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July 2, 2020

VIA http://www.regulations.gov

The Honorable Wilbur L. Ross, Jr.
Secretary of Commerce
U.S. Department of Commerce
14th Street and Constitution Avenue, NW
Washington, DC 20230

DOCKET NO. BIS–2020–0015

Re: Comments of AK Steel Corporation Regarding Section 232 National Security Investigation of Imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation Into Transformers, Wound Cores for Incorporation Into Transformers, Electrical Transformers, and Transformer Regulators

Dear Mr. Secretary:

On behalf of AK Steel Corporation ("AK Steel"), a wholly-owned U.S. subsidiary of Cleveland-Cliffs Inc., we submit these comments in response to the request published by the Department of Commerce, Bureau of Industry and Security for comments regarding the Section 232 National Security Investigation of Imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation Into Transformers, Wound Cores for Incorporation Into Transformers, Electrical Transformers, and Transformer Regulators.[1]

Pursuant to the National Security Industrial Base Regulations, 15 C.F.R. § 705.6(a), AK Steel requests that these comments be treated as Business Confidential and that they be exempted

[1] Bureau of Industry and Security, U.S. Department of Commerce, *Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation Into Transformers, Wound Cores for Incorporation Into Transformers, Electrical Transformers, and Transformer Regulators*, 85 Fed. Reg. 29926 (May 19, 2020).

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from public disclosure. Specifically, the material bracketed in these comments relates to trade secrets, commercial and financial information, and other information considered sensitive or privileged, the release of which to the public would cause substantial harm to the competitive position of AK Steel Corporation.[2] AK Steel Corporation certifies that the material marked as "Business Confidential" in this submission is exempted from public disclosure by the *Freedom of Information Act* as "trade secrets and commercial or financial information obtained from a person and privileged or confidential."[3] A non-confidential version of this submission has been provided for the public record.

Please contact us if you have any questions about this submission.

Respectfully submitted,

/s/ Stephen P. Vaughn
Stephen P. Vaughn
Clinton R. Long

Counsel for AK Steel Corporation

[2] *See* 15 C.F.R. § 705.6(a).

[3] *See id.*; 5 U.S.C. § 552(b)(4).

UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF INDUSTRY AND SECURITY
Washington, D.C.

IN THE MATTER OF **SECTION 232 NATIONAL SECURITY INVESTIGATION OF IMPORTS OF LAMINATIONS FOR STACKED CORES FOR INCORPORATION INTO TRANSFORMERS, STACKED CORES FOR INCORPORATION INTO TRANSFORMERS, WOUND CORES FOR INCORPORATION INTO TRANSFORMERS, ELECTRICAL TRANSFORMERS, AND TRANSFORMER REGULATORS**	**Docket No. BIS-2020-0015** **PUBLIC VERSION**

COMMENTS OF AK STEEL CORPORATION, A WHOLLY-OWNED U.S. SUBSIDIARY OF CLEVELAND-CLIFFS INC.

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July 2, 2020

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I. INTRODUCTION AND EXECUTIVE SUMMARY[1]

This investigation concerns an urgent threat to U.S. national security. Time is running out to save American production of electrical steel -- a material that is necessary to preserve and upgrade the U.S. electrical grid. This submission is made on behalf of AK Steel Corporation ("AK Steel"), a wholly-owned U.S. subsidiary of Cleveland-Cliffs Inc. ("Cleveland-Cliffs") that is the only producer of electrical steel in North America.[2] AK Steel makes this product at facilities in Butler, Pennsylvania and Zanesville, Ohio. As shown throughout this submission, years of attacks from low-priced imports have forced AK Steel almost completely out of the electrical steel business. Three of the articles at issue in these investigations -- laminations, stacked cores, and wound cores -- are made from grain-oriented electrical steel ("GOES"), a product that AK Steel invented almost 100 years ago. Without strong, timely, and effective relief on imports of those products, AK Steel will have to stop making electrical steel. If that happens, Americans will be wholly dependent on overseas sources for both GOES and non-oriented electrical steel ("NOES"). Such an outcome will have catastrophic consequences for our economy, our electrical grid, and our national security.

For years, officials at AK Steel have warned that low-priced imports of laminations, stacked cores, and wound cores threaten the future of electrical steel production in this country. These imports -- processed primarily in Canada and Mexico with low-priced GOES from countries that have a history of unfair trade in the United States -- drive down U.S. production of

[1] **Exhibit 1** contains comments and information directed to the criteria listed in the National Security Industrial Base Regulations, as mentioned in the Federal Register notice initiating this investigation. *See* Bureau of Industry and Security, U.S. Department of Commerce, *Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation Into Transformers, Wound Cores for Incorporation Into Transformers, Electrical Transformers, and Transformer Regulators*, 85 Fed. Reg. 29926, 29927 (May 19, 2020) ("*Notice of Request for Public Comments*").

[2] [

]

cores and laminations. Since demand for GOES depends on demand for cores and laminations, these developments have had a devastating effect on AK Steel. In fact, when Cleveland-Cliffs analyzed AK Steel's operations as part of the due diligence for its decision to buy that company, Cleveland-Cliffs concluded that the electrical steel part of AK Steel's operations actually lowered the company's projected earnings before interest, taxes, depreciation and amortization ("EBITDA") by $40 million.

Concerned about these facts, a bipartisan coalition of Members of Congress raised the future of electrical steel production with the Secretary of Commerce ("Secretary"). On May 11, the Secretary decided to launch an investigation under Section 232 of the *Trade Expansion Act of 1962*, as amended to determine whether downstream products made from GOES are being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security. The available evidence leaves no doubt that relief under Section 232 is not only appropriate, but absolutely necessary. The key points in that evidence may be summarized as follows:

Electrical steel, including GOES, is vital to U.S. national security. Two years ago, in a Section 232 investigation into imports of steel, the Department of Commerce ("Department") left no doubt that electrical steel is critical to our national security. The Department specifically found that maintaining a strong electrical grid is essential to both the U.S. economy and our national security.[3] The Department further found that electrical steel is "necessary" for transformers of all types of energy across the country.[4] It specifically stated that "{i}f domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the U.S. will become entirely dependent on foreign producers to supply these critical

[3] *See* U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 2, 13-14, 23-24, and Appendix I, p. 1, provided at **Exhibit 2**.

[4] *See id.* at 46.

materials and products."[5] The Department concluded that "{w}ithout an assured domestic supply of {electrical steel} products, the United States cannot be certain that it can effectively respond to large power disruptions affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner."[6]

Those findings apply directly to this investigation. GOES is a type of electrical steel that is used almost exclusively to make laminations, stacked cores, and wound cores for use in electrical transformers. Without GOES, it is impossible to upgrade the U.S. electrical grid, or even to replace transformers that are damaged through age or natural disaster. [

] Without AK Steel, Americans would have to wait weeks or even months for GOES to cross the ocean -- a delay that could have disastrous consequences. Problems in other countries -- such as the recent global pandemic -- could create even longer delays. The U.S. government must avoid a situation where Americans cannot immediately obtain the GOES needed to preserve our electrical grid.

Nor can this problem be solved by relying on imports of laminations, stacked cores, and wound cores from Canada and Mexico. No companies in Canada or Mexico currently produce GOES. The downstream products made from GOES in those countries depend upon imports from countries in Asia or Europe. In an emergency, waiting for GOES to cross the ocean to Canada and Mexico, waiting for it to be processed there, and then waiting for it to be shipped to the United States would take even longer than importing GOES directly to this country. Again, this type of delay would put our economy -- and our national security -- at risk.

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[5] *Id.* (footnote omitted).

[6] *Id.*

In short, there can be no question that to the extent imports threaten the future of GOES production in the United States, those imports also threaten to impair our national security. Furthermore, as shown below, the facts show that imports of downstream products made from GOES have almost destroyed electrical steel production in the United States.

Imports of downstream products made from GOES are entering the U.S. market in such quantities as to threaten the future of AK Steel's production of electrical steel. A few years ago, when the Department conducted its Section 232 investigation into steel, executives at AK Steel warned that tariffs on GOES alone would not be sufficient to preserve electrical steel production in the United States. They stated that to avoid such tariffs, overseas producers of GOES would ship their product to other countries, where it would be turned into laminations, stacked cores, and wound cores for shipment to the United States. If that happened, AK Steel would lose sales, and its future as a producer of electrical steel would be in peril.

Since then, events have played out exactly as AK Steel warned. In 2016, the last year before the Section 232 investigation into steel was announced, Canada and Mexico imported a total of 176,205 short tons of GOES. In the three full years since that time, their imports of GOES have averaged almost 200,000 short tons per year. At the same time, the average price of GOES being imported by Canada and Mexico fell dramatically -- from $1,946/short ton in 2016, to $1,675/short ton or less in each of the last three years.

These surging imports of low-priced GOES into Canada and Mexico have contributed to a dramatic increase in U.S. imports of downstream articles made from GOES. As explained above, the price of GOES used to make laminations, stacked cores, and wound cores has fallen significantly since 2016. Meanwhile, there has been no apparent increase in the cost of processing GOES into cores and laminations. But the value of U.S. imports of cores and laminations has soared: from $99.7 million in 2016 to more than $201 million last year. The

quantities of imports represented by these figures are more than sufficient to threaten the future of AK Steel's ability to make electrical steel.

Imports of downstream products made from GOES are entering the U.S. market under such circumstances as to threaten the future of AK Steel's production of electrical steel. Quantity alone cannot fully explain the severity of the threat resulting from U.S. imports of laminations, stacked cores, and wound cores. Those imports enter this market at extremely low prices, [ ] These developments, in turn, lower demand for GOES made by AK Steel. The sales lost by AK Steel as a result have lowered its capacity utilization and increased its per-ton cost of production. These developments, in turn, have prevented AK Steel from making the level of capital expenditures necessary for long-term survival. In fact, as Lourenco Goncalves, Chairman, President, and CEO of Cleveland-Cliffs, has made clear, at this point AK Steel could improve its bottom line by stopping production of electrical steel altogether.

Conditions are rapidly getting worse. As time passes, the United States is becoming more and more dependent on downstream products made from GOES, while the price of GOES shipped to Canada and Mexico is plummeting. From Q1 2019 to Q1 2020, the average unit value of GOES imported into Canada and Mexico fell from $1,690/short ton to only $1,505/short ton. All things being equal, lower prices for GOES should lower the value of U.S. imports made from that GOES. In fact, however, the value of such imports soared -- from $40.1 million in Q1 2019 to $68.1 million in Q1 2020. Given these and other facts, AK Steel expects its sales of GOES to decline by [ ] from 2019 to 2020. As shown in an expert report attached to this submission, basic economic principles indicate that AK Steel's current situation is unsustainable. Without adequate relief, AK Steel [ ] from stopping all production of electrical steel.

Only strong, prompt, effective, and urgent trade relief can prevent imports from having a severe impact on U.S. national security. The facts facing the government in this investigation are clear: AK Steel's electrical steel operations -- the only such operations in North America -- are quickly being forced out of business by imports of downstream products made from low-priced GOES. If these imports are not stopped, and stopped quickly, AK Steel will have no choice but to soon end all production of electrical steel. If that happens, there is no reason to believe that any other company would take on the costs and technical challenges of making this critical product in the United States. Americans -- who need access to a strong and dependable supply of electricity at every moment of their lives -- will find themselves wholly dependent on foreign producers (including producers in China) for the GOES needed to keep the power on and the grid secure.

For years now, AK Steel -- first as an independent company and now as a wholly-owned subsidiary of Cleveland-Cliffs -- has urged the U.S. government to grant necessary trade relief. Even today, AK Steel can survive -- and thrive -- as a long-term, stable source of electrical steel. But there is almost no time left. It is unfair to expect Cleveland-Cliffs and its shareholders to keep losing money on a product that is under attack from around the world.

Under these circumstances, the Department should urgently recommend that the President approve strong and effective measures to adjust imports of laminations, stacked cores, and wound cores. Such measures should be implemented as soon as practicable given the unsustainable nature of the domestic electrical steel market situation. Such measures must cover Canada and Mexico, which account for virtually all shipments of these products to the United States. The measures must also be strong enough to encourage U.S. consumers of GOES to immediately begin making more cores and laminations in the United States. Finally, the measures must be strong enough to allow AK Steel to obtain a reasonable rate of return on its

investments in electrical steel -- and to justify further capital expenditures needed to maintain and upgrade its facilities and make investments in research and development. Together, these facts support the conclusion that a very significant tariff is needed on these items. As explained in more detail below, [

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This conclusion is also supported by the expert analysis attached to this submission.

AK Steel remains hopeful that the current challenges facing its electrical steel operations can be resolved. The company and its new owners from Cleveland-Cliffs are ready and willing to work with the Department and the rest of the Administration to find a solution that will allow the United States to avoid becoming dependent on imports to maintain its electrical grid. But let there be no doubt: this problem is urgent, and can only be resolved by a strong and effective response.

II. FACTUAL BACKGROUND

On May 11, 2020, based on inquiries and requests from interested parties in the United States, including multiple members of Congress, the Secretary initiated an investigation to determine the effect of imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation into Transformers, Wound Cores for Incorporation into Transformers, Electrical Transformers, and Transformer Regulators on the national security.[7] This investigation was initiated under Section 232 of the *Trade Expansion Act of 1962*, as amended.[8]

[7] *Notice of Request for Public Comments* at 29926.

[8] *Id.*

These comments are being filed on behalf of AK Steel, the nation's only producer of electrical steel, including GOES. GOES is a flat-rolled alloy steel product that typically contains approximately 3.2 percent by weight of silicon.[9] GOES is subject to specialized rolling and annealing (heat treatment) processes, which produce grain structures uniformly oriented in the rolling (lengthwise) direction of the steel sheet.[10] This uniformly oriented grain structure permits the steel sheet to conduct a magnetic field with a high degree of efficiency in the direction of rolling compared with other steels, such as NOES.[11] As a result, GOES has superior magnetic properties compared with NOES, both in terms of higher permeability and lower core loss.[12]

AK Steel produces a wide range of GOES, including conventional GOES in standard gauges (thicknesses) ranging from 0.007 inch (0.18 mm) through 0.0138 inch (0.35 mm), and high-permeability GOES in two standard thicknesses.[13] AK Steel's predecessor company, Armco, first invented and introduced GOES in 1926.[14] AK Steel makes electrical steel at its

[9] *See* U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at 6, 8, provided at **Exhibit 3**.

[10] *Id.* at 6.

[11] *Id.*

[12] *Id.* The ITC has explained that the term "permeability" refers to "the ease with which magnetic lines of force distribute themselves throughout (flow through) a material, or more generally, the ease of magnetization of the GOES product in response to a magnetic field," and the term "core loss" refers to the measured amount of electrical energy that is lost as heat from eddy currents generated when a magnetic flux flows through the steel. *Id.* at 6 n.20.

[13] *Id.* at 6.

[14] AK Steel, "Electrical Steels: Grain Oriented," available at http://aksteel.com/our-products/eletrical-steel/grain-oriented-electrical-steels (last visited May 31, 2020), provided at **Exhibit 4**.

Butler Works in western Pennsylvania, a one-hour drive north of Pittsburgh.[15] Its facility in Zanesville, Ohio has finishing facilities for use in producing GOES.[16] Electrical steel is a critical product for both the Butler Works and the Zanesville Works -- and these facilities cannot survive unless AK Steel can obtain a true market-based rate of return for GOES.

GOES is used primarily in the production of laminated cores for large- and medium-sized electrical power transformers and distribution transformers.[17] The U.S. International Trade Commission ("ITC") has defined a "transformer" as "an electrical apparatus that transfers electrical energy from one electrical circuit to another without any direct electrical connection by the electromagnetic induction of an alternating electrical current between two or more magnetically coupled coils or windings."[18] Transformers are used either to increase (step-up) or decrease (step-down) the voltage (electrical potential) of an alternating electrical current within the circuitry of electrical equipment or systems.[19]

Electrical transformers are produced with either stacked or wound cores.[20] Stacked cores are used in larger distribution and power transformers while wound cores are used in smaller

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[15] AK Steel, "Steel Production in Western Pennsylvania," available at http://aksteel.com/about-us/locations/ak-steel/butler-works (last visited May 31, 2020), provided at **Exhibit 5**.

[16] AK Steel, "Steel Production in Zanesville, Ohio," available at http://aksteel.com/about-us/locations/ak-steel/zanesville-works (last visited May 31, 2020), provided at **Exhibit 6**.

[17] *See* U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at 6, provided at Exhibit 3.

[18] *Id.* at 6 n.24.

[19] *Id.*

[20] *Id.* at I-19.

(*e.g.*, either pole- or pad-mounted) distribution transformers that step down the voltage from the transmission line and provide power to residences and offices.[21]

When GOES is used in stacked cores, it is sheared or stamped into individual laminations, which are then stacked together to form the core.[22] When GOES is used to make wound cores, a continuous length of GOES is wound around a mandrel multiple times to form the core.[23] Copper windings (electricity conductors) are wrapped around both stacked and wound cores.[24]

In this investigation, the Department is considering how imports of the following items affect U.S. national security:

- laminations for stacked cores for incorporation into transformers ("laminations");
- stacked cores for incorporation into transformers ("stacked cores");
- wound cores for incorporation into transformers ("wound cores");
- electrical transformers; and
- transformer regulators.[25]

This submission, on behalf of AK Steel, addresses laminations, stacked cores, and wound cores. The Department should assess the impact of these products collectively. In other words, the Department should recognize that these three products form a single product group: downstream GOES products for incorporation into transformers. Each of these products is made with GOES; the products and their ultimate end uses are very similar (with stacked cores and wound cores

[21] *Id.* at I-19 to I-20.

[22] *Id.* at I-19.

[23] *Id.*

[24] *Id.*

[25] *Notice of Request for Public Comments* at 29926.

serving the same purpose in a transformer and laminations being used to make cores for incorporation into transformers); and each product has increasingly entered the U.S. market at very low prices from Canada and Mexico since Section 232 tariffs were imposed on GOES in 2018. For these reasons, AK Steel treats these products as a single group of products throughout this submission, and the Department should assess the effect of these imported products on U.S. national security as one group of downstream GOES products.

As shown throughout this submission, imports of these products have had a severe negative impact on demand for U.S. production of GOES, putting the future of AK Steel's facilities in Butler and Zanesville at risk -- and raising the dangerous possibility that the United States may permanently lose the capacity to make electrical steel. These facts justify action under Section 232.

