,946	159,097
Total	122,657	141,551	126,431	158,340	137,221	177,282	165,803	158,946	159,097
Landed, duty-paid value (*1,000 dollars*)									
Russia	26,201	25,529	35,325	30,272	0	0	32	0	0
Other[2]	122,231	134,819	104,420	143,365	159,030	232,213	251,459	239,778	286,171
Total	148,432	160,349	139,745	173,638	159,030	232,213	251,491	239,778	286,171
Unit value (*per short ton of contained silicon*)									
Russia	$1,041	$1,036	$1,034	$927	([3])	([3])	$1,486	([3])	([3])
Other[2]	1,254	1,153	1,132	1,141	$1,159	$1,310	1,521	$1,509	$1,799
Average	1,210	1,133	1,105	1,097	1,159	1,310	1,521	1,509	1,799
Share of total quantity (*percent*)									
Russia	20.5	17.4	27.0	20.6	0.0	0.0	([4])	0.0	0.0
Other[2]	79.5	82.6	73.0	79.4	100.0	100.0	100.0	100.0	100.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] There were no U.S. imports of silicon metal from Russia during January-March 2008.
[2] The largest "other" sources and their respective shares of the total quantity of silicon metal imported during 2007 include the following: Brazil (34 percent), South Africa (26 percent), Canada (19 percent), Australia (10 percent), and Norway (7 percent).
[3] Not applicable.
[4] Less than 0.05 percent.

Source: Official Commerce statistics, HTS subheadings 2804.69.10 and 2804.69.50.

Table I-6
Silicon metal: U.S. imports from leading nonsubject sources, 2002-07

Source	Calendar year					
	2002	2003	2004	2005	2006	2007
	Quantity (*short tons of contained silicon*)					
	Covered by antidumping duty orders					
Brazil[1]	41,899	55,830	75,255	68,759	6,903	([1])
China	5,318	3,057	3,086	2,683	112	413
Subtotal	47,217	58,887	78,341	71,442	7,015	413
	Not covered by antidumping duty orders					
Brazil[1]	([1])	([1])	([1])	([1])	52,424	54,544
South Africa	33,516	41,103	43,784	38,273	42,031	41,617
Canada	19,687	18,954	25,962	29,520	29,701	29,735
Australia	720	4,658	3,937	9,257	14,108	15,179
Norway	7,773	7,591	12,079	10,209	9,120	10,864
Spain	1,619	([2])	437	0	0	2,900
Philippines	0	144	474	1,662	1,682	1,609
France	66	219	9,551	2,269	0	1,079
Germany	2,275	1,204	260	244	([2])	126
United Kingdom	131	667	705	455	1,626	587
Netherlands	4	19	17	0	20	342
Sweden	25	68	144	106	144	80
Japan	([2])	21	([2])	31	15	4
All others	12,664	3,685	1,591	1,815	2,060	19
Total, imports not covered by antidumping duty orders	78,479	78,334	98,941	93,840	151,932	158,683
Total, nonsubject imports	125,697	137,221	177,282	165,282	158,946	159,097

Table continued on following page.

Table I-6--*Continued*
Silicon metal: U.S. imports from leading nonsubject sources, 2002-07

Source	Calendar year					
	2002	2003	2004	2005	2006	2007
	Value (*1,000 dollars*)[3]					
	Covered by antidumping duty orders					
Brazil[1]	54,633	66,094	92,572	97,846	10,317	([1])
China	4,194	2,676	3,497	2,938	384	880
Subtotal	58,827	68,770	96,069	100,784	10,702	880
	Not covered by antidumping duty orders					
Brazil[1]	([1])	([1])	([1])	([1])	77,855	98,247
South Africa	34,299	43,098	50,823	53,897	61,052	67,479
Canada	20,930	20,477	33,443	46,084	43,451	50,306
Australia	824	5,580	5,859	15,522	21,062	25,917
Norway	9,929	13,318	22,353	23,162	17,500	28,114
Spain	1,596	22	704	0	0	6,061
Philippines	0	149	831	3,069	2,469	2,735
France	50	207	16,654	3,062	0	2,707
Germany	3,973	2,025	770	607	14	1,181
United Kingdom	148	778	1,155	1,452	1,762	1,108
Netherlands	17	66	53	0	30	644
Sweden	350	479	847	813	975	497
Japan	15	159	35	152	163	136
All others	12,407	3,903	2,616	2,855	2,744	159
Total, imports not covered by antidumping duty orders	84,538	90,261	136,144	150,675	229,077	285,292
Total, nonsubject imports	143,365	159,030	232,213	251,459	239,778	286,171