If AK Steel is forced to stop production of electrical steel, its production of NOES will also come to an end. AK Steel is the nation's only producer of NOES, and it makes this product in the same facilities, and with the same employees, that it uses to make GOES. NOES is a flat-rolled alloy steel product used to manufacture laminations that are assembled in stacks to produce magnetic cores for alternating-current electrical apparatus.[26] NOES has desirable magnetic properties that are similar in all directions (non-oriented), unlike GOES (which has superior magnetic properties in the lengthwise direction of the sheet).[27] Thus, NOES is used primarily to make laminations for which the direction of the magnetic flux in the apparatus is constantly changing, such as for rotating machinery such as motors and generators, whereas GOES is used primarily in transformers, where the laminations can be produced in such a way as

[26] *See Non-Oriented Electrical Steel from China, Germany, Japan, Korea, Sweden, and Taiwan*, Inv. Nos. 701-TA-506 & 508 and 731-TA-1238-1243 (Final), USITC Pub. 4502 (Nov. 2014) at I-10, provided at **Exhibit 55**.

[27] *Id.*

to take advantage of the favorable directionality of the steel.[28] In other words, NOES is critical to the production of electric vehicles.[29] While this investigation focuses on products made from GOES, the United States also benefits from having domestic production of NOES. Losing the ability to make NOES would certainly impair the economic and national security interests of the United States.

III. LEGAL STANDARD

This investigation is taking place pursuant to Section 232 of the *Trade Expansion Act of 1962*, as amended, codified at 19 U.S.C. § 1862. The investigation was initiated upon the Secretary's own motion, in accord with 19 U.S.C. § 1862(b)(1)(A). The Secretary must now determine whether the articles covered by this investigation are being imported "in such quantities" or "under such circumstances" as to "threaten to impair the national security{.}"[30] If the Secretary finds that this standard has been met, then 19 U.S.C. § 1862(b)(3)(A) provides that the Secretary shall so advise the President in a report.[31]

Within 90 days after receiving a report submitted under 19 U.S.C. § 1862(b)(3)(A) in which the Secretary finds that an article is being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security, the President shall: (1) determine whether the President concurs with the finding of the Secretary, and (2) if the President concurs, determine the nature and duration of the action that, in the

[28] *Id.* at I-11.

[29] *Id.* at II-16 (discussing the relationship between demand for electric vehicles and demand for NOES).

[30] 19 U.S.C. § 1862(b)(3)(A).

[31] *Id.*

judgment of the President, must be taken to adjust the imports of the article and its derivatives so that such imports will not threaten to impair the national security.[32]

These factors are addressed below. In this investigation, the evidence shows that laminations, stacked cores, and wound cores are all being imported into the United States in such quantities and under such circumstances as to threaten to impair the national security. The facts further show that only a significant tariff on laminations, stacked cores, and wound cores will be sufficient to adjust imports of those articles so that such imports will not threaten to impair the national security.

IV. ELECTRICAL STEEL AND ITS DOWNSTREAM CORE AND LAMINATION PRODUCTS ARE ESSENTIAL TO U.S. NATIONAL SECURITY

A. The United States Has A Strong National Security Interest In Producing GOES

In early 2018, the Department issued a Section 232 report on the effects of imports of steel on U.S. national security and steel production in the United States.[33] The findings in that report plainly show that the United States has a strong national security interest in producing electrical steel, including GOES. The report specifically found that the term "national security" encompasses critical U.S. infrastructure sectors, including "the electric power grid."[34]

In its report, the Department explained that "{e}lectrical steel is necessary for power distribution transformers for all types of energy – including solar, nuclear, wind, coal, and natural gas – across the country."[35] The report stated that "{i}f domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the

[32] *Id.* § 1862(c)(1)(A).

[33] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), provided at Exhibit 2.

[34] *Id.* at 2.

[35] *Id.* at 46.

U.S. will become entirely dependent on foreign producers to supply these critical materials and products."[36] The report concluded that "{w}ithout an assured domestic supply of {electrical steel} products, the United States cannot be certain that it can effectively respond to large power disruptions affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner."[37]

The Department also explained that "{c}onventional and high-permeability domain-refined grain-oriented electrical steels (GOES) are used in cores and core assemblies for electrical transformers (including power transformers, switchgear, step-up, step-down, and distribution transformers) installed at military facilities across the United States."[38] The Department similarly found that "small transformers employing electrical steel are used in radar, ships, and some weapons systems. The availability of electrical steel meeting defense performance specifications is important to mission assurance and reliable operations."[39]

Electrical steel is also critical for [ ], the development, maintenance, and strength of which certainly is in the national security interest of the United States. [

][40]

[36] *Id.* (footnote omitted).

[37] *Id.*

[38] *Id.* at Appendix H, p. 5.

[39] *Id.*

[40] Affidavit of [ ] at para. 10, provided at **Exhibit 7**.

NOES, which is vital to the production of electric vehicles, is also critical to the economic and national security interests of the United States. In fact, [

]41 Of course, [

]

Because these critical applications and end uses are significant to the economy and national security of the United States, there can be no doubt that the United States has a strong national security interest in GOES production.

B. The Electrical Grid Is Essential To National Security

1. Previous Government findings demonstrate that the electrical grid is essential to national security

In its 2018 report under Section 232 regarding steel production in the United States, the Department concluded that the term "national security" encompasses critical U.S. infrastructure sectors, including "the electric power grid."[42] Relying on its October 2001 report regarding the effects of imports of iron ore and semi-finished steel on U.S. national security, the Department explained that "national security," as that term is used in Section 232, includes the general security and welfare of certain industries that are critical to the minimum operations of the government and economy.[43]

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[41] *See* [ ]

[42] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 2, provided at Exhibit 2.

[43] *Id.* at 13.

In applying this interpretation, the Department relied upon a list of 16 "critical infrastructure" sectors in Presidential Policy Directive 21, issued in February 2013.[44] One of these critical infrastructure sectors is the energy sector. The Department found that this sector uses steel in electricity power generating plants, electric power transmission towers, power distribution grids and stations, transformers, and transformer cores.[45] Thus, only two years ago, the Department considered and determined that "national security" includes the electrical grid (as well as the electrical steel and its downstream products used in the electrical grid) that is critical to minimum operations of the government and economy. The Department should reach the same conclusion here.

Other parts of the U.S. government have agreed with the Department's determination that the electrical grid is critical for U.S. national security. In June 2016, the Department of Defense ("DoD") issued a report explaining that disruptions in power supply can significantly affect critical aspects of national defense and security:

> DoD relies on commercial power to conduct missions from its installations, and these commercial power supplies can be threatened by natural hazards and other events. DoD recognizes that such events could result in power outages affecting critical DoD missions involving power projection, defense of the homeland, or operations conducted at installations in the U.S. directly supporting warfighting missions overseas.[46]

Furthermore, according to a 2013 report by the President's Council of Economic Advisers ("CEA") and the Office of Electricity Delivery and Energy Reliability of the Department of Energy ("DOE"), "99 percent of all U.S. Department of Defense installations located within the

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[44] *Id.* at 13, 23-24, and Appendix I, pp. 1-2.

[45] *Id.* at Appendix I, p. 1.

[46] Office of the Assistant Secretary of Defense (Energy, Installations, and Environment), *Department of Defense Annual Energy Management Report Fiscal Year 2015* (June 2016), at 45, provided at **Exhibit 8**.

United States rely on the commercial electric grid for power{.}"[47] The CEA also separately stated that "85 percent of the DoD's energy comes from commercial sources" and explained that "{i}t is estimated that a loss of power would impact the DoD missions of preventing terrorism and enhancing security, safeguarding and securing cyberspace, and strengthening national preparedness. If power outages affected missions both at home and abroad, United States security would be significantly impacted."[48]

In a March 2017 report to Congress entitled "Strategic Transformer Reserve," the DOE explained that "beyond its role as an everyday commodity expected to be extremely reliable, electricity is an essential part of public health and safety and national security, and is thereby considered a critical or 'lifeline' function."[49] Moreover, the DOE told Congress that "the other lifeline functions (telecommunications, transportation, and water) are dependent on electricity."[50] In a separate report on the U.S. electrical grid, the DOE similarly stated that the "U.S. electric power grid is one of the Nation's critical life-line functions on which many other critical infrastructure depend, and the destruction of this infrastructure can have a significant impact on national security and the U.S. economy."[51]

In its 2017 report to Congress, the DOE further explained that "ensuring the resilience of the electric grid and its ability to recover from both localized and catastrophic events is

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[47] Council of Economic Advisers and the Office of Electricity Delivery and Energy Reliability of the Department of Energy, *Economic Benefits of Increasing Electric Grid Resilience to Weather Outages* (Aug. 2013), at 23 (citation omitted), provided at **Exhibit 9**.

[48] Council of Economic Advisers, *The Cost of Malicious Cyber Activity to the U.S. Economy* (Feb. 2018), at 42-43 (citation omitted), provided at **Exhibit 10**.

[49] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 1, provided at **Exhibit 11**.

[50] *Id.*

[51] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (Apr. 2014), at vii, provided at **Exhibit 12**.

sufficiently critical to the economy and national well-being that its provision goes beyond a purely private sector responsibility."[52] In order to "protect public health and safety, enhance national security, and ensure the resilience of the Nation's electric grid," the DOE said that "there is an imperative to take actions that require industry and government to increase grid resilience{.}"[53]

On May 1, 2020, President Donald J. Trump issued an Executive Order on Securing the United States Bulk-Power System. In that order, the President left no doubt regarding the importance of the electrical grid to national security. The President explained that the U.S. bulk-power system[54] "provides the electricity that supports our national defense, vital emergency services, critical infrastructure, economy, and way of life."[55] In declaring a national emergency with respect to the threat to the United States bulk-power system, President Trump emphasized the devastating consequences of problems associated with the electrical grid on U.S. national security:

> The bulk-power system is a target of those seeking to commit malicious acts against the United States and its people, including malicious cyber activities, because a successful attack on our bulk-power system would present significant risks to our economy, human health and safety, and would render the United States less capable of acting in defense of itself and its allies.[56]

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[52] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 1, provided at Exhibit 11.

[53] *Id.* at 21.

[54] The President defined the bulk-power system as "(i) facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof); and (ii) electric energy from generation facilities needed to maintain transmission reliability." *Executive Order on Securing the United States Bulk-Power System* (May 1, 2020), at Section 4(a), provided at **Exhibit 13**.

[55] *Id.*

[56] *Id.*

The President went on to explain that U.S. national security can be undermined if "foreign adversaries" use the market to influence on our electrical grid:

> I further find that the unrestricted acquisition or use in the United States of bulk-power system electric equipment designed, developed, manufactured, or supplied by persons owned by, controlled by, or subject to the jurisdiction or direction of foreign adversaries augments the ability of foreign adversaries to create and exploit vulnerabilities in bulk-power system electric equipment, with potentially catastrophic effects.
>
> I therefore determine that the unrestricted foreign supply of bulk-power system electric equipment constitutes an unusual and extraordinary threat to the national security, foreign policy, and economy of the United States{.}[57]

Regarding this order, Secretary of Energy Dan Brouillette explained that it "is imperative the bulk-power system be secured against exploitation and attacks by foreign threats . . . . This Executive Order will greatly diminish the ability of foreign adversaries to target our critical electric infrastructure."[58] Thomas Popik, president of the Foundation for Resilient Societies (a non-profit organization with the goal of protecting technologically-advanced societies from natural and man-made disasters),[59] said that "{n}ational security will greatly benefit" from this executive order, which prevents relying "on a manufacturing base for the most critical equipment in countries like China whose national interests may be adverse to those of the United States."[60] According to the *Wall Street Journal*, national security officials have concluded that China has

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[57] *Id.*

[58] "U.S. Moves to Address 'Extraordinary Threat' From Some Foreign Electric Gear," *Wall Street Journal* (May 1, 2020), provided at **Exhibit 14**.

[59] Foundation for Resilient Societies, "About Us," available at http://resilientsocieties.org/about-us.html (last visited June 1, 2020), provided at **Exhibit 15**.

[60] "U.S. Moves to Address 'Extraordinary Threat' From Some Foreign Electric Gear," *Wall Street Journal* (May 1, 2020), provided at Exhibit 14.

the "ability to temporarily disrupt the operations of electric utilities and gas pipelines."[61] Furthermore, Tom Kuhn, president of the Edison Electric Institute, said that the order "reflects this ongoing collaboration with the federal government and provides new ways to mitigate threats to electric-sector critical infrastructure . . . . Reliable electricity and a secure energy grid are essential to the nation's economy and our way of life."[62]

The viability of the electrical grid is so important to national security that Congress passed and President Barack Obama signed the *Fixing America's Surface Transportation Act* in 2015.[63] This statute included a directive for the DOE, along with other government and domestic industry partners, to create a plan for establishing a strategic transformer reserve to support and secure "critical electric infrastructure" and "defense and military installations."[64]

In sum, there can be no question that the U.S. electrical grid is essential to national security. Within the last few years, actions by the Department, the DoD, the CEA, the DOE, President Trump, President Obama, and the U.S. Congress all testify to this fact.

2. The electrical grid is essential to the economic welfare of the United States, which has a "close relation" to national security

Section 232(d) provides that in the administration of this statute, the Secretary and the President shall "recognize the close relation of the economic welfare of the Nation to our national security{.}"[65] In this case, the Department should certainly conclude that a strong and reliable electrical grid is vital to the economic welfare of the United States.

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[61] *Id.*

[62] *Id.*

[63] Pub. L. No. 114-94.

[64] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 2-3 and 23, provided at Exhibit 11.

[65] 19 U.S.C. § 1862(d). *See also* 15 C.F.R. § 705.4(b).

In 2017, the DOE stated that a "key driver for U.S. economic competitiveness has been the supply and delivery of electricity that is affordable, accessible, and reliable. The reliability of electricity directly affects the efficiency of production processes, enabling the efficient and cost-effective coordination of economic activity without disruption."[66] The DOE added that "{w}ithout access to reliable electricity, much of the economy and all electricity-enabled critical infrastructures are at risk."[67]

A 2015 report by the Military Advisory Board for the Center for Naval Analyses -- which consists of retired high-ranking military officials -- also explained that the electrical grid is essential to our nation's economic health and our national security:

> Reliable electricity underpins every facet of American lives. . . .
>
> Assuring that *we have reliable, accessible, sustainable, and affordable electric power is a national security imperative*. Our increased reliance on electric power in every sector of our lives, including communications, commerce, transportation, health and emergency services, in addition to homeland and national defense, means that *large-scale disruptions of electrical power will have immediate costs to our economy and can place our security at risk*.
>
> Whether it is the ability of first responders to answer the call to emergencies here in the United States, or the readiness and capability of our military service members to operate effectively in the U.S. or deployed in theater, these missions are directly linked to assured domestic electric power.[68]

Problems with the electrical grid can have catastrophic consequences for the U.S. economy. For example, in a February 2018 report, the CEA explained that a 2003 power outage caused by a programming error resulted in power outages of between two days and two weeks in

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[66] U.S. Department of Energy, *Transforming the Nation's Electricity System* (Jan. 2017), at 1-5, provided at **Exhibit 16**.

[67] *Id.* at 1-31.

[68] Center for Naval Analyses Military Advisory Board, *National Security and Assured U.S. Electrical Power* (Nov. 2015), at iii, 1 (emphases added), provided at **Exhibit 17**.

the Midwest and Northeast of the United States and parts of Canada. The estimated cost of these outages was $6 billion.[69]

The CEA explained that a "cyberattack on the electrical grid could have large-scale economic impacts as infrastructure damages, loss in output, delayed production, spoiled inventory, and loss of wages all decrease productivity and earnings for the duration of the blackout."[70] In support of this conclusion, the CEA relied on a study conducted by Lloyd's of London and the Centre for Risk Studies of the University of Cambridge estimating that a cyberattack could result in economic losses to the United States of between $243 billion and $1 trillion.[71] The CEA's summary of the study's findings on the devastating economic effects of a cyberattack demonstrate how crucial the electrical grid is to the economic welfare of the United States:

> Direct damages would include, but are not limited to, damage to assets, infrastructure, sales revenue of electricity supply companies, sale{s} revenue of other businesses and supply chains. . . .
>
> Productivity would see a decrease as businesses close from loss of power and people are unable to perform their regular duties. Even as businesses return to power employees may have difficulties getting to work due to limited fuel supply, disabled traffic lights, and limited to no public transportation.
>
> Trade will also be impacted as maritime operating ports are suspended and the ability to load and unload ships becomes difficult to impossible without electricity. In addition, even if

[69] Council of Economic Advisers, *The Cost of Malicious Cyber Activity to the U.S. Economy* (Feb. 2018), at 41, provided at Exhibit 10.

[70] *Id.*

[71] *Id.* The study estimated that the total impact to the U.S. economy would be $243 billion if the crisis lasted for two weeks, $544 billion if the crisis lasted for three weeks, and -- in the most extreme scenario -- over $1 trillion if the crisis lasted for four weeks. Lloyd's of London and the University of Cambridge's Centre for Risk Studies, *Business Blackout: The insurance implications of a cyber attack on the US power grid* (May 2015), at 21-23, provided at **Exhibit 18**.

> goods are able to make it to the limited available ports, there would be backups resulting in a slowdown of production along the supply chain.
>
> Consumption will increase initially as people panic buy commodities; however, this will quickly take a turn. As banks do not have power and businesses either have to close or are limited to cash, people will need to limit their consumption and it will remain low until all affected people and business return to full power.
>
> Finally, rail systems and airports will be shut down as a result of the power outages impacting tourism. . . . tourism would decrease severely during the outage and would not return to normal levels for several weeks.[72]

In sum, as the CEA explained, an "attack on the power grid could have devastating consequences for firms and private citizens."[73] Furthermore, cyberattacks are not the only potential cause of an electricity crisis. Natural disasters, such as hurricanes, often cause significant damage to the U.S. electrical grid. When the electrical grid is damaged, it is absolutely vital that it be repaired immediately. The electrical grid is essential to the U.S. economy, and -- given the "close relation of the economic welfare of the Nation to our national security"[74] -- the electrical grid is also essential to U.S. national security.

C. GOES Is Essential To The U.S. Electrical Grid

GOES is used to make components that are critical to the U.S. electrical grid. As explained above, in a 2014 investigation, the ITC found that because of specialized rolling and heat treatment processes, GOES has grain structures that permit it to conduct a magnetic field with a high degree of efficiency in the direction of rolling compared with other steels.[75] Because

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[72] Council of Economic Advisers, *The Cost of Malicious Cyber Activity to the U.S. Economy* (Feb. 2018), at 41-42, provided at Exhibit 10.

[73] *Id.* at 40.

[74] 19 U.S.C. § 1862(d).

[75] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at 6, provided at Exhibit 3.

of its superior magnetic qualities, GOES is used primarily to make cores and laminations for electrical power transformers.