Table continued on following page.

Table I-6--*Continued*
Silicon metal: U.S. imports from leading nonsubject sources, 2002-07

Source	Calendar year					
	2002	2003	2004	2005	2006	2007
Unit value (*per short ton of contained silicon*)						
Covered by antidumping duty orders						
Brazil[1]	1,304	1,184	1,230	1,423	1,495	([4])
China	789	875	1,133	1,095	3,445	2,127
Subtotal	1,246	1,168	1,226	1,411	1,526	2,127
Not covered by antidumping duty orders						
Brazil[1]	([4])	([4])	([4])	([4])	$1,485	$1,801
South Africa	$1,023	$1,049	$1,161	$1,408	1,453	1,621
Canada	1,063	1,080	1,288	1,561	1,463	1,692
Australia	1,145	1,198	1,488	1,677	1,493	1,707
Norway	1,277	1,754	1,851	2,269	1,919	2,588
Spain	986	204,229	1,610	([4])	([4])	2,090
Philippines	([4])	1,033	1,754	1,847	1,467	1,699
France	761	946	1,744	1,350	([4])	2,509
Germany	1,747	1,681	2,961	2,493	82,787	9,359
United Kingdom	1,132	1,167	1,637	3,193	2,814	1,888
Netherlands	3,819	3,511	3,189	([4])	1,526	1,887
Sweden	13,815	7,045	5,903	7,699	6,757	6,203
Japan	38,441	7,448	299,149	4,848	10,999	34,995
All others	980	1,059	1,645	1,573	1,333	8,732
Total, imports not covered by antidumping duty orders	1,077	1,152	1,376	1,606	1,508	1,798
Total, nonsubject imports	1,141	1,159	1,310	1,521	1,509	1,799

[1] The antidumping duty order concerning silicon metal from Brazil was revoked by Commerce effective February 16, 2006. 71 FR 76636, December 21, 2006.
[2] Less than 0.5 short tons.
[3] Landed, duty-paid.
[4] Not applicable.

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

Source: Compiled from official Commerce statistics.

Table I-7
Silicon metal: U.S. producers' U.S. shipments, U.S. imports, and apparent U.S. consumption, 1999-2007