The physical characteristics of GOES make it essential for the transmission of electrical power. In a 2014 report, the DOE explained that the "electrical steel used in power transformer manufacture is a specialty steel tailored to produce certain magnetic properties and high permeability. A special type of steel called cold-rolled grain-oriented electrical steel . . . makes up the core of a power transformer."[76] In its investigation, the ITC explained that laminations for "transformer cores are oriented within transformers to take advantage of the directional magnetic properties of the steel. . . . The directional magnetic properties of the GOES allow for the transformation of the electrical potential (voltage) for an alternating electrical current."[77]

Eric Petersen, who was then AK Steel's Vice President of Sales and Customer Service, testified to the ITC why the unique physical characteristics of GOES are so beneficial for transformers:

> GOES possesses distinctive physical properties that make it particularly suitable for use in transformers. Due to its chemistry and its special manufacturing processes, large grains are formed in the Steel that are oriented in the direction in which the Steel is rolled. This allows the Steel to conduct a magnetic field with a high degree of efficiency.
>
> As a result of these unique physical characteristics, GOES has superior magnetic properties that make it a highly efficient electromagnetic material, for constructing the cores of transformers compared to any other type of Steel.[78]

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[76] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (Apr. 2014), at 11, provided at Exhibit 12.

[77] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at 6-7 (footnote omitted), provided at Exhibit 3.

[78] *In the Matter of: Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia* (July 24, 2014), at 20, provided at **Exhibit 19**.

Mr. Petersen added that, although the initial production processes for GOES are similar to those of other steels, there are unique production steps for GOES: "For example, after cold-rolling, a magnesium oxide coating is applied to the GOES coils, that later serves as an insulator when the Steel is used to construct transformer cores. The coil is then annealed at a high temperature for five or six days, and during this annealing process, these large-sized, highly oriented grains are formed."[79]

These characteristics make GOES an essential input for laminations, cores, and transformers that are used in the electrical grid. According to the DOE, "{e}lectrical steel is the *most critical component* that has the greatest impact on the performance of the power transformer, because it is designed to provide low core loss and high permeability, which are essential to efficient and economical power transformers."[80] The DOE also described electrical steel and copper as "key raw materials . . . which are integral to" large power transformers, and the "core is the most critical component of {a large power transformer}, which requires a highly-trained and skilled workforce and cold-rolled, grain-oriented (CRGO) laminated electrical steel."[81] In a separate report, issued in 2017, the DOE found that "{s}pecial grade electrical steel is used for the core of a power transformer and *is critical to the efficiency and performance of the equipment*{.}"[82]

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[79] *Id.* at 21.

[80] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (Apr. 2014), at 11 (emphasis added), provided at Exhibit 12.

[81] *Id.* at 7, 9.

[82] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 14 (emphasis added), provided at Exhibit 11.

D. GOES Production In The United States Is Critical To National Security

1. The enormous U.S. electrical grid faces numerous threats that endanger national security

The U.S. Energy Information Administration has stated that, in the United States, "the entire electricity grid consists of hundreds of thousands of miles of high-voltage power lines and millions of miles of low-voltage power lines with distribution transformers that connect thousands of power plants to hundreds of millions of electricity customers all across the country."[83] According to a 2014 report by the DOE, the U.S. electrical grid transmits electricity from over 6,000 power plants through approximately 390,000 miles of transmission lines.[84] If anything, those numbers have likely grown since the DOE report was issued. Transformers are present throughout the grid to adjust the voltage on each segment of power transmission, thus allowing electricity to flow from generators to end users throughout the country.[85]

Relied on by millions of end users, including U.S. military facilities, manufacturing plants, hospitals, and family homes, the U.S. electrical grid faces a number of threats. According to the DOE, "{t}ransformers, power lines, and substation equipment are often exposed to the elements and are vulnerable to an increasing number of natural and manmade threats," including natural disasters (*e.g.*, lightning strikes), "extreme terrestrial or space weather events, accidents, equipment failures, deliberate attacks, and other unknowns."[86] These concerns are not merely hypothetical. For example, in 2017 a "triple whammy" of hurricanes in Texas, Florida, and

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[83] U.S. Energy Information Administration, "Electricity explained," available at https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php (last visited June 6, 2020), provided at **Exhibit 20**.

[84] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (Apr. 2014), at 5, provided at Exhibit 12.

[85] *Id.*

[86] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 14-15, provided at Exhibit 11.

Puerto Rico resulted in the following: "Total outages topped 12 million, entire grids virtually destroyed and, worst of all, close to 800 lives lost."[87]

Intentional attacks also threaten the electrical grid. In April 2013, snipers attacked a power substation in California and "surgically knocked out 17 giant transformers that funnel power to Silicon Valley."[88] Jon Wellinghoff, who was chairman of the Federal Energy Regulatory Commission ("FERC") at the time of the attack, called it "the most significant incident of domestic terrorism involving the grid that has ever occurred" in the United States.[89] It took several weeks to repair the substation and make it operational again.[90] Representative Henry Waxman of California called the sniper attack "an unprecedented and sophisticated attack on an electric grid substation with military-style weapons. Communications were disrupted. The attack inflicted substantial damage. It took weeks to replace the damaged parts. Under slightly different conditions, there could have been serious power outages or worse."[91] Mr. Wellinghoff explained that a FERC analysis "found that if a surprisingly small number of U.S. substations were knocked out at once, that could destabilize the system enough to cause a blackout that could encompass most of the U.S."[92]

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[87] "Grid Responders Gain Insights Battling Harvey, Irma and Maria," *Power Grid International* (Jan. 1, 2018), provided at **Exhibit 21**.

[88] "Assault on California Power Station Raises Alarm on Potential for Terrorism," *Wall Street Journal* (Feb. 5, 2014), provided at **Exhibit 22**.

[89] *Id.*

[90] *Id.*

[91] "'Military-Style' Raid on California Power Station Spooks U.S.," *Foreign Policy* (Dec. 27, 2013), provided at **Exhibit 23**.

[92] "Assault on California Power Station Raises Alarm on Potential for Terrorism," *Wall Street Journal* (Feb. 5, 2014), provided at Exhibit 22.

Cyberattacks also pose significant risks to the U.S. electrical grid. These attacks may intend to cause a variety of harmful results, including "equipment malfunction or failure, physical equipment damage, power disruptions, or blackouts."[93] In other words, cyber attackers may not necessarily only intend to cause a power outage. A cyberattack may cause physical damage to the grid's equipment, as the Idaho National Laboratory of the DOE explained: "attackers may manipulate digital components to cause unintended physical consequences to real equipment, such as falsifying sensor signals, causing temperature shifts to destroy electronics, over- or under-pressurizing valves, among many other possibilities in a complex control system."[94] The CEA has also explained that cyber attackers may seek to force generators to overload and burn out:

> a particular threat actor (e.g., a nation-state) could develop a malware that can infect electricity generation control rooms. Methods for inserting the malware include, but are not limited to: (1) targeting laptops and other personal electronic devices of key personnel with access to multiple power plants, (2) conducting 'phishing' attacks that allow the hackers to compromise the corporate network and establish chain attacks that ultimately lead to the control system (known as pivoting), (3) hacking a remotely accessed control system, and (4) physically entering the locations that monitor the network. . . .
>
> The attackers can then choose to trigger the malware at their discretion and take control of the generators. They can accomplish this task by *forcing the generators to overload and burn out, thus causing additional fires and explosions in some cases*. Such an attack could potentially destabilize a large area, such as the entire Northeastern U.S. regional grid. Power could be restored in some areas relatively quickly (within 24 hours), but other areas may be left without power for a number of weeks{.}[95]

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[93] Idaho National Laboratory, *Cyber Threat and Vulnerability Analysis of the U.S. Electric Sector* (Aug. 2016), at 8, provided at **Exhibit 24**.

[94] *Id.* at 4 (footnote omitted).

[95] Council of Economic Advisers, *The Cost of Malicious Cyber Activity to the U.S. Economy* (Feb. 2018), at 40-41 (citation omitted), provided at Exhibit 10.

Aging equipment compounds the threats to the electric grid, including the threat to national security, and hinders the ability of power providers to re-establish service after blackouts and power outages. Weather-related power outages alone, exacerbated by aging equipment, are estimated to have cost the U.S. economy an average of $18 billion to $33 billion annually from 2003 to 2012.[96] As a result, much of the electrical grid is in desperate need of modernization. The American Society of Civil Engineers has identified "{d}esign and construction of additional transmission grid infrastructure" as a strategic imperative to improve the condition of the nation's infrastructure.[97]

A 2014 report from the DOE vividly described the problems with an aging electrical grid in this country:

> {A}ge is certainly a contributing factor to increases in transformer failures. Various sources, including power equipment manufacturers, estimated that the average age of LPTs {*i.e.*, large power transformers} installed in the United States is 38 to 40 years, with approximately 70 percent of LPTs being 25 years or older. According to an industry source, there are some units well over 40 years old and some as old as over 70+ years that are still operating in the grid. An LPT is subjected to faults that result in high radial and compressive forces, as the load and operating stress increase with system growth. In an aging power transformer failure, typically the conductor insulation is weakened to the degree at which it can no longer sustain the mechanical stresses of a fault.[98]

The Military Advisory Board of the Center for Naval Analyses has echoed the opinion of the DOE, describing the risk of aging equipment to national security as follows:

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[96] American Society of Civil Engineers, *2017 Infrastructure Report Card: Energy D+*, attached as **Exhibit 25**.

[97] American Society of Civil Engineers, *Policy Statement 484* (July 9, 2016), provided at **Exhibit 26**.

[98] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (Apr. 2014), at 28-29 (footnotes omitted), provided at Exhibit 12.

> The current U.S. electric grid's overreliance on aging twentieth-century technology—based on centralized power generation and interconnected distribution architecture—makes it susceptible to a wide variety of threats, including severe weather and other natural disasters, direct physical attack or cyberattack, and accidents associated with the age of the grid or human error. The national security vulnerabilities associated with the grid, its discrete power generation and nodal distribution, and the design of power transmission leave the U.S. open to both small/short-duration and large/long-duration power outages.[99]

In sum, the U.S. electrical grid -- a system that is absolutely critical to the health, safety, and prosperity of roughly 330 million Americans -- faces numerous threats that endanger our national security. Those threats are compounded by aging equipment, which must often be replaced on very short notice.

2. The United States needs domestic production of GOES to efficiently respond to threats to U.S. national security, improve the security and resiliency of the electrical grid, and develop new technologies

In its Section 232 report on steel, the Department recognized the critical need to maintain production of the entire supply chain necessary to maintain our electrical grid here in the United States. As shown below, the Department specifically found that U.S. national security requires an American supply of electrical steel, including GOES:

> In the case of critical infrastructure, the United States is down to only one remaining producer of electrical steel in the United States (AK Steel – which is highly leveraged). Electrical steel is necessary for power and distribution transformers for all types of energy – including solar, nuclear, wind, coal, and natural gas – across the country. If domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the U.S. will become entirely dependent on foreign producers to supply these critical materials and products. *Without an assured domestic supply of these products, the United States cannot be certain that it can effectively respond to large power disruptions*

[99] Center for Naval Analyses Military Advisory Board, *National Security and Assured U.S. Electrical Power* (Nov. 2015), at 1, provided at Exhibit 17.

> *affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner*.[100]

This finding alone is sufficient to demonstrate that domestic production of GOES is vital to the national security of the United States.

This conclusion has broad support in Congress. According to Senator Rob Portman (Ohio), Senator Sherrod Brown (Ohio), and Senator Robert P. Casey, Jr. (Pennsylvania), "GOES is critical for the electrical transformers that support our power grid. It is not reasonable, or even possible, to rely entirely on overseas production for material that sustains the critical infrastructure of the United States."[101] Representative Troy Balderson (Ohio) and Representative Mike Kelly (Pennsylvania) have also emphasized the need for domestic production of GOES:

> Without AK Steel's GOES, the U.S. will be solely reliant on overseas production for material that supports America's critical infrastructure. If the national electrical grid were to be attacked or compromised by a natural disaster, the U.S. would need a dependable source of electrical steel to allow for rapid repair. Becoming wholly dependent on foreign producers for this vital product puts Americans at grave and unnecessary risk.[102]

In the sections below, we provide more detail regarding the findings of the Department in its Section 232 report on steel about the importance of U.S. production of electrical steel to national security.

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[100] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 46 (emphasis added; footnote omitted), provided at Exhibit 2.

[101] Letter from Senator Rob Portman, Senator Sherrod Brown, and Senator Robert P. Casey, Jr. to Ambassador Robert Lighthizer (Oct. 31, 2019), provided at **Exhibit 27**.

[102] Letter from Representative Troy Balderson and Representative Mike Kelly to President Donald Trump (Mar. 6, 2020), provided at **Exhibit 28**.

a. AK Steel is the only remaining U.S. producer of GOES, and there are significant barriers to entry for new U.S. producers of GOES

As the Department found in its Section 232 report on steel, "the United States is down to only one remaining producer of electrical steel in the United States{.}"[103] The DOE also stated in a 2017 report that AK Steel "is currently the only domestic manufacturer" of GOES, a material that it described as "critical to the efficiency and performance of" cores and power transformers.[104] Considering that electrical steel and the grid equipment made from it are essential to the national security of the United States, any threat to AK Steel's production of electrical steel threatens the national interest and national security of the United States.

Until 2016, there were two producers of GOES in the United States: AK Steel and Allegheny Ludlum, LLC ("Allegheny Ludlum"). In 2015, Allegheny Technologies Incorporated ("ATI") announced that its subsidiary Allegheny Ludlum would idle its production of GOES in 2016, and ATI specifically stated that low-priced imports of GOES forced this decision.[105] ATI permanently closed its GOES production in 2016 because of continued pressure from imports.[106] Without tariff relief in this investigation, AK Steel will soon follow Allegheny Ludlum in exiting the U.S. GOES industry. Then there will be no U.S. production of GOES, or any other electrical steel. In March 2020, Lourenco Goncalves, the Chairman, President, and CEO of Cleveland-Cliffs, told the Congressional Steel Caucus that the two AK Steel plants that make GOES in

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[103] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 46, provided at Exhibit 2.

[104] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 14, provided at Exhibit 11.

[105] Allegheny Technologies Incorporated Press Release, "ATI Announces Rightsizing Actions to Align Flat Rolled Products Operations to Challenging Market Conditions," (Dec. 10, 2015), provided at **Exhibit 29**.

[106] *See* Section V.A.1.

Pennsylvania and Ohio will close without Section 232 relief.[107] Economic analysis confirms that AK Steel's current production of electrical steel is unsustainable.[108]

Without AK Steel's production, the United States would have no domestic GOES production to help build, rebuild, repair, or resolve issues with the electrical grid. In any emergency or other scenario where repairs were urgent, the United States could not expect another American steel company to step in and make GOES on existing equipment or with employees trained to make other types of steel. GOES is a highly specialized product and there are significant barriers of entry that would make it difficult for another U.S. company -- including other steel companies -- to begin making the specialized product that the U.S. electrical grid requires. Once again, this fact is confirmed by economic analysis.[109] The facts make clear that domestically produced GOES will not be available if AK Steel is forced to stop making GOES.

As [ ] states in a sworn affidavit attached to this submission, AK Steel invented GOES and has made this product for decades.[110] AK Steel produces GOES to meet every application required to build and support the electrical grid from the initial power generation stage, through the transfer of power across the grid and ultimately to end-user applications.[111] Entry into the GOES market is challenging because producing GOES requires

[107] "AK Steel buyer warns of plant closures without stronger U.S. import curbs," *Reuters* (Mar. 5, 2020), provided at **Exhibit 30**.

[108] Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section II.B, provided at **Exhibit 56**.

[109] *Id.* at Section III.D.

[110] Affidavit of [ ] at para. 2, provided at Exhibit 7.

[111] *Id.*

specialized equipment and expertise.[112] GOES is a highly engineered product that requires a number of unique steps in order to produce.[113] AK Steel has a highly-trained and specialized workforce with the necessary expertise both to make GOES and to conduct research and development to develop improved GOES in the future.[114] Without these employees, their experience, and their expertise, AK Steel (and thus the United States) could not produce GOES.[115] In the Department's recent Section 232 investigation into steel, Roger Newport -- who was then the CEO of AK Steel -- gave sworn testimony on this exact point:

> High-end electrical steel is an incredibly difficult product to manufacture, as it requires a significant amount of dedicated, capital equipment and a sophisticated, well-trained workforce. Therefore, if AK Steel were to exit the market, there would be no operational electrical steel manufacturing equipment in the United States, the specialized labor and related expertise in operations would be lost, and many of AK Steel's talented operators and researchers would either re-locate to other businesses, industries and/or foreign countries, or become unemployed.[116]

In a 2014 investigation by the ITC, Tom Conway, Vice President of the Steel Workers Union, testified that workers making GOES have different training and skills than employees that make other types of steel: "it takes a lot of skill now to sit in that pulpit, roll these steels, understand the particular unique metallurgical qualities of GOES and what it takes. So these are

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[112] *Id.* at para. 3.

[113] *Id.*

[114] *Id.* at para. 4.

[115] *See id.* ("These experienced employees are critical to AK Steel's production of GOES.")

[116] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at Appendix F, p. 18, provided at Exhibit 2.

jobs that take a while to break in and learn. It's not something you learn in a matter of months or weeks to do this{.}"[117]

In addition to specialized workers, AK Steel also has a mature supply chain for raw materials that are necessary to support the company's GOES production.[118] It would be extremely challenging and time-consuming for any other company to re-establish this supply chain if AK Steel were forced to stop making GOES.[119] With its workers and raw materials, AK Steel produces GOES on dedicated lines and facilities with specific equipment that is used only to make GOES.[120] [

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In sworn testimony before the ITC as part of its 2014 investigations, Eric Petersen of AK Steel testified that the production of GOES is "unique and it uses equipment that is specifically

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[117] *In the Matter of: Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia* (July 24, 2014), at 85, provided at Exhibit 19. The ITC provided a detailed description of how GOES is made in its final determinations on imports of GOES. *See* U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at I-14 through I-22, provided at Exhibit 3.

[118] Affidavit of [ ] at para. 5, provided at Exhibit 7.

[119] *Id.*

[120] *Id.* at para. 6.

[121] *Id.* The economic analysis attached to this submission further demonstrates that [

] Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section III.D, provided at Exhibit 56.

designed and used exclusively to manufacture GOES."[122] Similarly, Ray Polinski, Vice President and General Manager of GOES at Allegheny Ludlum testified before the ITC staff that his company could not use its equipment for anything other than GOES: "we've tried to find other uses for it, but the equipment is so unique it is only good for producing grain-oriented electrical steel and it has no other use."[123]

Based on these statements from current and former U.S. producers of GOES, it is clear that -- if the United States loses AK Steel's GOES production -- it would be extremely difficult for any other company to begin GOES production here. A company would have to invest an enormous amount of money and significant time to obtain the necessary production equipment, establish a supply chain, and provide considerable specialized training for employees to make GOES. Even if that company has significant steel-making experience, the distinctive production process and employee skill requirements would require substantial investments in money and time. In an emergency situation, other companies could not begin making GOES in the United States in a timely manner, and the United States would have no choice but to buy GOES from foreign sources. In fact, this is precisely what the Department found when it looked into the matter in 2018: "{i}f domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the U.S. will become entirely dependent on foreign producers to supply these critical materials and products."[124]

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[122] *In the Matter of: Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia* (July 24, 2014), at 20, provided at Exhibit 19.

[123] *In the Matter of: Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia* (Oct. 25, 2013), at 82, provided at **Exhibit 31**. Allegheny Ludlum stopped producing GOES in 2016, soon after the ITC denied relief in these investigations.

[124] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 46 (footnote omitted), provided at Exhibit 2.

b. U.S. production of GOES enhances the ability of the United States to effectively respond to power disruptions and other national security threats

In its Section 232 report on steel, the Department explained that "{w}ithout an assured domestic supply of {electrical steel} products, the United States cannot be certain that it can effectively respond to large power disruptions affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner."[125]

Electrical grid equipment is highly sophisticated. In the event of an accident, attack, or other issue with the equipment, repairs can take several weeks or months. For example, "{w}ith just a few shots from a high-powered rifle, an unknown gunman knocked out an electric power substation in rural south-central Utah {in September 2016}, cutting off electricity to 13,000 customers for a day and forcing the utility to wait" an estimated six months "until the station's disabled transformer" would be repaired or replaced.[126]

However long it takes to repair or replace a transformer or other piece of grid equipment, it necessarily takes longer to repair or replace the equipment with imported GOES than it would with GOES made in the United States. According to [ ] if a major disaster required significant investment in transformers to support the electrical grid, and even assuming that foreign producers would be able and willing to quickly expand their production of GOES to address the emergency, it could take a minimum of three months for U.S. transformer producers to obtain the GOES necessary to return to normal electrical service.[127] There are no producers of GOES in Mexico or Canada, and all downstream GOES products that are imported from Mexico

[125] *Id.* at 46.

[126] "Substation attack is new evidence of grid vulnerability," *E&E News* (Oct. 6, 2016), provided at **Exhibit 32**.

[127] Affidavit of [ ] at para. 7, provided at Exhibit 7.

and Canada are made from GOES produced by countries outside of North America.[128] Compared with shipping GOES within the United States from a facility of a domestic supplier, it would be dangerous for Americans to have to rely on shipments of GOES across the ocean in a time of emergency. Similarly, shipping GOES across the ocean to Mexico or Canada so that companies in those countries could make laminations and cores for the U.S. market would result in significant delays -- and those delays would be disastrous for Americans without electricity.[129]

In April 2018, AK Steel's former CEO Roger Newport warned the Ways and Means Committee of the U.S. House of Representatives of the importance of maintaining U.S. production of GOES:

> Grain oriented electrical steel is the critical component in the cores of transformers that move electricity across the entire grid and deliver power to our homes and businesses. Damage or erosion of this infrastructure would have a significant negative impact on national security and the U.S. economy, which is why it is imperative that we have a domestic supply chain that can react to any such occurrence. . . .
>
> In the case of a natural disaster or a cyber- or physical attack on the country's electrical grid, the United States' national security cannot be put in jeopardy due to the absence of a domestic supply chain that supports the key components of the electrical grid. If the U.S. ends up being reliant on foreign suppliers to repair a catastrophic failure of the electrical grid, *the disruption to the nation's businesses and citizens' way of life would be unnecessarily long and burdensome*.[130]

Even if GOES were available from a country that is friendly toward the United States, it would be extremely risky to depend on access to GOES in a timely manner. In its recent Section 232 report on steel, the Department concluded that "{w}hile the United States has many allies

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[128] *Id.* at paras. 7-8.

[129] *See id.* at para. 8.

[130] Testimony of Roger K. Newport, Chief Executive Officer, AK Steel Corporation, House Ways and Means Committee, Hearing on the Effects of Tariff Increases on the U.S. Economy and Jobs (Apr. 12, 2018), at 2, 4 (emphasis added), provided at **Exhibit 33**.

that produce steel, *relying on foreign owned facilities located outside the United States introduces significant risk and potential delay* for the development of new steel technologies and production of needed steel products, *particularly in times of emergency*."[131] This reasoning certainly applies to GOES.

The experience of AK Steel in prior disasters demonstrates the importance of having an assured supply of GOES in the United States. [

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]135 If a [ ] natural disaster or other emergency happens in the future that requires urgent repairs or replacements, and there is no production of GOES in the United States, the consequences for Americans could be devastating.

Former AK Steel CEO Roger Newport testified to this point before the Department in the Section 232 proceeding on steel:

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[131] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 46 (emphases added), provided at Exhibit 2.

[132] Affidavit of [ ] at para. 9, provided at Exhibit 7.

[133] *Id.*

[134] *Id.*

[135] *Id.*

> A secure, reliable supply of electrical steel is necessary to maintain the electrical grid. Major blackouts, such as the one in San Francisco last month that shut down the financial center of the city, demonstrate that the lack of reliable electrical grid infrastructure is a major threat to our national economy. Major blackouts may occur as a result of grid obsolescence, severe weather events like Hurricane Katrina or Superstorm Sandy, or cyber, terrorist or other attacks on our electrical infrastructure. A secure, domestic source of electrical steel is more important than ever before.[136]

As discussed below, the survival of domestic GOES production is threatened by imports of downstream products -- including the products at issue in this investigation. These laminations, stacked cores, and wound cores are being made from GOES that is produced overseas, and then sold in Mexico or Canada at prices that AK Steel cannot afford to match. Because AK Steel has lost so much business -- and been forced to accept unsustainably low pricing for its remaining business -- the United States could soon lose the ability to make electrical steel.[137] Such a result would certainly threaten our electrical grid, the economy that depends on that grid, and our national security.

c. The United States needs GOES production to improve the security and resiliency of the electrical grid

According to the DOE, to "protect public health and safety, enhance national security, and ensure the resilience of the Nation's electric grid, there is an imperative to take actions that require industry and government to increase grid resilience{.}"[138] Without an assured domestic supply of GOES, a critical component of grid equipment, Americans will become dependent on imports for any improvement in the security and resiliency of the grid.

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[136] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at Appendix F, p. 17, provided at Exhibit 2.

[137] Affidavit of [ ] at para. 27, provided at Exhibit 7.

[138] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 21, provided at Exhibit 11.

Power transformers are custom-built products with long lead times. According to the DOE, in 2010, the average lead time was five to twelve months for domestically produced large power transformers and six to sixteen months for those made by foreign producers.[139] The lead time can increase by up to 18 to 24 months when demand is high, and it could even extend up to five years in extreme cases if the manufacturer has difficulty obtaining any key raw materials.[140] Without a secure domestic supply of GOES, transformer producers in the United States would be forced to wait on overseas producers to obtain GOES. If anything interfered with our ability to import GOES -- such as geopolitical conflicts or another pandemic -- the U.S. electrical grid would be in grave peril. Furthermore, U.S. customers would likely be at the back of the line for obtaining new and improved varieties of electrical steel that may be developed in the future. By contrast, ensuring that Americans have access to domestic production of GOES would allow grid improvements to take place on a faster timeframe and will prevent shortages of a critical raw material for necessary electrical equipment.

d. The United States needs GOES production to develop new technologies for the electrical grid

In 2017, the DOE reported that "{a}dvanced grid hardware needs to be designed and built to better withstand and rapidly recover from the impact of lightning strikes, extreme terrestrial or space weather events, electrical disturbances, accidents, equipment failures, deliberate attacks, and other unknowns."[141] The DOE explained that such advancements "will ensure a reliable and resilient electric power system and achieve the full value of ongoing grid

[139] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid Report* (April 2014), at 9, provided at Exhibit 12.

[140] *Id.*

[141] U.S. Department of Energy, *Strategic Transformer Reserve: Report to Congress* (Mar. 2017), at 14-15, provided at Exhibit 11.

modernization{.}"[142] It further stated that "{n}ext-generation technologies can improve the performance and lifetime of transformers and other equipment over current designs, and unleash new and expanded capabilities for the grid."[143]

Without a domestic producer of GOES, advancements in technologies that could benefit or become critical to the U.S. electrical grid will occur and reside in other countries. As the Department concluded regarding steel in its Section 232 report on that product, even if the countries that make advancements in GOES are allies of the United States, the absence of these technologies and GOES products in the United States introduces risks and potential delays for improving the electrical grid.[144] It is far more advantageous for the United States to have these technologies developed in the United States to help improve the U.S. electrical grid and reduce risks of delays and inability to access the technologies.

The DOE periodically reviews and increases its efficiency standards for GOES. As the DOE increasingly requires more efficient GOES, without a U.S. producer of GOES, the technology associated with more efficient GOES products will inherently reside in other countries. If the President provides sufficient trade relief -- relief that will allow AK Steel to make an adequate profit and invest in GOES -- AK Steel and its talented employees will continue to develop critical cutting-edge products here in the United States.[145] Those products will help the U.S. electrical grid become more efficient and meet the DOE's increasing efficiency standards.[146] Ensuring that the best technology and new GOES products are made

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[142] *Id.* at 15.

[143] *Id.*

[144] *See* U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 46, provided at Exhibit 2.

[145] Affidavit of [ ] at para. 13, provided at Exhibit 7.

[146] *Id.*

here is in the interest of the U.S. government, American utilities, the American people, and the national security of the United States.[147]

V. DOWNSTREAM PRODUCTS MADE FROM GOES ARE BEING IMPORTED IN SUCH QUANTITIES AS TO THREATEN TO ELIMINATE U.S. PRODUCTION OF ELECTRICAL STEEL

According to Section 232(c)(1)(A), the Secretary must determine whether the articles at issue in this investigation are "being imported into the United States in such quantities . . . as to threaten to impair the national security."[148] In its notice of request for public comments in this investigation, the Department stated that it is "particularly interested in comments and information" regarding the "{q}uantity of . . . the importation of the" products at issue in this investigation.[149] This request closely mirrors the Department's regulations, which state that to "determine the effect on the national security of the imports of the article under investigation, the Department shall consider the quantity of the article in question{.}"[150] As explained in this section, based on the increasing volume of cores and laminations, the rapid penetration of imported cores and laminations in the U.S. market, and the fact that the volume of imports of cores and laminations exceeds the exported volume of these products, the "quantity of the article in question"[151] is significant.

A. Imports Of Downstream GOES Products Are Increasing

Foreign producers have repeatedly sought to take sales from AK Steel -- both through direct shipments to the U.S. market and by selling their GOES for use in downstream products

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[147] *Id.*

[148] 19 U.S.C. § 1862(c)(1)(A).

[149] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927.

[150] 15 C.F.R. § 705.4(a).

[151] *Id.*

that flood this country. Both methods have harmed AK Steel and put the future of U.S. electrical steel production at very significant risk. Thus, the products at issue are "being imported into the United States in such quantities . . . as to threaten to impair the national security."[152]

1. U.S. imports of GOES increased significantly until Section 232 tariffs were imposed

To fully appreciate what is happening in the U.S. market, it is critical that the Department consider that foreign producers of GOES have attacked this market for decades. As long ago as 1988, Allegheny Ludlum tried to obtain relief under Section 337 of the Tariff Act of 1930 alleging that GOES made in Japan by Nippon Steel Corp. violated a patent held by Allegheny Ludlum.[153] Allegheny Ludlum and Armco (AK Steel's predecessor) were petitioners in investigations that resulted in antidumping and countervailing duties against GOES from Italy and antidumping duties against GOES from Japan in 1994.[154] These orders remained in place until March 2006.[155]

After U.S. imports of GOES increased to over 36,000 short tons in 2012,[156] AK Steel and Allegheny Ludlum filed antidumping petitions against imports of GOES from China, Czech

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[152] 19 U.S.C. § 1862(c)(1)(A).

[153] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at I-7, provided at Exhibit 3. The ITC did not initiate an investigation because "Allegheny Ludlum did not produce a product pursuant to its own patent and, therefore, did not satisfy the statute's definition of an 'industry.'" *Id.* (footnote omitted).

[154] U.S. International Trade Commission, *Grain-Oriented Silicon Electrical Steel From Italy and Japan*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 2778 (May 1994), at II-3 and n.5, provided at **Exhibit 34**. Armco was not a petitioner in the investigation against Japan but supported the petition.

[155] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at I-7, I-9, provided at Exhibit 3.

[156] U.S. Imports of GOES, provided at **Exhibit 35**.

Republic, Germany, Japan, Korea, Poland, and Russia and a countervailing duty petition against imports of GOES from China in 2013.[157] Imports of GOES subsequently fell due to the filing of the petitions, preliminary duties, and the prospect of final antidumping and countervailing duties.[158] The Department determined that imports of GOES from these countries were being dumped in the U.S. market and that imports from China were subsidized.[159] The Department calculated the following dumping and subsidy margins for imports of GOES from these seven countries.[160]

Segment	**Country**	**Margin**
Subsidy Investigation	China	127.69 percent
Dumping Investigation	China	159.21 percent
Dumping Investigation	Czech Republic	13.76 percent to 35.93 percent
Dumping Investigation	Germany	133.70 percent to 241.91 percent
Dumping Investigation	Japan	93.36 percent to 172.30 percent
Dumping Investigation	Korea	3.68 percent
Dumping Investigation	Poland	78.10 percent to 99.51 percent
Dumping Investigation	Russia	68.98 percent to 119.88 percent

[157] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at I-12, provided at Exhibit 3; U.S. International Trade Commission, *Grain-Oriented Electrical Steel from China, Czech Republic, Korea, and Russia*, Inv. Nos. 701-TA-505 and 731-TA-1231, 1232, 1235, and 1237 (Final), USITC Pub. 4500 (Nov. 2014), at I-2, I-3, provided at **Exhibit 36**.

[158] *See* U.S. Imports of GOES, provided at Exhibit 35.

[159] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at I-12, provided at Exhibit 3; U.S. International Trade Commission, *Grain-Oriented Electrical Steel from China, Czech Republic, Korea, and Russia*, Inv. Nos. 701-TA-505 and 731-TA-1231, 1232, 1235, and 1237 (Final), USITC Pub. 4500 (Nov. 2014), at I-2, I-3, provided at Exhibit 36.

[160] *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at I-12, provided at Exhibit 3; U.S. International Trade Commission, *Grain-Oriented Electrical Steel from China, Czech Republic, Korea, and Russia*, Inv. Nos. 701-TA-505 and 731-TA-1231, 1232, 1235, and 1237 (Final), USITC Pub. 4500 (Nov. 2014), at I-2, I-3, provided at Exhibit 36.

Unfortunately, the ITC determined that the domestic industry was neither materially injured, nor threatened with material injury, by reason of subject imports. The ITC determined that imports of GOES from these countries were significant in absolute terms and relative to consumption in the United States, but also concluded that subject imports did not cause significant adverse price effects or a significant adverse impact on the domestic industry.

Subsequent events indicate that the ITC underestimated the risk from unfairly-traded imports. After the ITC's negative determinations in 2014, imports of GOES surged dramatically, increasing every year from 2014 to 2017 and taking market share from the domestic industry.[161] In 2015, ATI announced that its subsidiary Allegheny Ludlum would end production of GOES in 2016. In announcing the decision, ATI's President and CEO Rich Harshman made clear that unfair trade of imported GOES factored into the decision. Mr. Harshman said that U.S. production of GOES "will continue to face increasingly challenging market conditions due to global excess capacity and *aggressive pricing*."[162] Mr. Harshman also stated that market conditions could not support an investment in the high permeability GOES products that were increasingly demanded by customers.[163] When ATI announced the permanent closure of Allegheny Ludlum's GOES production, Mr. Harshman explained that "{b}ased on current and forecasted market and competitive conditions, including the expectation of continued significant excess global capacity for commodity stainless steel sheet and GOES products, *we have now*

[161] U.S. Imports of GOES, provided at Exhibit 35; Affidavit of [ ] at para. 17, provided at Exhibit 7; Section V.B.

[162] Allegheny Technologies Incorporated Press Release, "ATI Announces Rightsizing Actions to Align Flat Rolled Products Operations to Challenging Market Conditions," (Dec. 10, 2015) (emphasis added), provided at Exhibit 29.

[163] *Id.*

concluded that these facilities cannot be operated at an acceptable rate of return."[164] In short, unfairly-traded imports -- entering this market at prices Allegheny Ludlum could not afford to match -- forced Allegheny Ludlum out of the market.

AK Steel gained some of the market share vacated by Allegheny Ludlum's departure.[165] However, imports quickly surged, and AK Steel's small increase in market share was short-lived.[166] Between 2016 and 2017, U.S. imports of GOES nearly doubled -- from 37,361 short tons to 73,946 short tons.[167] Over this same period, the market share of imports of GOES increased from [ ] of apparent U.S. consumption of GOES to [ ] and AK Steel's market share declined from [ ][168] In other words, the market share of U.S. imports of GOES [ ] from 2016 to 2017 at AK Steel's expense.[169] AK Steel thus lost substantial sales to low-priced imports of GOES.[170]

Along with an increase in U.S. imports of GOES after the ITC's negative determination, imports of cores and laminations began entering the United States from Canada and Mexico. When AK Steel and Allegheny Ludlum filed petitions in 2013, Geoff Pfeiffer of AK Steel testified before the ITC staff that companies in Canada and Mexico that made laminations or

[164] "ATI Announces Third Quarter 2016 Results," *Business Wire* (Oct. 25, 2016), at 2 (emphasis added), provided at **Exhibit 37**.

[165] *See* Affidavit of [ ] at para. 17, provided at Exhibit 7.

[166] *See id.*

[167] U.S. Imports of GOES, provided at Exhibit 35.

[168] *See* Apparent U.S. Consumption and Market Shares of GOES, provided at **Exhibit 38**.

[169] *See id.*

[170] *See* Affidavit of [ ] at paras. 17, 20-23, provided at Exhibit 7.

cores from GOES were "playing a role" in the U.S. market but "on a relatively small scale."[171] Ray Polinski of Allegheny Ludlum added that "{p}eople can take dumped products into Canada and Mexico, dumped GOES, because there's no home market producer. . . . they can add . . . a small amount of value, and turn it into a wound core, which is just taking it from a big coil to a smaller coil, and the {Harmonized Tariff Schedule} code changes" when the products are imported into the United States.[172]

After AK Steel and Allegheny Ludlum filed petitions against unfairly-traded GOES in 2013, there was a dramatic rise in new core-making capacity outside of the United States, particularly in Canada and Mexico.[173] With minimal additional processing, GOES can be converted into cores and laminations and then imported into the United States.[174] Because U.S. producers of GOES do not make cores and laminations, those articles were specifically excluded from the scope of the Department's antidumping and countervailing duty investigations.[175] Thus, domestic producers could not pursue antidumping and/or countervailing duties against imports of downstream GOES products.