Item	1999	2000	2001	2002	2003	2004	2005	2006	2007
Quantity (*short tons of contained silicon*)									
U.S. producers' U.S. shipments	201,545	187,951	151,766	104,151	131,301	146,657	144,832	(1)	***
U.S. imports: Russia	25,158	24,643	34,153	32,643	0	0	22	0	0
Other sources	97,499	116,908	92,279	125,697	137,221	177,282	165,282	158,946	159,097
Total imports	122,657	141,551	126,431	158,340	137,221	177,282	165,303	158,946	159,097
Apparent U.S. consumption	324,202	329,502	278,197	262,491	268,522	323,939	310,135	(1)	***
Value (*1,000 dollars*)									
U.S. producers' U.S. shipments	275,812	245,142	196,244	(1)	(1)	(1)	(1)	(1)	***
U.S. imports: Russia	26,201	25,529	35,325	30,272	0	0	32	0	0
Other sources	122,231	134,819	104,420	143,365	159,030	232,213	251,459	239,778	286,171
Total imports	148,432	160,349	139,745	173,638	159,030	232,213	251,491	239,778	286,171
Apparent U.S. consumption	424,244	405,491	335,989	(1)	(1)	(1)	(1)	(1)	***
Share of consumption based on quantity (*percent*)									
U.S. producers' U.S. shipments	62.2	57.0	54.6	39.7	48.9	45.3	46.7	(1)	***
U.S. imports: Russia	7.8	7.5	12.3	12.4	0.0	0.0	0.0	(1)	0.0
Other sources	30.1	35.5	33.2	47.9	51.1	54.7	53.3	(1)	***
Total imports	37.8	43.0	45.4	60.3	51.1	54.7	53.3	(1)	***
Share of consumption based on value (*percent*)									
U.S. producers' U.S. shipments	65.0	60.5	58.4	(1)	(1)	(1)	(1)	(1)	***
U.S. imports: Russia	6.2	6.3	10.5	(1)	(1)	(1)	(1)	(1)	0.0
Other sources	28.8	33.2	31.1	(1)	(1)	(1)	(1)	(1)	***
Total imports	35.0	39.5	41.6	(1)	(1)	(1)	(1)	(1)	***

[1] Not available.

Source: Tables I-4 and I-5.

Table C-1
Silicon Metal: Summary data concerning the U.S. market, 2008-13
(Quantity=short tons contained Si; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per short ton contained Si; Period changes=percent--exceptions noted)

	Report data						Period changes					
	Calendar year									Calendar year		
	2008	2009	2010	2011	2012	2013	2008-13	2008-09	2009-10	2010-11	2011-12	2012-13
U.S. consumption quantity:												
Amount	***	***	***	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***	***	***	***
Importers' share (fn1):												
Russia	***	***	***	***	***	***	***	***	***	***	***	***
All others sources, nonsubject	***	***	***	***	***	***	***	***	***	***	***	***
Total imports	***	***	***	***	***	***	***	***	***	***	***	***
U.S. consumption value:												
Amount	***	***	***	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***	***	***	***
Importers' share (fn1):												
Russia	***	***	***	***	***	***	***	***	***	***	***	***
All others sources, nonsubject	***	***	***	***	***	***	***	***	***	***	***	***
Total imports	***	***	***	***	***	***	***	***	***	***	***	***
U.S. imports from:												
Russia:												
Quantity	0	0	fn3	131	44	0	fn4	fn4	fn4	fn4	(66.7)	(100.0)
Value	0	0	15	415	133	0	fn4	fn4	fn4	2,704.7	(67.9)	(100.0)
Unit value	fn2	fn2	$33,568	$3,176	$3,057	fn2	fn4	fn4	fn4	(90.5)	(3.8)	fn4
Ending inventory quantity	***	***	***	***	***	***	***	***	***	***	***	***
All other sources:												
Quantity	182,393	131,465	195,056	200,859	147,019	126,540	(30.6)	(27.9)	48.4	3.0	(26.8)	(13.9)
Value	446,551	299,498	466,855	606,095	414,506	326,991	(26.3)	(32.9)	55.9	29.8	(31.6)	(20.6)
Unit value	$2,448	$2,278	$2,393	$3,018	$2,819	$2,600	6.2	(6.9)	5.1	26.1	(6.5)	(7.8)
Ending inventory quantity	***	***	***	***	***	***	***	***	***	***	***	***
Total imports:												
Quantity	182,393	131,465	195,056	200,990	147,062	126,540	(30.6)	(27.9)	48.4	3.0	(26.8)	(14.0)
Value	446,551	299,498	466,870	606,510	414,639	326,991	(26.3)	(32.9)	55.9	29.9	(31.6)	(20.7)
Unit value	$2,448	$2,278	$2,394	$3,018	$2,819	$2,600	6.2	(6.9)	5.1	26.1	(6.5)	(7.8)
Ending inventory quantity	***	***	***	***	***	***	***	***	***	***	***	***
U.S. producers':												
Average capacity quantity	***	***	***	***	***	***	***	***	***	***	***	***
Production quantity	***	***	***	***	***	***	***	***	***	***	***	***
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)	***	***	***	***	***	***	***	***	***	***	***	***
Productivity (short tons per 1,000 hours)	***	***	***	***	***	***	***	***	***	***	***	***
Unit labor costs (Dollars per short ton containing Si)	***	***	***	***	***	***	***	***	***	***	***	***
Net Sales:												
Quantity	***	***	***	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS)	***	***	***	***	***	***	***	***	***	***	***	***
Gross profit or (loss)	***	***	***	***	***	***	***	***	***	***	***	***
SG&A expenses	***	***	***	***	***	***	***	***	***	***	***	***
Operating income or (loss)	***	***	***	***	***	***	***	***	***	***	***	***
Capital expenditures	***	***	***	***	***	***	***	***	***	***	***	***
Unit COGS	***	***	***	***	***	***	***	***	***	***	***	***
Unit SG&A expenses	***	***	***	***	***	***	***	***	***	***	***	***
Unit operating income or (loss)	***	***	***	***	***	***	***	***	***	***	***	***
COGS/sales (fn1)	***	***	***	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***	***	***	***