Facing the prospect of significant duties if the ITC had ruled in the domestic industry's favor, foreign producers began to ship increasing volumes of GOES to Canada and Mexico for minimal conversion into cores and laminations for the U.S. market. From 2013 (the year the

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[171] *In the Matter of: Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia* (Oct. 25, 2013), at 87, provided at Exhibit 31.

[172] *Id.* at 88-89.

[173] Affidavit of [ ] at para. 16, provided at Exhibit 7.

[174] *Id.*

[175] U.S. International Trade Commission, *Grain-Oriented Electrical Steel from Germany, Japan, and Poland*, Inv. Nos. 701-TA-355 and 731-TA-660 (Final), USITC Pub. 4491 (Sept. 2014), at 5-6, provided at Exhibit 3.

petitions were filed) to 2014, imports of GOES into Canada and Mexico increased by over 15,000 short tons, and such imports increased by nearly 45,000 short tons from 2014 to 2015.[176]

After the ITC reached a negative determination on AK Steel and Allegheny Ludlum's GOES petition, foreign producers continued to use supply chains in Canada and Mexico for shipping downstream GOES products into the United States.[177] In 2018, Roger Newport, the CEO of AK Steel, testified to the U.S. House of Representatives Ways and Means Committee that "{w}hile the GOES case was ultimately terminated after the ITC's negative determination, the core/transformer-making capacity in Canada and Mexico increased significantly, as foreign producers continue to try to find new ways to evade any relief the U.S. government may put in place."[178] In short, by taking advantage of downstream operations in Canada and Mexico, foreign producers of dumped and subsidized GOES could evade the potential effects of U.S. tariffs.

In recent years, [

][179] Historically, [

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[176] Mexican and Canadian Imports of GOES, provided at **Exhibit 39**.

[177] Affidavit of [ ] at para. 16, provided at Exhibit 7.

[178] Testimony of Roger K. Newport, Chief Executive Officer, AK Steel Corporation, House Ways and Means Committee, Hearing on the Effects of Tariff Increases on the U.S. Economy and Jobs (Apr. 12, 2018), at 3 (emphasis added), provided at Exhibit 33.

[179] Affidavit of [ ] at para. 26, provided at Exhibit 7.

[180] *See*, *e.g.*, *id.* at paras. 9, 21, 23, 26.

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2. U.S. imports of downstream GOES products increased significantly after Section 232 tariffs on steel were imposed

Section 232 relief on steel has had a restraining effect on U.S. imports of GOES. U.S. imports of GOES fell from 73,946 short tons in 2017, the same year that the Department initiated its Section 232 investigation of steel,[183] to 29,503 short tons last year.[184]

Significantly, however, the Section 232 tariffs on steel do not apply to downstream products made from GOES -- including the laminations, stacked cores, and wound cores at issue in these investigations. During the Department's Section 232 investigation regarding steel, the CEO of AK Steel testified that he was "very concerned that importers will simply side-step the relief that covers steel by using foreign electrical steel to build cores and transformers abroad, then import those cores and transformers into the United States."[185] This prediction has been confirmed in dramatic fashion.

Imports of GOES into Canada and Mexico equaled 155,099 short tons in 2014.[186] Each year since 2014, imports of GOES into Canada and Mexico have been substantially higher than

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181 *Id.* at 26.

182 *Id.*

183 U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 18, provided at Exhibit 2.

184 *Presidential Proclamation on Adjusting Imports of Steel into the United States* (Mar. 8, 2018) (indicating that subheadings 7225.11 and 7226.11 -- which cover GOES -- are covered by the tariffs), provided at **Exhibit 40**; U.S. Imports of GOES, provided at Exhibit 35.

185 U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at Appendix F, p. 18, provided at Exhibit 2.

186 Mexican and Canadian Imports of GOES, provided at Exhibit 39.

that amount.[187] Those imports are plainly being used to make cores and laminations for the U.S. market. In 2016, the last full year before the investigation into Section 232 tariffs on steel began, the United States imported $99.7 million worth of downstream products made from GOES.[188] In 2019, the United States imported *over $201 million* worth of such products, representing an increase of more than 101 percent from 2016 levels.[189] The overwhelming majority of these imports -- representing some 96.6 percent of the total -- came from Mexico and Canada.[190] The rising sales of downstream products from Canada and Mexico obviously displaced significant volumes of GOES production in the United States. In a recent letter to President Trump, a bipartisan coalition representing 25 Members of Congress described these developments as "*blatant circumvention of the Section 232 program*."[191]

In considering these facts, it is important to recall that the official U.S. Census data regarding imports of cores and laminations do not measure the volume of those imports by weight. Instead, the Census data simply count the number of units that enter the United States.[192] In recent years, the value of imports of downstream products has soared dramatically -- but Census data indicates that the number of units being imported into this country has fallen.[193]

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[187] *Id.*

[188] U.S. Imports of Cores and Laminations, provided at **Exhibit 41**.

[189] *Id.*

[190] *Id.*

[191] Letter from Representatives Marcy Kaptur, Mike Kelly, et al. to President Donald Trump (Apr. 15, 2020) (emphasis original), provided at **Exhibit 42**.

[192] *See* Chapter 85 of the Harmonized Tariff Schedule of the United States (2020 Revision 10) (May 2020) for classifications 8504.90.9634, 8504.90.9638, and 8504.90.9642, provided at **Exhibit 43**.

[193] U.S. Imports of Cores and Laminations, provided at Exhibit 41.

In theory, these developments could mean that while the volume of cores and laminations entering the U.S. market has fallen, the price of such items has significantly increased. But such a supposition is obviously absurd. The dominant driver in the price of cores and laminations is the price of GOES. AK Steel estimates that GOES accounts for [ ] of the price of laminations, [ ] of the price of wound cores, and [ ] of the price of stacked cores.[194] Significantly, the prices of GOES being shipped to Mexico and Canada have fallen. The average unit value of GOES imported into Mexico and Canada was $1,946 in 2016, and the average unit value has been significantly lower each year since then, including $1,659 in 2019.[195] Furthermore, there has been no apparent increase in the cost of converting GOES into cores and laminations. Given these facts, it is obvious that the prices of cores and laminations have not increased at all -- much less increased by an amount sufficient to explain the increase in value associated with such imports over the last few years. Indeed, [

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Given these facts, it is obvious that larger and heavier units of cores and laminations are being shipped to this country.[197] Such a development would explain both the increase in the value of imports and the decline in the number of units being reported. It seems clear that the increased volume of GOES is moving through Canada and Mexico to the United States in the

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[194] Affidavit of [ ] at para. 15, provided at Exhibit 7.

[195] Mexican and Canadian Imports of GOES, provided at Exhibit 39.

[196] *See* Affidavit of [ ] at paras. 15, 18, 22-23, provided at Exhibit 7.

[197] *See id.* at para. 14.

form of further processed cores and laminations that are not subject to the Section 232 tariffs on steel.[198]

For these reasons, the Department should look at the value data of imports of cores and laminations as the most appropriate metric for measuring the significant increase in import volumes. Those data plainly show that AK Steel is facing significantly more competition from imported cores and laminations than it was just a few years ago.

These conclusions are supported by evidence that AK Steel's GOES business has lost significant sales due to rising U.S. imports of downstream GOES products, just as the company did to imports of GOES before the Section 232 tariffs were imposed.[199] As explained in more detail below, [

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3. Without trade relief, the volume of U.S. imports of downstream GOES products will continue to significantly increase

There is no reason to believe that the problems described above will improve without significant trade relief. If anything, the threat from significant volumes of downstream products

198 *See*, *e.g.*, *id.* at paras. 14-17.

199 *Id.* at paras. 17-18, 22-23.

200 *Id.* at para. 17.

201 *Id.* at para. 18.

202 *Id.*

is intensifying. In its Section 232 report on steel, the Department stated that "{i}n the steel sector, foreign competition is characterized by substantial and sustained global overcapacity and production in excess of foreign domestic demand."[203] The Department added that the "excess capacity situation for steel is a global problem{.}"[204] The excess capacity of steel producers, the Department explained, meant that imports would likely increase and take additional market share from the U.S. steel industry:

> Another factor, not on the list, that the Secretary finds to be a relevant is the presence of massive excess capacity for producing steel. This excess capacity results in steel imports occurring "under such circumstances" that they threaten to impair the national security. *See* 19 U.S.C. § 1862(b)(3)(A). The circumstance of excess global steel production capacity is a factor because, while U.S. production capacity has remained flat since 2001, other steel producing nations have increased their production capacity, with China alone able to produce as much as the rest of the world combined. *This overhang of global excess capacity means that U.S. steel producers, for the foreseeable future, will continue to lose market share to imported steel as other countries export more steel to the United States to bolster their own economic objectives and offset loss of markets to Chinese steel exports.*[205]

This reasoning applies here. [ ][206] There is no reason to believe that conditions have improved since then -- if anything, the current tariffs on sales of GOES to the United States have increased pressure on foreign producers to find an outlet for this product. Considering that [

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[203] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 27, provided at Exhibit 2.

[204] *Id.* at Appendix L, p. 1.

[205] *Id.* at 16 (emphasis added).

[206] [ ] provided at **Exhibit 44**.

][207] Furthermore, as shown in the economic analysis attached to this submission, the global excess capacity of GOES production is likely to persist because of the ongoing recession caused by COVID-19 and an expected decrease in worldwide steel consumption.[208]

Given these facts, import shipments of GOES will likely surge into countries like Mexico and Canada, where the GOES can be processed into cores and laminations with minimal cost and effort. Over the last decade, shipments of GOES to Mexico and Canada soared from 99,189 short tons in 2010 to 184,112 short tons last year.[209]

Furthermore, there is [

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[207] Apparent U.S. Consumption and Market Shares of GOES, provided at Exhibit 38. In addition, [ ] AK Steel Trade and Operations Data for GOES, provided at **Exhibit 45**.

[208] Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section III.C, provided at Exhibit 56.

[209] Mexican and Canadian Imports of GOES, provided at Exhibit 39.

[210] Affidavit of [ ] at para. 19, provided at Exhibit 7.

[211] *Id.*

[212] *Id.*

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B. Imports Of GOES Products Are Rapidly Penetrating The U.S. Market

In the Section 232 report on steel, the Department considered the high penetration of imports as a factor in finding that imports adversely impacted the economic welfare of the U.S. steel industry.[213] In that report, the Department noted that -- at that time -- imports of finished steel products represented over 25 percent of U.S. consumption.[214] Similarly, imports of cores and laminations are rapidly penetrating the U.S. market, which threatens the future of AK Steel's GOES production and U.S. GOES production. In other words, cores and laminations are "being imported into the United States in such quantities . . . as to threaten to impair the national security."[215]

As discussed above, imports of GOES rapidly penetrated the U.S. market prior to the imposition of Section 232 tariffs, essentially doubling from 2016 (37,361 short tons) to 2017 (73,946 short tons).[216] After Section 232 tariffs were imposed, imports of downstream GOES products increased by massive margins. While the price of GOES remained low, the value of U.S. imports of products made from GOES soared from $99.7 million in 2016 to $201 million last year.[217]

As shown above, the most accurate way to use Census data to capture the role of downstream imports in the U.S. market is to focus on the value of those imports. The value data

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[213] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 29, provided at Exhibit 2.

[214] *Id.*

[215] 19 U.S.C. § 1862(c)(1)(A).

[216] U.S. Imports of GOES, provided at Exhibit 35.

[217] U.S. Imports of Cores and Laminations, provided at Exhibit 41.

leaves no doubt that imports of laminations and cores are taking a significant portion of GOES sales from AK Steel. In 2016, the value of U.S. imports of downstream GOES products represented [ ] of the value of apparent U.S. GOES consumption. By 2019, the value of U.S. imports of downstream GOES products was equal to [ ] of apparent U.S. GOES consumption.[218] If anything, these estimates understate the role of imported cores and laminations in the U.S. market -- because the price of those imports is lowered by the fact that they are made with low-priced GOES from abroad. Nevertheless, these facts strongly indicate that imports of cores and laminations have made it significantly more difficult for AK Steel to sell GOES.

C. The Volume Of Imported Downstream GOES Products Exceeds The Volume Of Exported Downstream GOES Products

In the Section 232 report on steel, the Department considered the high import to export ratio of steel products as a factor in finding that imports adversely impacted the economic welfare of the U.S. steel industry.[219] Determining whether imports are exceeding exports is highly relevant to whether the products at issue are "being imported into the United States in such quantities . . . as to threaten to impair the national security"[220] and the "{q}uantity of . . . the importation of the" products that the Department is reviewing in this investigation.[221]

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[218] *See* Ratio of U.S. Imports of Cores and Laminations to Estimated Value of Apparent U.S. Consumption of GOES, provided at **Exhibit 46**.

[219] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 30-31, provided at Exhibit 2.

[220] 19 U.S.C. § 1862(c)(1)(A).

[221] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. These data points are also relevant to the requirement in the Department's regulations that, to "determine the effect on the national security of the imports of the article under investigation, the Department shall consider the quantity of the article in question or other circumstances related to its import." 15 C.F.R. § 705.4(a).

As with the steel industry in general, far more downstream GOES products are being imported into the country than being exported. As mentioned above, because the Census data measures units instead of weights, the best barometer of the volume of imported core and lamination is the value of imports. Comparing these U.S. imports with the value of U.S. exports of parts of transformers other than ferrites -- which is the closest category in Schedule B of the Census export statistics -- demonstrates that imports have far exceeded exports since 2016.[222] In 2019, the ratio of imports of downstream GOES products to exports of parts of transformers other than ferrites was *nearly 350 percent*.

These data -- which are the best available to AK Steel -- underscore the extremely harmful scope of the imports at issue here. Remarkably, there are two compelling reasons why these data actually *understate* the ratio of U.S. imports to U.S. exports. First, the export data covers all parts of transformers other than ferrites, a category that includes products that are not laminations, stacked cores, and wound cores. In other words, the actual value of U.S. exports of downstream GOES products was almost certainly even lower than our estimate suggests. Second, U.S. imports of downstream products are made from GOES produced cheaply overseas, and shipped to North America at prices AK Steel cannot hope to match. This fact artificially deflates the value of U.S. imports of downstream products made from GOES. Thus, it seems clear that in volume terms, the ratio of U.S. imports to U.S. exports is even larger than our estimate suggests.

[222] Ratio of U.S. Imports to U.S. Exports, provided at **Exhibit 47**.

VI. DOWNSTREAM PRODUCTS MADE FROM GOES ARE BEING IMPORTED UNDER SUCH CIRCUMSTANCES AS TO THREATEN TO ELIMINATE U.S. PRODUCTION OF ELECTRICAL STEEL

Section 232(c)(1)(A) requires the Secretary to determine whether the articles under investigation are being imported "under such circumstances" as to threaten to impair the national security.[223] In its notice of request for public comments in this investigation, the Department stated that it is "particularly interested in comments and information" regarding several factors (which closely mirror the criteria for determining the effect of imports on the national security in the Department's regulations[224]) that will help the Department conduct its investigation. As explained in this section, several of these factors[225] demonstrate that downstream products made from GOES are being imported "under such circumstances" as to threaten to impair the national security. These factors are the following:

- "{O}ther circumstances related to" the importation of the products at issue in this investigation,[226] which certainly includes the prices at which imports are entering the United States.[227]
- "Existing and anticipated availability of human resources, products, raw materials, production equipment, and facilities to produce the Products{.}"[228]

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[223] 19 U.S.C. § 1862(c)(1)(A).

[224] *See* 15 C.F.R. § 705.4.

[225] The factors not addressed here are addressed in Sections IV.B, IV.D, V, and VII.D.2 and in Exhibit 1.

[226] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(a), (a)(5).

[227] In the Section 232 report on steel, the Department considered the prices of steel imports as a factor in finding that imports adversely impacted the economic welfare of the U.S. steel industry. U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 31-33, provided at Exhibit 2.

[228] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(a)(3).

- "The displacement of any domestic production of the Products causing substantial unemployment, decrease in the revenues of government, loss of investment or specialized skills and productive capacity, or other serious effects{.}"[229]
- "The impact of foreign competition on the economic welfare of the Products' industries{.}"[230]

As demonstrated below, imports of downstream GOES products meet each of these criteria and are entering the United States under such circumstances as to threaten AK Steel's GOES production and, therefore, the national security. Specifically, imports of downstream products made from GOES are entering the United States at artificially low prices, threaten the closure of AK Steel's GOES facilities, have caused U.S. employment to decline at domestic manufacturers of electrical grid equipment, have taken sales from AK Steel, have caused financial distress to the U.S. GOES industry, and prevent the U.S. GOES industry from making capital expenditures.

A. Imports Of The Articles Under Investigation Are Entering The United States At Artificially Low Prices

U.S. producers of GOES have long faced competition from low-priced, unfairly-traded imports.[231] The same pattern of artificially low-priced imports has continued with downstream GOES products after Section 232 steel tariffs limited imports of GOES. [

] as significant imported products made from GOES -- the laminations, stacked cores, and wound cores at issue

[229] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(2).

[230] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(1). The Department considered the "financial distress" of the U.S. steel industry in its Section 232 report on steel. U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 37-40, provided at Exhibit 2.

[231] *See* Section V.A.

here -- poured into the U.S. market.[232] As [

][233] [

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][235] These facts leave no doubt that the articles under investigation here are entering the U.S. market at very low prices -- artificially low prices.

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][238] These facts provide further evidence of the threat presented by low-priced imports of both GOES and downstream articles made from GOES.

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[232] *See* Affidavit of [ ] at para. 20, provided at Exhibit 7.

[233] *Id.* at para. 21.

[234] *Id.*

[235] *Id.*

[236] *Id.* at para. 22.

[237] *Id.*

[238] *Id.*

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The low prices of imported cores and laminations are also [

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]246 Of course, when

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239 *Id.* at para. 23.

240 *Id.*

241 *Id.*

242 *Id.*

243 *Id.* at para. 24.

244 *Id.*

245 *Id.*

246 *Id.*

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In sum, it is clear that imports of laminations, stacked cores, and wound cores are entering the U.S. market under such circumstances that endanger the existence of AK Steel's GOES production and thus threaten to impair the national security of the United States. As shown above, those articles are made from GOES that has a history of unfair trade in the United States. Those articles then enter the United States at extremely low prices -- reducing domestic production of cores and laminations, and thereby reducing domestic demand for GOES. As explained in more detail below, these developments could destroy the ability of this country to make its own electrical steel.