Source: Department of Commerce and Questionnaire responses

fn1.--Report data are in percent and period changes are in percentage points.
fn2.--less than 0.05 percent
fn3.--less than 1
fn4.--Undefined.

Table C-2 (Using General Imports)
Silicon Metal: Summary data concerning the U.S. market, 2008-13
(Quantity=short tons contained Si; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per short ton contained Si; Period changes=percent--exceptions noted)

	Report data						Period changes					
	Calendar year						Calendar year					
	2008	2009	2010	2011	2012	2013	2008-13	2008-09	2009-10	2010-11	2011-12	2012-13
U.S. consumption quantity:												
Amount	***	***	***	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***	***	***	***
Importers' share (fn1):												
Russia	***	***	***	***	***	***	***	***	***	***	***	***
All others sources, nonsubject	***	***	***	***	***	***	***	***	***	***	***	***
Total imports	***	***	***	***	***	***	***	***	***	***	***	***
U.S. consumption value:												
Amount	***	***	***	***	***	***	***	***	***	***	***	***
Producers' share (fn1)	***	***	***	***	***	***	***	***	***	***	***	***
Importers' share (fn1):												
Russia	***	***	***	***	***	***	***	***	***	***	***	***
All others sources, nonsubject	***	***	***	***	***	***	***	***	***	***	***	***
Total imports	***	***	***	***	***	***	***	***	***	***	***	***
U.S. imports from:												
Russia:												
Quantity	0	0	0	131	86	0	fn4	fn4	fn4	29,540.0	(34.3)	(100.0)
Value	0	0	15	394	241	0	fn4	fn4	fn4	2,562.0	(38.8)	(100.0)
Unit value	fn3	fn3	$33,568	$3,015	$2,806	fn3	fn4	fn4	fn4	(91.0)	(6.9)	fn4
Ending inventory quantity	***	***	***	***	***	***	***	***	***	***	***	***
All other sources:												
Quantity	182,810	121,838	183,912	206,729	184,486	173,490	(5.1)	(33.4)	50.9	12.4	(10.8)	(6.0)
Value	376,684	253,115	401,414	524,740	458,972	398,120	5.7	(32.8)	58.6	30.7	(12.5)	(13.3)
Unit value	2,061	2,077	2,183	2,538	2,488	2,295	11.4	0.8	5.1	16.3	(2.0)	(7.8)
Ending inventory quantity	***	***	***	***	***	***	***	***	***	***	***	***
Total imports:												
Quantity	182,810	121,838	183,912	206,859	184,572	173,490	(5.1)	(33.4)	50.9	12.5	(10.8)	(6.0)
Value	376,684	253,115	401,428	525,134	459,213	398,120	5.7	(32.8)	58.6	30.8	(12.6)	(13.3)
Unit value	$2,061	$2,077	$2,183	$2,539	$2,488	$2,295	11.4	0.8	5.1	16.3	(2.0)	(7.8)
Ending inventory quantity	***	***	***	***	***	***	***	***	***	***	***	***
U.S. producers':												
Average capacity quantity	***	***	***	***	***	***	***	***	***	***	***	***
Production quantity	***	***	***	***	***	***	***	***	***	***	***	***
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)	***	***	***	***	***	***	***	***	***	***	***	***
Productivity (short tons per 1,000 hours)	***	***	***	***	***	***	***	***	***	***	***	***
Unit labor costs (Dollars per short ton containing Si)	***	***	***	***	***	***	***	***	***	***	***	***
Net Sales:												
Quantity	***	***	***	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS)	***	***	***	***	***	***	***	***	***	***	***	***
Gross profit or (loss)	***	***	***	***	***	***	***	***	***	***	***	***
SG&A expenses	***	***	***	***	***	***	***	***	***	***	***	***
Operating income or (loss)	***	***	***	***	***	***	***	***	***	***	***	***
Capital expenditures	***	***	***	***	***	***	***	***	***	***	***	***
Unit COGS	***	***	***	***	***	***	***	***	***	***	***	***
Unit SG&A expenses	***	***	***	***	***	***	***	***	***	***	***	***
Unit operating income or (loss)	***	***	***	***	***	***	***	***	***	***	***	***
COGS/sales (fn1)	***	***	***	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1)	***	***	***	***	***	***	***	***	***	***	***	***