B. Imports Of The Articles Under Investigation Threaten AK Steel's Ability To Make Electrical Steel

U.S. imports of GOES and downstream GOES products have had significant negative effects and threaten additional adverse effects on the existing and anticipated availability of U.S.-made GOES and the only remaining U.S. GOES producer's production equipment and facilities.

In its recent Section 232 report on steel, the Department found that "{f}or most capital and energy-intensive U.S. steel producers, capacity levels of 80 percent or higher are required to maintain facilities, carry out periodic modernization, service company debt, and fund research and development."[247] The Department also found that "{w}hen steel factory utilization falls, costs per unit of steel product rises, reducing profit margins and product pricing flexibility. Higher capacity utilization usually results in lower per-unit product costs and higher overall profit. Over 80 percent is a healthy capacity utilization rate and a rate at which most companies

[247] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 47, provided at Exhibit 2.

would be profitable."[248] The Department added that the "U.S. steel industry uses 80 percent as a benchmark for minimum operational efficiency."[249]

Similar to the steel industry in general, GOES production facilities must also operate at relatively high rates of capacity utilization. The ITC has found that "{g}rain-oriented silicon electrical steel production is relatively capital intensive. As a result, the high costs associated with operating and maintaining a GOES plant require manufacturers to sustain relatively high capacity utilization rates to stay profitable."[250] Economic analysis confirms these statements.[251]

Due to the large volumes of low-priced imports of GOES and GOES downstream products over the past several years, AK Steel's capacity utilization is [

]"[252]

Without further relief, AK Steel cannot justify continuing its GOES operations.[253] Furthermore, AK Steel had previously invested $11 million at its Butler Works to increase

[248] *Id.* at 48 (footnote omitted).

[249] *Id.* at 48.

[250] U.S. International Trade Commission, *Grain-Oriented Silicon Electrical Steel From Italy and Japan*, Inv. Nos. 701-TA-355 and 731-TA-659-660 (Review), USITC Pub. 3396 (Feb. 2001), at 16 (footnote omitted), provided at **Exhibit 48**.

[251] *See* Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section IV and Section V.A, provided at Exhibit 56.

[252] AK Steel Trade and Operations Data for GOES, provided at Exhibit 45.

[253] Affidavit of [ ] at para. 29, provided at Exhibit 7.

GOES capacity, but that additional capacity sits unused, as AK Steel has lost sales to unfairly priced imports.[254] This represents a significant "loss on investment" due to displacement of U.S. production by imports.

Under such circumstances, and without additional trade relief, the United States will soon lose the ability to make electrical steel, which the DOE has called "the *most critical component* that has the greatest impact on the performance of the power transformer{.}"[255] In March 2020, AK Steel was bought by Cleveland-Cliffs. Just before that transaction concluded, Lourenco Goncalves, Chairman, President, and CEO of Cleveland-Cliffs, testified before the Congressional Steel Caucus that unless his company obtained trade relief, he would be forced to close the AK Steel plants in Butler, Pennsylvania and Zanesville, Ohio -- the last two plants in the United States that make electrical steel.[256] Thus, without relief, AK Steel will follow the path of Allegheny Ludlum, which was forced out of the U.S. GOES market by large volumes of unfairly low-priced imports of GOES.[257]

If AK Steel were forced to cease the U.S. production of GOES, the United States would permanently lose the benefit of AK Steel's GOES equipment and AK Steel's mature supply chain for raw materials to support GOES production.[258] No other American company stands

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[254] *Id.*

[255] U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (Apr. 2014), at 11 (emphasis added), provided at Exhibit 12.

[256] "AK Steel buyer warns of plant closures without stronger U.S. import curbs," *Reuters* (Mar. 5, 2020), provided at Exhibit 30.

[257] Allegheny Technologies Incorporated Press Release, "ATI Announces Rightsizing Actions to Align Flat Rolled Products Operations to Challenging Market Conditions," (Dec. 10, 2015), provided at Exhibit 29; "ATI Announces Third Quarter 2016 Results," *Business Wire* (Oct. 25, 2016), at 2, provided at Exhibit 37.

[258] Affidavit of [ ] at para. 5, provided at Exhibit 7.

ready to replace that production.[259] If AK Steel is forced to exit the GOES market, America will become dependent on imports to preserve its electrical grid -- and may stay that way forever.

Thus, U.S. imports of cores and laminations have had significant negative effects and threaten additional adverse effects on the "{e}xisting and anticipated availability of . . . products, raw materials, production equipment, and facilities to produce the Products."[260] Furthermore, imports of these products have caused and/or threaten to cause "displacement of any domestic production" of GOES "causing . . . loss of investment . . . and productive capacity{.}"[261] As explained above, the consequences for our national security would be catastrophic.[262] For these reasons, the Department should conclude that cores and laminations are being imported into the U.S. market under such circumstances that threaten to impair the national security of the United States.

C. Imports Of The Articles Under Investigation Have Caused U.S. Employment To Decline

U.S. imports of GOES and downstream products made from GOES have had significant negative effects and threaten additional adverse effects on the existing and anticipated availability of human resources necessary to make GOES for equipment used in the electrical grid. Large volumes of low-priced imports of GOES already forced Allegheny Ludlum to close

[259] Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section III.D, provided at Exhibit 56.

[260] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(a)(3).

[261] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(2).

[262] *See* Section IV.D.2.

its U.S. GOES production.[263] This closure eliminated jobs for American workers, including 350 people who worked at Allegheny Ludlum's GOES plant in Bagdad, Pennsylvania.[264]

Picking up where U.S. imports of GOES left off when they were hit with Section 232 tariffs on steel, downstream GOES products have flooded the U.S. market with cores and laminations minimally processed from foreign GOES in Canada and Mexico. The collective harm of imports of GOES and downstream GOES products [

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As a result of unfair imports, the existence of the remaining U.S. GOES producer AK Steel is severely threatened. To reiterate: Mr. Goncalves told the Congressional Steel Caucus in March 2020 that the two AK Steel plants that make GOES in Pennsylvania and Ohio will close without Section 232 relief, and more than 1,400 employees at these plants will lose their jobs.[266]

If AK Steel is forced to close these plants, the number of employees that work in facilities that produce GOES in the United States will have gone from nearly 2,000 prior to 2016 to zero. That number does not include the employees at Allegheny Ludlum and AK Steel that may have worked in other locations and facilities but depended on GOES production for their employment.

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[263] Allegheny Technologies Incorporated Press Release, "ATI Announces Rightsizing Actions to Align Flat Rolled Products Operations to Challenging Market Conditions," (Dec. 10, 2015), provided at Exhibit 29; "ATI Announces Third Quarter 2016 Results," *Business Wire* (Oct. 25, 2016), at 2, provided at Exhibit 37.

[264] "ATI Ladish parent Allegheny Technologies permanently closing two Pennsylvania plants," *Pittsburgh Business Times* (Oct. 25, 2016), provided at **Exhibit 49**.

[265] AK Steel Trade and Operations Data for GOES, provided at Exhibit 45.

[266] "AK Steel buyer warns of plant closures without stronger U.S. import curbs," *Reuters* (Mar. 5, 2020), provided at Exhibit 30.

AK Steel has made GOES for decades.[267] The company has a sophisticated, highly-trained, workforce both in production and in research and development.[268] These specialized employees have the knowledge and experience necessary to manufacture this challenging product and create the next generation of GOES products.[269] Many employees at AK Steel's Butler and Zanesville plants, along with researchers at its Research and Innovation Center in Middletown, Ohio, are electrical steel experts.[270] Without these specialized, knowledgeable employees, AK Steel would not be able to produce GOES.[271] Because GOES production requires highly-skilled workers with extensive training,[272] once the expertise of these employees is lost, it would be almost impossible to replace.

In sum, imports are having a negative effect and threaten further negative effects on "existing and anticipated availability of {high-skilled} human resources" for producing GOES in the United States for use in equipment used in the electrical grid.[273] Furthermore, imports of GOES and downstream GOES products have caused and/or threaten to cause "displacement of any domestic production of" GOES "causing substantial unemployment {and} loss of . . . specialized skills" that are critical to produce the GOES used in the electrical grid.[274] Cores and

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[267] Affidavit of [ ] at para. 2, provided at Exhibit 7.

[268] *Id.* at para. 4.

[269] *Id.*

[270] *Id.*

[271] *See id.* ("These experienced employees are critical to AK Steel's production of GOES.")

[272] *See* Section IV.D.2.A.

[273] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(a)(3).

[274] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(2).

laminations are thus being imported into the U.S. market under such circumstances that threaten to impair the national security of the United States.

D. Imports Of The Articles Under Investigation Have Caused The U.S. GOES Industry To Lose Sales To Foreign Producers Of GOES Products

U.S. imports of downstream products made from GOES have caused the displacement of AK Steel's domestic products in the form of significant lost sales, causing the loss of productive capacity and other serious effects to AK Steel's financial performance.

As explained above, imports of cores and laminations have taken a significant share of the U.S. market, especially after the imposition of Section 232 tariffs on GOES in 2018.[275] [

]276 [

]277 [

]278 [

]279 [

[275] *See* Sections V.A and V.B.

[276] Affidavit of [ ] at para. 18, provided at Exhibit 7.

[277] *Id.* at para. 26.

[278] *Id.*

[279] *Id.*

]280

If the U.S. government imposes adequate trade relief, however, this business can be saved. [

]281 The potential benefits from trade relief underscore the extremely detrimental harm that the company, its production, and its sales have suffered due to downstream GOES imports.

In sum, the Department should conclude that U.S. imports of downstream GOES products have forced the "displacement of . . . domestic production of" GOES, which is "causing . . . loss of . . . productive capacity" and "other serious effects" on AK Steel's GOES operations.[282] For these reasons, cores and laminations are being imported into the U.S. market under such circumstances that threaten to impair the national security of the United States.

E. Imports Of Articles Under Investigation Have Caused Financial Distress To The U.S. GOES Industry And Have Had A Devastating Effect On The Profitability Of Those Facilities

In spite of the Section 232 relief on steel, and due to increasing imports of downstream GOES products, AK Steel has [ ] From 2016 to 2019, [

280 *Id.*

281 *Id.* at para. 28.

282 *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(2).

]283 As shown throughout this submission, these developments were directly caused by imports of cores and laminations.

Lourenco Goncalves, the Chairman, President, and CEO of Cleveland-Cliffs, explained in a May 2020 earnings call that the profitability of AK Steel's GOES business is "under pressure" because of low-priced imports of downstream GOES products.[284] Mr. Goncalves also stated that imports of cores and laminations caused AK Steel's business in the second half of 2019 to record a negative EBITDA (*i.e.*, earnings before interest, taxes, depreciation, and amortization).[285]

Clearly, the U.S. GOES industry is in financial distress because of imports of GOES and -- more recently -- downstream GOES products, and the "impact of foreign competition on the economic welfare" of U.S. GOES production has been devastating.[286] Thus, cores and laminations are being imported into the U.S. market under such circumstances that endanger the future of AK Steel's GOES production and threaten to impair the national security of the United States.

F. Imports Of Articles Under Investigation Prevent The U.S. GOES Industry From Making Capital Expenditures

In its Section 232 report on steel, the Department considered the "capital expenditures" of the U.S. steel industry in its Section 232 report on steel.[287] As with the steel industry in general,

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[283] AK Steel Financial Data for GOES, provided at **Exhibit 50**.

[284] "Q1 2020 Cleveland-Cliffs Inc Earnings Call," *Fair Disclosure Wire* (May 11, 2020), at 4-5, 8, provided at **Exhibit 51**.

[285] *Id.* at 4.

[286] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(1).

[287] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at 40-41, provided at Exhibit 2.

U.S. imports of GOES and downstream GOES products have prevented AK Steel from making necessary investments. From 2015 to 2017, when U.S. imports of GOES skyrocketed from 30,106 short tons to 73,946 short tons,[288] AK Steel's capital expenditures for electrical steel [ ][289] AK Steel's capital expenditures [ ] as $201.3 million in imports of cores and laminations flooded the U.S. market.[290] Competing against low-priced cores and laminations means that AK Steel loses revenue on sales by lowering its prices or loses the sale altogether. Under either scenario, AK Steel's ability to invest is diminished by a lack of revenue.

Without reinvestment, AK Steel will not be able to innovate in order to keep pace with the latest production technology or be able to meet increasingly stringent DOE efficiency standards. [ ][291] [ ][292] [ ][293]

In sum, large volumes of unfairly low-priced imports of downstream GOES products have prevented the U.S. GOES industry from making necessary capital investments, and the

[288] U.S. Imports of GOES, provided at Exhibit 35.

[289] AK Steel Capital Expenditures and Research and Development Expenses, provided at **Exhibit 52**.

[290] *Id.*; U.S. Imports of Cores and Laminations, provided at Exhibit 41.

[291] Affidavit of [ ] at para. 12, provided at Exhibit 7.

[292] *Id.*

[293] *Id.*

"impact of foreign competition on the economic welfare" of U.S. GOES production has thus been extremely harmful.[294]

VII. WITHOUT SUFFICIENT AND URGENTLY-NEEDED TRADE RELIEF, AK STEEL WILL CLOSE ITS GOES PRODUCTION FACILITIES IN THE UNITED STATES

A. Since The Beginning Of This Year, Market Conditions For AK Steel's GOES Production Have Gotten Significantly Worse

As shown throughout this submission, for years officials at AK Steel warned about the dangers from imports of downstream products made from GOES. Those warnings have come true -- significant import volumes of cores and laminations have driven AK Steel to the verge of stopping all production of electrical steel.

Furthermore, data from 2020 shows that the situation is rapidly deteriorating. As explained above, [

] These trends are accelerating. For example, [

][295] [

][296]

Meanwhile, Census data indicates that imports of U.S. cores and laminations are soaring. From Q1 2019 to Q1 2020, the price of imported GOES into Canada and Mexico plunged --

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[294] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(b)(1).

[295] Affidavit of [ ] para. 27, provided at Exhibit 7.

[296] *Id.*

from $1,690/short ton to only $1,505/short ton, a decline of 10.9 percent.[297] Such a decline in the price of GOES going into Canada and Mexico would be expected to lower the value of U.S. imports of cores and laminations made from that GOES. But the opposite has occurred. In Q1 2019, the United States imported $40.1 million worth of cores and laminations from Canada and Mexico.[298] In Q1 2020, that figure grew to $68.1 million.[299] In other words, while the price of GOES used to make cores and laminations was falling by 10.9 percent, the value of U.S. imports of cores and laminations grew by 69.7 percent.[300] Taken together, these facts plainly demonstrate a significant increase in the volume of such imports.

These facts are also reflected in [

]^{301} In [

]^{302} [

]^{303} These facts alone raised serious concerns about the future of AK Steel's production of electrical steel. [

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[297] *See* Mexican and Canadian Imports of GOES, provided at Exhibit 39 (1,690 - 1,505 = 185; 185 / 1,690 = 0.109 = 10.9 percent).

[298] *See* U.S. Imports of Cores and Laminations, provided at Exhibit 41.

[299] *See id.*

[300] 68.101780 - 40.127654 = 27.97; 27.97 / 40.127654 = 0.697 = 69.7 percent.

[301] *See* AK Steel Financial Data for GOES, provided at Exhibit 50.

[302] *See id.*

[303] *See id.*

]304

Significantly, these [ ]

In fact, [

]305

In short, AK Steel has plainly come to the end of the road in terms of electrical steel production. If the company cannot obtain strong and effective relief on imports of cores and laminations, it will have no choice but to stop making this critical product.

B. The Future Of AK Steel's U.S. GOES Facilities Depends On Sufficient Trade Relief

In March 2020, Cleveland-Cliffs acquired AK Steel, including the company's GOES production facilities in Butler and Zanesville. Also in March 2020, Lourenco Goncalves -- Chairman, President, and CEO of Cleveland-Cliffs -- testified before the Congressional Steel Caucus regarding the "the absurd level of {Section 232} circumvention that comes through both Mexico and Canada" in the form of cores and laminations.[306] Mr. Goncalves told the Congressional Steel Caucus that the two AK Steel plants that make GOES in Pennsylvania and Ohio will close without Section 232 relief: "I'm talking about 1,500 jobs in Butler, Pennsylvania, and 100 jobs in Zanesville, Ohio, that will be gone. And I promise, they will be gone if I don't get help{.}"[307]

In May 2020, during a Cleveland-Cliffs earnings call, Mr. Goncalves elaborated on the pressure AK Steel's GOES operations are facing due to imports of cores and laminations and

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304 *See id.*

305 *See id.*

306 "AK Steel buyer warns of plant closures without stronger U.S. import curbs," *Reuters* (Mar. 5, 2020), provided at Exhibit 30.

307 *Id.*

how closing the facilities would significantly help Cleveland-Cliffs' bottom line. Mr. Goncalves explained that "the profitability of this business has been under pressure, with legacy standalone AK Steel recording negative EBITDA in the second half of 2019 on the production and sales of electrical steels."[308] Mr. Goncalves added that this financial distress is a "*direct consequence of the actions taken by bad players in the marketplace*, developing ways to circumvent Section 232 tariffs on steel coils by rerouting dumped GOES coils to Mexico and to Canada" from where laminations and cores are sent to the United States without paying Section 232 tariffs on steel.[309]

Mr. Goncalves further stated that AK Steel's "*electrical steel business in due diligence for us was a minus $40 million EBITDA*."[310] In other words, shutting down AK Steel's electrical steel business would be "an immediate $40 million EBITDA improvement" for Cleveland-Cliffs.[311] Given the severe impact that AK Steel's GOES operations have suffered, Mr. Goncalves stated that "{w}ithout action by the federal government to level the playing field, 1,450 jobs at Butler Works in Pennsylvania and Zanesville works in Ohio" are at risk, and a positive and expedited outcome from this Section 232 investigation "is critical to save the jobs of the employees of these . . . operations in Pennsylvania and Ohio."[312]

As these facts show, very little time is left. For years, AK Steel has warned about the threat to its ability to make electrical steel. For months, Mr. Goncalves has made clear that Cleveland-Cliffs is on the verge of stopping electrical steel production at AK Steel. The future

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[308] "Q1 2020 Cleveland-Cliffs Inc Earnings Call," *Fair Disclosure Wire* (May 11, 2020), at 4, provided at Exhibit 51. The term "EBITDA" refers to earnings before interest, taxes, depreciation and amortization.

[309] *Id.* at 5 (emphasis added).

[310] *Id.* at 8 (emphasis added).

[311] *Id.*

[312] *Id.* at 5.

of electrical steel production in the United States [

] The current Section 232 investigation covers a number of different products. But in this submission, we have focused solely on the need for relief on laminations, stacked cores, and wound cores. This issue must be resolved very quickly in order to save electrical steel production in the United States. We urge the Administration to act promptly.