Notes: Department of Commerce General Import statistics

fn1.--Report data are in percent and period changes are in percentage points.
fn2.--less than 0.05 percent
fn3.--less than 1
fn4.--Undefined.

APPENDIX D

FIRMS' NARRATIVES ON THE IMPACT OF THE ORDER AND THE LIKELY IMPACT OF THE REVOCATION

Table D-1

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

Item / Firm	Narrative
U.S. producers: Effect of order:	
***	***
***	***
***	***
U.S. producers: Likely impact of revocation:	
***	***
***	***

Table continued on next page

Table D-1—continued

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

U.S. importers: Effect of order:	
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***

Table continued on next page

Table D-1—continued

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

U.S. importers: Effect of order:	
***	***

Table continued on next page

Table D-1—continued

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

U.S. importers: Likely impact of revocation of order:	
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***

Table continued on next page

Table D-1—continued

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

U.S. purchasers: Effect of order:	
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***
***	***

Table continued on next page

Table D-1—continued

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

U.S. purchasers: Effect of order:	
***	***
***	***

Table continued on next page

Table D-1—continued

Silicon metal: Firms' narratives on the impact of the order and the likely impact of revocation

Foreign producers or exporters:	**Effect of order:**
***	***
Foreign producers or exporters:	**Likely effect of revocation of order:**
***	***

Source: compiled from data submitted in response to Commission questionnaires

APPENDIX E

MONTHLY U.S. IMPORTS OF SILICON METAL

Table E-1

Silicon metal: Monthly Imports, January 2014 through December 2019

Month	Countries under order	Countries Subject to recent related investigations	All other sources	All sources
	Quantity (short tons contained silicon)			
2014.--				
January	---	12,328	5,620	17,949
February	---	11,302	3,938	15,240
March	0	9,774	10,540	20,314
April	0	7,970	6,552	14,522
May	43	8,544	8,818	17,406
June	---	9,586	6,770	16,356
July	43	11,932	7,804	19,779
August	25	8,404	7,612	16,041
September	---	9,445	11,381	20,826
October	7	11,091	4,882	15,980
November	---	8,967	7,842	16,809
December	---	9,112	11,226	20,338
2015.--				
January	0	9,459	7,819	17,278
February	---	7,211	8,312	15,523
March	91	7,799	8,717	16,607
April	---	9,567	7,373	16,940
May	19	6,755	7,174	13,949
June	70	8,954	8,236	17,260
July	0	8,750	7,562	16,312
August	72	8,030	7,294	15,396
September	22	4,160	5,252	9,434
October	49	5,432	5,318	10,799
November	0	8,363	7,339	15,701
December	13	6,902	7,753	14,668