C. With Sufficient Trade Relief, AK Steel's GOES Facilities Will Ensure A Stable Source Of U.S. GOES Supply And Meet National Defense Requirements

AK Steel is a reliable producer of high-quality GOES.[313] AK Steel invented GOES, has been a stable source of GOES for decades, and has developed the best GOES products in the world.[314] The company can make any grade of GOES, including the highest-quality and most efficient high-permeability grades.[315] Imports of GOES and downstream GOES products, however, have severely impacted AK Steel's GOES operations and threaten its U.S. facilities. With sufficient trade relief, AK Steel will continue providing a stable source of GOES to the U.S. market for use in key components of the electrical grid [ ]

The Chairman, President, and CEO of Cleveland-Cliffs -- Lourenco Goncalves -- recently estimated that GOES consumption in the United States is approximately 250,000 short tons.[316] AK Steel's [

][317] This includes

[313] Affidavit of [ ] at para. 2, provided at Exhibit 7.

[314] *Id.*

[315] *Id.*

[316] "Q1 2020 Cleveland-Cliffs Inc Earnings Call," *Fair Disclosure Wire* (May 11, 2020), at 8, provided at Exhibit 51.

[317] AK Steel Trade and Operations Data for GOES, provided at Exhibit 45.

the [

]318 If there is sufficient trade relief, AK Steel will continue GOES operations, and there will continue to be a stable source of U.S.-made GOES for "projected national defense requirements."319

Even if there were a dramatic spike in GOES demand beyond AK Steel's current GOES capacity, such as a major infrastructure project to modernize the electrical grid, the company would have the ability to increase its capacity. AK Steel could increase its capacity to [

] if market conditions justified such an action.320 AK Steel has so far elected not to make the capital investments needed to raise its capacity because it cannot be assured that there will be any return whatsoever in light of imports unfairly taking market share through unreasonably low pricing.321 Similarly, [

]322

With sufficient trade relief, AK Steel could make such investments, which would greatly enhance the security, resiliency, and efficiency of the U.S. electrical grid and improve U.S. national security. Trade relief will thus ensure that there is "{d}omestic production and

318 *See* Section IV.A.

319 *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(a)(1), (4).

320 Affidavit of [ ] at para. 31, provided at Exhibit 7.

321 *Id.*

322 *Id.* at para. 12.

productive capacity {of GOES} needed for the Products to meet projected national defense requirements" and that AK Steel can support the "{g}rowth requirements of Products' industries to meet national defense requirements and/or requirements for supplies and services necessary to assure such growth including investment, exploration, and development{.}"[323]

D. Trade Relief Must Allow For A Healthy Rate Of Return On The Production Of Electrical Steel In The United States

1. Trade relief must cover imports from Canada and Mexico

In 2019, over 92 percent of imports of the downstream products at issue entered the United States from Canada and Mexico.[324] Significantly, GOES is not produced in either country. As the Department concluded in the Section 232 report on steel, "{i}mportantly, there is today only one remaining domestic producer of GOES and NOES in the United States: AK Steel. It is also the only producer of these products in North America."[325]

Instead, GOES is entering Canada and Mexico from producers in a variety of other countries, including countries like Japan, Korea, and China that were formerly found to be engaged in unfair trade in the U.S. market. The GOES then undergoes slight alterations to become cores, laminations, and other downstream products for shipment to the U.S. market. These facts plainly show an ongoing effort to circumvent Section 232 relief on GOES and hurt the last producer of GOES in North America. As Mr. Goncalves has explained, AK Steel's poor profitability in the second half of 2019 was a direct consequence of schemes to circumvent the Section 232 tariffs by foreign producers of GOES that started shipping GOES to Canada and

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[323] *See Notice of Request for Public Comments*, 85 Fed. Reg. 29926, 29927. *See also* 15 C.F.R. § 705.4(a)(1)-(2), (4).

[324] U.S. Imports of Cores and Laminations, provided at Exhibit 41.

[325] U.S. Department of Commerce, *The Effect of Imports of Steel on the National Security* (Jan. 11, 2018), at Appendix I, p. 4 (footnote omitted), provided at Exhibit 2.

Mexico for minimal processing into cores and laminations that could be imported into the United States without paying Section 232 tariffs.[326]

Because nearly all of the imported cores and laminations at issue are imported from Canada and Mexico, which has greatly accelerated since the Section 232 tariffs on steel were imposed, no relief will suffice without covering Canada and Mexico. If Canada and Mexico are not included in the remedy, the relief will not be effective. Any remedy absent these countries would have no positive impact on AK Steel's GOES production or financial results, and the same threats to national security that exist today with a domestic GOES industry on the verge of disappearing will become a reality.

2. The President should impose a significant tariff on imports of laminations, stacked cores, and wound cores

Section 232(c)(1)(A) provides that within 90 days after receiving a report in which the Secretary finds that an article is being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security, the President shall: (1) determine whether the President concurs with the finding of the Secretary, and (2) if the President concurs, determine the nature and duration of the action that, in the judgment of the President, must be taken to adjust the imports of the article and its derivatives so that such imports will not threaten to impair the national security.[327] As this language shows, the President has broad authority to determine the adjustment necessary to prevent imports from threatening to impair the national security. In this case, the most effective remedy would be a very significant tariff on all imports of laminations, stacked cores, and wound cores into the United States.

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[326] *See* "Q1 2020 Cleveland-Cliffs Inc Earnings Call," *Fair Disclosure Wire* (May 11, 2020), at 4-5, provided at Exhibit 51.

[327] 19 U.S.C. § 1862(c)(1)(A).

Financial data from AK Steel prove that only a dramatic change in market conditions will be sufficient to preserve GOES production in the United States. As discussed above, Cleveland-Cliffs -- North America's largest producer of iron ore pellets, a highly sophisticated investor with extensive knowledge of both the steel business and the raw materials used to make steel -- recently conducted due diligence into AK Steel's operations. Cleveland-Cliffs ultimately decided to buy AK Steel in a stock deal valued at about $1.1 billion.[328] However, as described above, Cleveland-Cliffs concluded that AK Steel's electrical steel business -- including its production of GOES -- actually *detracted* from the overall value of the company. On an earnings call last month, Mr. Goncalves explained that Cleveland-Cliffs could obtain an immediate improvement of $40 million in its EBITDA numbers by shutting down AK Steel's production of electrical steel.[329]

Furthermore, as shown throughout this submission, it is not enough for AK Steel to break even. To remain in the electrical steel business, AK Steel requires a rate of return over the business cycle that would be sufficient to fund necessary expenditures in maintenance and research and development. Otherwise, AK Steel should spend its capital on other activities. Given the significant risks associated with the electrical steel business, [

][330] This type of return is not possible at current volume levels. However, Cleveland-Cliffs has carefully analyzed the GOES business, and has

[328] *See* "Cleveland-Cliffs Buying AK Steel in $1.1B Stock Deal," *U.S. News & World Report* (Dec. 3, 2019), provided at **Exhibit 53**.

[329] "Q1 2020 Cleveland-Cliffs Inc Earnings Call," *Fair Disclosure Wire* (May 11, 2020), at 8, provided at Exhibit 51.

[330] Affidavit of [ ] at para. 32, provided at Exhibit 7.

concluded that [

]331 The key figures in this analysis can be seen below:

AK STEEL OPERATIONS ON GOES (quantities in short tons, values in $1,000)332

		Current Projections	Projections With Effective Relief	
Net sales (in short tons)	[			]
Net sales values	[			]
Cost of goods sold	[			]
Gross profits	[			]
Other costs before EBITDA	[			]
EBITDA	[			]
Capital expenditures	[			]
EBITDA minus Cap Ex	[			]
Total Capital Deployed	[			]
Return on Capital Deployed	[			]

A review of the data indicate that AK Steel's projections [

] AK Steel currently projects an average unit value for its sales of

[ ]333 In the scenario with effective relief, the projected average unit value is

[ ]334 The [

] AK Steel currently expects that its cost of goods sold will be [

331 Economic analysis is wholly consistent with this. Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section II, provided at Exhibit 56 (demonstrating that AK Steel can only achieve the needed profitability improvement by increasing output by [ ] percent above 2019 levels, which corresponds to [ ] of additional GOES demand in the United States).

332 Affidavit of [ ] at para. 32 and Attachment 1, provided at Exhibit 7.

333 *See* AK Steel Financial Data for GOES, provided at Exhibit 50. [

]

334 [ ]

],[335] and its other costs before EBITDA would be [ ][336] If AK Steel can [

][337] and [ ][338] respectively. In other words, [

]

The [

][339] However, it must be recalled that for years now, U.S. customers of GOES have become increasingly reliant on imports of cores and laminations from Canada and Mexico. As discussed throughout this submission, [

] To change this pattern of behavior, it is vital that relief on cores and laminations be sufficient to encourage the reshoring of supply chains here in the United States.

It also seems clear that foreign producers of GOES are engaged in unfair trading practices. In 2018, Mexico's largest suppliers of GOES were Japan, China, Russia, Poland, Korea, Germany, and the Czech Republic.[340] Together, these seven countries accounted for 97.2

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[335] [ ]

[336] [ ]

[337] [ ]

[338] [ ]

[339] *See* AK Steel Financial Data for GOES, provided at Exhibit 50.

[340] *See* Mexican and Canadian Imports of GOES, provided at Exhibit 39.

percent of Mexican imports of GOES.[341] As shown above, the Department investigated GOES from all seven of these countries in 2014, and determined that all of it was dumped and/or subsidized.[342] Last year, Japan, China, Russia, Poland, and Korea -- all countries proven to have engaged in unfair trade in this country -- accounted for 99.6 percent of Mexican imports of GOES.[343] Meanwhile, Japan, Korea, Russia, China, and Germany -- five countries with a history of unfair trade in the United States -- accounted for 88.8 percent of Canadian imports of GOES in 2019.[344] In other words, the same producers who were found to be attacking this market through unfair trade in the past are the ones attacking the market by shipping GOES to Canada and Mexico today. No wonder the prices of GOES into Canada and Mexico are so much lower than prices in the United States. No wonder those prices have fallen dramatically since 2016. It seems obvious that we are seeing a classic example of dumped and subsidized goods being shipped to North America at unfair prices -- only this time instead of attacking the U.S. market directly (which would subject them to our antidumping and countervailing duty laws), the foreign producers are attacking the U.S. market indirectly by encouraging the production of low-priced cores and laminations in Canada and Mexico.

These facts are highly significant for purposes of setting the potential tariff rates, because it indicates that the U.S. government is dealing with a problem that is grounded in unfair trading practices. It is common for unfairly-traded goods to face very large tariffs. In fact, such tariffs are often the only way to create a level playing field in the U.S. market. During the 2014 investigations, as shown above, the Department concluded that five of the seven countries at

[341] *See id.*

[342] *See* Section V.A.1.

[343] *See* Mexican and Canadian Imports of GOES, provided at Exhibit 39.

[344] *See id.*

issue were dumping GOES into the U.S. market at margins that exceeded 99 percent.[345] Significantly, all seven of these countries are now shipping GOES to Mexico and Canada at prices that are dramatically below the prices at which they sold GOES to the United States during the three full years covered by the ITC's 2014 investigation.[346]

In short, to save electrical steel production in the United States, the President must establish a tariff that is sufficient to address the likelihood that imports of GOES are pouring into Canada and Mexico at unfair prices -- and that these imports are encouraging the surge of cores and laminations that are driving AK Steel from the electrical steel business. This tariff must also be sufficient to convince major U.S. consumers of GOES to change their recent behavior and begin bringing more production of cores and laminations back to the United States. [

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Economic analysis supports this conclusion. Attached as Exhibit 56 to this submission is a detailed economic report showing the need for strong and effective trade relief. The report makes the following key points:

- A review of AK Steel's performance wholly supports the conclusion that it is not viable for AK Steel to continue making electrical steel under current market conditions. Unless there is a significant change in the market, basic economic principles justify shutting down all remaining electrical steel production in the United States.[347]

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[345] *See* Section V.A.1 of this submission.

[346] *See* Comparison of Average Unit Values of U.S. Imports with Mexican and Canadian Imports, provided at **Exhibit 54**.

[347] Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section II, provided at Exhibit 56.

- There is no reason to believe that global market conditions are going to improve. In fact, the global market for GOES is distorted by an oversupply in China which is putting downward pressure on GOES prices everywhere. Under these circumstances, it is critical that AK Steel be able to obtain a healthy rate of return on its sales in the U.S. market.[348]

- To return to healthy levels of profitability, AK Steel requires a significant increase in its production and U.S. sales. Such an increase is vital to lower the company's per-ton costs and generate necessary revenues.[349]

- AK Steel can only obtain a significant increase in its production and U.S. sales if the tariff relief on cores and laminations is sufficient to: (1) overcome the ability of foreign producers of GOES to lower their prices to the level of their variable costs, and (2) create an incentive for U.S. purchasers of GOES to increase production of cores and laminations in the United States. Such a tariff [ ][350]

In short, the report confirms the need for strong, prompt, and effective trade relief.

In considering the appropriate tariff levels, one other point should be kept in mind. The current tariff on GOES under Section 232 is 25 percent and quota levels are in place on GOES from Korea and Brazil. Under these circumstances, imports of GOES are still readily available to U.S. consumers. In fact, last year the United States imported 29,503 short tons of GOES, with an average unit value of only $1,750/short ton.[351] Thus, even with significant tariffs on cores and laminations, the U.S. market for GOES will feature robust competition from imports.[352] These facts should alleviate any concern that the type of tariff on cores and laminations necessary to preserve AK Steel's electrical steel will trigger any kind of shortage in the U.S. market.

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[348] *Id.* at Section III.

[349] *Id.* at Section IV.

[350] *Id.* at Section V.

[351] *See* U.S. Imports of GOES, provided at Exhibit 35.

[352] Economic analysis confirms this point. Capital Trade, Incorporated, *Effective Trade Relief on Transformer Cores and Laminations* (July 2, 2020), at Section V.C, provided at Exhibit 56.

VIII. CONCLUSION

The relevant facts show that imports of laminations, stacked cores, and wound cores are entering the U.S. market in such quantities, and under such circumstances, as to threaten to impair the national security of the United States. To prevent these imports from threatening to impair the national security, the President should use authority under Section 232 to impose significant tariffs on them. These tariffs will allow AK Steel to continue making electrical steel, including GOES, that is critical to the nation's electrical grid.

Respectfully submitted,

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EXHIBIT 1

COMMENTS AND INFORMATION DIRECTED TO THE CRITERIA LISTED IN THE NATIONAL SECURITY INDUSTRIAL BASE REGULATIONS

In the Federal Register notice initiating this investigation,[1] the U.S. Department of Commerce ("Department") stated that it was "particularly interested" in comments and information directed to the criteria listed in Section 705.4 of the National Security Industrial Base Regulations.[2] These criteria are all addressed in the body of this submission. However, for the convenience of the Department, we are here briefly summarizing the key points regarding each of the relative criteria.

(i) Quantity of, or other circumstances related to, the importation of the Products;

For purposes of this submission, the Products at issue are laminations for stacked cores for incorporation into transformers,[3] stacked cores for incorporation into transformers,[4] and wound cores for incorporation into transformers.[5] These Products are all made from grain-

[1] Bureau of Industry and Security, U.S. Department of Commerce, *Notice of Request for Public Comments on Section 232 National Security Investigation on Imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation into Transformers, Wound Cores for Incorporation into Transformers, Electrical Transformers, and Transformer Regulators*, 85 Fed. Reg. 29926 (May 19, 2020).

[2] *See* 15 C.F.R. § 705.4.

[3] Data regarding imports of laminations for stacked cores may be found at numbers 8504.90.9534 and 8504.90.9634 of the U.S. Harmonized Tariff Schedule ("HTS"). *See* U.S. Imports of Cores and Laminations, provided at Exhibit 41 of this submission.

[4] Data regarding imports of stacked cores for incorporation into transformers may be found at numbers 8504.90.9538 and 8504.90.9638 of the HTS. *See id.*

[5] Data regarding imports of wound cores for incorporation into transformers may be found at number 8504.90.9542 and 8504.90.9642 of the HTS. *See id.*

oriented electrical steel ("GOES"). The vast majority of these imports enter the United States from Canada and Mexico.[6]

The U.S. Census Bureau collects quantity data for these products in units rather than by weight. Because the size of particular units can vary significantly, merely counting the units associated with these imports cannot adequately account for the volume of domestically-produced GOES that is being displaced by imports of products made by GOES.[7] The best way to observe trends in import data for laminations and cores is to analyze the value of imports. The price of imported GOES has generally fallen since 2016, the last full year before the Administration launched its Section 232 investigation into steel, and there has been no apparent increase in the cost of turning GOES into cores and laminations.[8] Under these circumstances, if the value of cores and laminations being imported into this country is rising, the Department can be confident that the volume of domestic GOES being displaced by those imports is also rising.

In recent years, the value of U.S. imports of cores and laminations has increased dramatically -- from $99.7 million in 2016 to more than $201 million in 2019, and from $40.1 million in Q1 2019 to $68.1 million in Q1 2020.[9] By contrast, the volume of AK Steel's net sales of GOES fell from [ ] in 2016 to [ ][10] AK Steel projects that its sales of GOES will decline by [ ] from 2019 to 2020.[11]

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[6] *See* Imports of Cores and Laminations, provided at Exhibit 41 of this submission.

[7] *See* the discussion at Section V.A.2 of this submission.

[8] *See* the discussion at Section V.A.2 of this submission.

[9] *See* Imports of Cores and Laminations, provided at Exhibit 41 of this submission.

[10] *See* AK Steel Financial Data for GOES, provided at Exhibit 50 of this submission.

[11] *See id.*

Together, these facts show that significant volumes of cores and laminations are pouring into this market, and that AK Steel -- the only remaining producer of electrical steel in North America -- is being harmed as a result.

(ii) Domestic production and productive capacity needed for the Products to meet projected national defense requirements;

Two years ago, in its Section 232 investigation into steel, the Department made clear that maintaining a domestic supply of electrical steel is critical to U.S. national security.[12] AK Steel is the only producer of electrical steel left in this country, and is on the verge of stopping all production. The key issue here, therefore, is what level of domestic production and productive capacity for cores and laminations is necessary to maintain a supply of domestically-produced electrical steel in the United States. As referenced above, AK Steel anticipates selling [ ] of GOES in 2020.[13] That level of sales is certainly not adequate for AK Steel to justify making electrical steel, and the company will soon shut down all electrical steel production unless it has good reason to believe that this number will improve. As explained in the text, AK Steel's market analysis indicates that it will need to sell [ ] to stay in the electrical steel business.[14] It is essential that the United States have enough production of cores and laminations to support this level of GOES sales.

[12] *See* the discussion at Section IV.B.1 of this submission.

[13] *See* AK Steel Financial Data for GOES, provided at Exhibit 50 of this submission.