Table continued on next page

Table E-1—Continued

Silicon metal: Monthly Imports, January 2014 through December 2019

Month	Countries under order	Countries Subject to recent related investigations	All other sources	All sources
	Quantity (short tons contained silicon)			
2016.--				
January	88	6,645	7,475	14,208
February	---	4,474	5,943	10,416
March	45	10,377	7,528	17,950
April	44	7,205	4,457	11,705
May	49	5,916	8,462	14,426
June	---	12,411	2,799	15,210
July	43	11,363	3,774	15,180
August	1	13,763	2,576	16,339
September	0	8,700	2,548	11,247
October	---	9,496	4,499	13,994
November	---	12,202	2,843	15,044
December	70	9,032	1,850	10,952
2017.--				
January	66	9,520	4,171	13,756
February	49	9,647	3,049	12,745
March	---	11,882	2,749	14,631
April	69	9,672	3,908	13,648
May	---	10,997	3,402	14,399
June	---	12,075	2,941	15,016
July	6	14,012	4,220	18,239
August	0	16,499	2,859	19,358
September	21	6,952	4,298	11,272
October	49	5,187	3,781	9,017
November	---	11,815	4,776	16,591
December	0	5,750	7,089	12,839

Table continued on next page

Table E-1—Continued

Silicon metal: Monthly Imports, January 2014 through December 2019

Month	Countries under order	Countries Subject to recent related investigations	All other sources	All sources
	Quantity (short tons contained silicon)			
2018.--				
January	49	5,070	4,247	9,365
February	17	7,041	4,078	11,136
March	1	6,817	5,841	12,659
April	---	5,639	4,901	10,540
May	34	7,569	11,694	19,297
June	0	5,319	4,172	9,491
July	1	5,862	3,996	9,859
August	49	5,467	4,111	9,626
September	2	5,012	4,101	9,115
October	0	4,149	6,436	10,585
November	17	4,778	3,263	8,058
December	72	6,789	6,048	12,909
2019.--				
January	---	8,829	6,401	15,230
February	25	6,383	4,490	10,898
March	---	11,752	5,631	17,383
April	34	9,837	6,909	16,780
May	97	10,192	4,732	15,021
June	1	5,604	6,971	12,576
July	---	7,610	5,313	12,923
August	---	5,714	4,411	10,126
September	29	5,177	5,893	11,099
October	22	5,622	6,114	11,758
November	---	7,305	3,072	10,378
December	---	6,662	4,139	10,801

Source: Official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed March 3, 2020.

APPENDIX F

U.S. SHIPMENTS BY CHANNELS OF DISTRIBUTION

Table F-1
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments to distributions, 2016-2018, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Share of quantity (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Ratio to overall apparent consumption (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***

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 official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Table F-2
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon and chemical end users, 2016-2018, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Share of quantity (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Ratio to overall apparent consumption (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***

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 official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Table F-3
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments to primary aluminum end users, 2016-2018, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Share of quantity (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Ratio to overall apparent consumption (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***

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 official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Table F-4
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments to secondary aluminum end users, 2016-2018, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Share of quantity (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Ratio to overall apparent consumption (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***

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 official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.

Table F-5
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments to other end users, 2016-2018, January to September 2018, and January to September 2019

Item	Calendar year			January to September	
	2016	2017	2018	2018	2019
	Quantity (short tons contained silicon)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Share of quantity (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***
	Ratio to overall apparent consumption (percent)				
U.S. producers' U.S. shipments	***	***	***	***	***
U.S. importers' U.S. shipments.--Russia	***	***	***	***	***
Nonsubject Sources	***	***	***	***	***
All import sources	***	***	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***	***	***

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 official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed December 30, 2019.