[14] *See* discussion at Section VII.D.2 of this submission.

(iii) Existing and anticipated availability of human resources, products, raw materials, production equipment, and facilities to produce the Products;

Again, the key issue here is whether there is enough production of cores and laminations in the United States to maintain domestic production of electrical steel. As of now, AK Steel has enough capacity to make [ ][15] It currently employs more than 1,400 employees in Butler, Pennsylvania and Zanesville, Ohio to make this product.[16] It has extensive expertise and supply chains developed through almost 100 years of electrical steel production.[17] However, as explained above, U.S. production of cores and laminations appears to be falling significantly. This fact can be seen in the decline of AK Steel's GOES sales from 2016 to 2020. To preserve electrical steel production in the United States, it is vital that the United States make enough cores and laminations to allow AK Steel to remain in the electrical steel business. The only way for this to happen is a significant tariff of imports of cores and laminations.[18]

(iv) Growth requirements of Products' industries to meet national defense requirements and/or requirements for supplies and services necessary to assure such growth including investment, exploration, and development;

As explained above, AK Steel projects sales of [ ] of GOES in 2020.[19] To obtain a sustainable rate of return, AK Steel estimates that it [

[15] *See* AK Steel Trade and Operations Data for GOES, provided at Exhibit 45 of this submission.

[16] *See* "AK Steel buyer warns of plant closures without stronger U.S. import curbs," *Reuters* (Mar. 5, 2020), provided at Exhibit 30 of this submission.

[17] *See* discussion at Sections IV.D.2.a and VI.C of this submission.

[18] *See* discussion at Section VII.D.2 of this submission.

[19] *See* AK Steel Financial Data for GOES, provided at Exhibit 50 of this submission.

]20 If it cannot make these sales, AK Steel will stop making electrical steel and the United States will have no electrical steel for use in maintaining and upgrading the electrical grid. It is critical that the United States adjust imports of cores and laminations to avoid this result.

(v) The impact of foreign competition on the economic welfare of the Products' industries;

As our submission makes clear, imports of cores and laminations are undermining domestic production of these articles. In fact, [

]21 In other words, U.S. production of cores and laminations is disappearing. In the absence of trade relief, this development will cause the United States to lose all capacity to make electrical steel.

(vi) The displacement of any domestic production of the Products causing substantial unemployment, decrease in the revenues of government, loss of investment or specialized skills and productive capacity, or other serious effects;

As our submission makes clear, the United States is on the verge of losing its ability to make electrical steel. Cleveland-Cliffs, which recently bought AK Steel, anticipates that the company's electrical steel operations will lower Cleveland-Cliffs's earnings before interest, taxes, depreciation, and amortization by $40 million in 2020.[22] Meanwhile, as explained above, U.S. production of cores and laminations is falling [

[20] *See* discussion at Section VII.D.2 of this submission.

[21] *See* discussion at Sections V.A.1 and VI.D of this submission.

[22] *See* discussion at Section VII.B of this submission.

][23] If these fateful developments are not stopped soon -- by trade relief on cores and laminations sufficient to encourage more production in the United States -- the consequences for this country will be devastating.

As we explain in this submission, production of electrical steel is a very challenging enterprise that requires a sophisticated workforce, specialized equipment, and a stable supply chain for necessary raw materials.[24] It also requires customers who use GOES to make cores and laminations. At this point, in the absence of relief, AK Steel will soon stop making electrical steel. Once that happens, it is extremely unlikely that any other U.S. company would take its place. AK Steel estimates that [

][25] It defies belief that any company would take on such an effort soon after AK Steel was forced out of business.

Once AK Steel stops making GOES, any remaining producers of cores and laminations will be wholly dependent on imports from overseas. As shown throughout our submission, [ ][26] This trend can be expected to continue -- and even accelerate -- once there is no more GOES production in this country.

The loss of America's capacity to make GOES, cores, and laminations will have devastating effects. AK Steel alone has more than 1,400 employees in Butler and Zanesville

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[23] *See* discussion at Sections V.A.1 and VI.D of this submission.

[24] *See* discussion at Sections IV.D.2.a and VI.C of this submission.

[25] *See* discussion at Section IV.D.2.a of this submission.

[26] *See* discussion at Sections V.A.1 and VI.D of this submission.

whose jobs would be at risk.[27] All of the investments and specialized skills associated with this production will disappear. All of the taxes paid to federal, state, and local governments due to production of GOES, cores, and laminations will be lost. And, as explained above, these developments are likely to be permanent. To avoid these outcomes, it is vital that the United States impose strong and effective trade relief.

(vii) National defense supporting uses of the Products including data on applicable contracts or sub-contracts, both past and current;

Laminations, stacked cores, and wound cores are used to make electric transformers, which are essential to maintaining and upgrading our electrical grid. As explained in our submission, the Department has already determined -- as part of its 2018 Section 232 investigation into steel -- that preserving a strong and efficient electrical grid is vital to our national security.[28] Thus, all of the products at issue are used in applications that are critical to the national defense.

(viii) Country of manufacture for the Products;

As shown in the submission, the vast majority of imports of cores and laminations enter the United States from Canada and Mexico.[29] The GOES used to produce those cores and laminations come from a number of different countries in Asia and Europe.[30]

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[27] *See* "AK Steel buyer warns of plant closures without stronger U.S. import curbs," *Reuters* (Mar. 5, 2020), provided at Exhibit 30 of this submission.

[28] *See* the discussion at Section IV.B.1 of this submission.

[29] *See* the discussion at Section V.A.2 of this submission and U.S. Imports of Cores and Laminations, provided at Exhibit 41 of this submission.

[30] *See* Mexican and Canadian Imports of GOES, provided at Exhibit 39 of this submission.

(ix) Relevant factors that are causing or will cause a weakening of our national economy; and

This point is covered in detail throughout our submission, and we will not repeat that discussion here. The key point may be briefly summarized as follows: imports of cores and laminations are destroying our country's ability to make electrical steel. The consequences of this fact will have a severe impact on our national economy, above and beyond the national security risk.[31]

(x) Any other relevant factors, including the use and importance of the Products in critical infrastructure sectors identified in Presidential Policy Directive 21 (Feb. 12, 2013).

Presidential Policy Directive 21 identifies 16 critical infrastructure sectors: (1) chemical; (2) commercial facilities; (3) communications; (4) critical manufacturing; (5) dams; (6) defense industrial base; (7) emergency services; (8) energy; (9) financial services; (10) food and agriculture; (11) government facilities; (12) healthcare and public health; (13) information technology; (14) nuclear reactors, materials, and waste; (15) transportation systems; and (16) water and wastewater systems.[32] Each of these sectors -- and many others besides -- is utterly dependent on a strong and dependable supply of electricity. The Department made this exact point two years ago in its Section 232 report on steel:

> In the case of critical infrastructure, the United States is down to only one remaining producer of electrical steel in the United States (AK Steel -- which is highly leveraged). Electrical steel is necessary for power distribution transformers for all types of energy -- including solar, nuclear, wind, coal, and natural gas -- across the country. If domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the U.S. will become entirely dependent on foreign producers to supply these critical materials and products. Without an

[31] *See* discussion at Sections IV.B.2, IV.D, V, and VI of this submission.

[32] *See* U.S. Department of Commerce, The Effect of Imports of Steel on the National Security (Jan. 11, 2018), at Appendix I, pp. 1-2, provided at Exhibit 2 of this submission. *See also* Section IV.B.1 of this submission.

> assured domestic supply of these products, the United States cannot be certain that it can effectively respond to large power disruptions affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner.[33]

These findings leave no doubt that the United States requires "an assured domestic supply" of electrical steel. But that supply will be lost unless the U.S. government acts -- soon -- to address the problems resulting from unfettered imports of cores and laminations. We urge the government to do so.

[33] U.S. Department of Commerce, The Effect of Imports of Steel on the National Security (Jan. 11, 2018), at 46, provided at Exhibit 2 of this submission.

EXHIBIT 2

THE EFFECT OF IMPORTS OF STEEL ON THE NATIONAL SECURITY

AN INVESTIGATION CONDUCTED UNDER SECTION 232 OF THE TRADE EXPANSION ACT OF 1962, AS AMENDED

U.S. Department of Commerce
Bureau of Industry and Security
Office of Technology Evaluation

January 11, 2018

The Secretary also recognized the close relation of the economic welfare of the United States to its national security; the impact of foreign competition on the economic welfare of individual domestic industries; and any substantial unemployment, decrease in revenues of government, loss of skills, or any other serious effects resulting from the displacement of any domestic products by excessive imports, without excluding other factors, in determining whether a weakening of the U.S. economy by such imports may impair national security. In particular, this report assesses whether steel is being imported "in such quantities" and "under such circumstances" as to "threaten to impair the national security."[4]

Findings

In conducting the investigation, the Secretary found:

A. Steel is Important to U.S. National Security

1. National security includes projected national defense requirements for the U.S. Department of Defense.

2. National security also encompasses U.S. critical infrastructure sectors including transportation systems, the electric power grid, water systems, and energy generation systems.

3. Domestic steel production is essential for national security applications. Statutory provisions illustrate that Congress believes domestic production capability is essential for defense requirements and critical infrastructure needs, and ultimately to the national security of the United States.[5] U.S. Government actions on steel across earlier Administrations

[4] 19 U.S.C. § 1862(b)(3)(A).

[5] *See,* e.g., 15 U.S.C. § 271(a)(1)("The future well-being of the United States economy depends on a strong manufacturing base…"); 50 U.S.C. § 4502(a)("Congress finds that – (1) the security of the United States is dependent on the ability of the domestic industrial base to supply materials and services… (2)(C) to provide for the protection and restoration of domestic critical infrastructure operations under emergency conditions…"; and American Recovery and Reinvestment Act, P.L. 111-5, §1605, 123 Stat. 303 (Feb. 17, 2009) (providing that none of the funds appropriated or made available by the act may be used for the construction, alteration, maintenance, or repair of a public building or public work unless the iron, steel, and manufactured goods are produced in the United States).

All unclassified and non-proprietary portions of the report submitted by the Secretary to the President must be published.

Within 90 days after receiving a report in which the Secretary finds that an article is being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security, the President shall:

(1) "Determine whether the President concurs with the finding of the Secretary;" and

(2) "If the President concurs, determine the nature and duration of the action that, in the judgment of the President, must be taken to adjust the imports of the article and its derivatives so that such imports will not threaten to impair the national security." *See* 19 U.S.C. § 1862(c)(1)(A).

II. Discussion

While Section 232 does not contain a definition of "national security", both Section 232, and its implementing regulations at 15 C.F.R. Part 705, contain non-exclusive lists of factors that Commerce must consider in evaluating the effect of imports on the national security. Congress in Section 232 explicitly determined that "national security" includes, but is not limited to, "national defense" requirements. *See* 19 U.S.C. § 1862(d). The Department in 2001 determined that "national defense" includes both defense of the United States directly and the "ability to project military capabilities globally."[11]

The Department also concluded in 2001 that "in addition to the satisfaction of national defense requirements, the term "national security" can be interpreted more broadly to include the general security and welfare of certain industries, beyond those necessary to satisfy national defense requirements that are critical to the minimum operations of the economy and government." The Department called these "critical industries."[12] This report once again uses these reasonable

[11] Department of Commerce, Bureau of Export Administration; *The Effect of Imports of Iron Ore and Semi-Finished Steel on the National Security*; Oct. 2001 ("2001 Report").

[12] *Id.*

interpretations of "national defense" and "national security." However, this report uses the more recent 16 critical infrastructure sectors identified in Presidential Policy Directive 21[13] instead of the 28 critical industry sectors used by the Bureau of Export Administration in the 2001 Report.[14]

Section 232 directs the Secretary to determine whether imports of any article are being made "in such quantities or under such circumstances" that those imports "threaten to impair the national security." *See* 19 U.S.C. § 1862(b)(3)(A). The statutory construction makes clear that either the quantities or the circumstances, standing alone, may be sufficient to support an affirmative finding. They may also be considered together, particularly where the circumstances act to prolong or magnify the impact of the quantities being imported.

The statute does not define a threshold for when "such quantities" of imports are sufficient to threaten to impair the national security, nor does it define the "circumstances" that might qualify.

Likewise, the statute does not require a finding that the quantities or circumstances are impairing the national security. Instead, the threshold question under Section 232 is whether those quantities or circumstances "threaten to impair the national security." *See* 19 U.S.C. § 1862(b)(3)(A). This formulation strongly suggests that Congress expected an affirmative finding under Section 232 would occur before there is actual impairment of the national security.[15]

Section 232(d) contains a considerable list of factors for the Secretary to consider in determining if imports "threaten to impair the national security"[16] of the United States, and this list is mirrored in the implementing regulations. *See* 19

[13] Presidential Policy Directive 21; Critical Infrastructure Security and Resilience; February 12, 2013 ("PPD-21").

[14] See Op. Cit. at 16.

[15] The 2001 Report used the phrase "fundamentally threaten to impair" when discussing how imports may threaten to impair national security. *See* 2001 Report at 7 and 37. Because the term "fundamentally" is not included in the statutory text and could be perceived as establishing a higher threshold, the Secretary expressly does not use the qualifier in this report. The statutory threshold in Section 232(b)(3)(A) is unambiguously "threaten to impair" and the Secretary adopts that threshold without qualification. 19 U.S.C. § 1862(b)(3)(A). The statute also uses the formulation "may impair" in Section 232(d). *Id.* at 1862(d).

[16] 19 U.S.C. § 1862(b)(3)(A).

See 19 U.S.C. § 1862(d). Since the 2001 investigation, foreign competition and the displacement of domestic steel by excessive imports have resulted in the closure of six basic oxygen furnace facilities and the idling of four more (which is more than a 50 percent reduction in the number of such facilities), a 35 percent decrease in employment in the steel industry, and caused the domestic steel industry as a whole to operate on average with negative net income since 2009.

Another factor, not on the list, that the Secretary finds to be a relevant is the presence of massive excess capacity for producing steel. This excess capacity results in steel imports occurring "under such circumstances" that they threaten to impair the national security. *See* 19 U.S.C. § 1862(b)(3)(A). The circumstance of excess global steel production capacity is a factor because, while U.S. production capacity has remained flat since 2001, other steel producing nations have increased their production capacity, with China alone able to produce as much as the rest of the world combined. This overhang of global excess capacity means that U.S. steel producers, for the foreseeable future, will continue to lose market share to imported steel as other countries export more steel to the United States to bolster their own economic objectives and offset loss of markets to Chinese steel exports.

It is these three factors – displacement of domestic steel by excessive imports and the consequent adverse impact on the economic welfare of the domestic steel industry, along with global excess capacity in steel – that the Secretary has concluded create a persistent threat of further plant closures that could leave the United States unable in a national emergency to produce sufficient steel to meet national defense and critical industry needs. The Secretary finds this "weakening of our internal economy may impair the national security" as defined in Section 232. *See* 19 U.S.C. 1862(d).

The Secretary also considered whether the source of the imports affects the analysis under Section 232. In the 2001 Report, "the Department found that iron ore and semi-finished steel are imported from reliable foreign sources" and concluded that "even if the United States were dependent on imports of iron ore and semi-finished steel, imports would not threaten to impair national security." 2001 Report at 27. However, because Congress in Section 232 chose to explicitly direct the Secretary to consider whether the "impact of foreign competition" and "the

III. INVESTIGATION PROCESS

A. Initiation of Investigation

On April 19, 2017, U.S. Secretary of Commerce Wilbur Ross initiated an investigation to determine the effect of imported steel on national security under Section 232 of the Trade Expansion Act of 1962, as amended (19 U.S.C. § 1862).

Pursuant to Section 232(b)(1)(B), the Department notified the U.S. Department of Defense with an April 19, 2017 letter from Secretary Ross to Secretary James Mattis.[23]

On April 20, 2017, President Donald Trump signed a Presidential Memorandum directing Secretary Ross to proceed expeditiously in conducting his investigation and submit a report on his findings to the President.[24]

On April 21, 2017, the Department published in the Federal Register a notice about the initiation of this investigation to determine the effect of imports of steel on the national security. The notice also announced the opening of the public comment period as well as a public hearing to be held on May 24, 2017.[25]

B. Public Hearing

The Department held a public hearing to elicit further information concerning this investigation in Washington, DC, on May 24, 2017. The Department heard testimony from 37 witnesses at the hearing. A full list of witnesses and copies of their testimony are included in Appendices E and F.

C. Public Comments

On April 21, 2017, the Department invited interested parties to submit written comments, opinions, data, information, or advice relevant to the criteria listed in

[23] 19 U.S.C. § 1862(b)(1)(B). *See* Appendix A: Section 232 Investigation Notification Letter to Secretary of Defense James Mattis (April 19, 2017) ; Department of Defense Response to Notification (May 8, 2017)

[24] *See* Appendix B: Presidential Memorandum for the Secretary of Commerce - Steel Imports and Threats to National Security (April 20, 2017)

[25] *See* Appendices C and D for Federal Register Notice Federal Register, Vol. 82, No. 79, 19205-19207 and *See* Federal Register, Vol. 82, No. 98, 23529-23530.

V. FINDINGS

A. Steel is Important to U.S. National Security

As discussed in Part II, "national security" under Section 232 includes both (1) national defense, and (2) critical infrastructure needs.

1. Steel is Needed for National Defense Requirements

Steel articles are critical to the nation's overall defense objectives.[30] The U.S. Department of Defense (DoD) has a large and ongoing need for a range of steel products that are used in fabricating weapons and related systems for the nation's defense.[31] DoD requirements – which currently require about three percent of U.S. steel production – are met by steel companies that also support the requirements for critical infrastructure and commercial industries.

The free market system in the United States requires commercially viable steel producers to meet defense needs. No company could afford to construct and operate a modern steel mill solely to supply defense needs because those needs are too diverse. In order to supply those diverse national defense needs, U.S. steel mills must attract sufficient commercial (i.e., non-defense) business. The commercial revenue supports construction, operation, and maintenance of production capacity as well as the upgrades, research and development required to continue to supply defense needs in the future. *See* Appendix H for examples.

2. Steel is Required for U.S. Critical Infrastructure

Steel also is needed to satisfy requirements for "those industries that the U.S. Government has determined are critical to minimum operations of the economy and government."[32] In the 2001 Report the Department identified 28 "critical industries."[33] The Critical Infrastructure Assurance Office that identified the

[30] *Accord*, 2001 Report at 1, 12.

[31] AISI 2017 public policy agenda, available from http://www.steel.org/~/media/Files/AISI/Reports/AISI-2017-Public-Policy-Agenda.pdf?la=en

[32] 2001 Report at 14. *See also,* 2001 Report at 16, Table 2, for a listing of the 28 critical industries.

[33] *Id.*

"critical industries" is no longer in existence, so for this investigation the Department instead relied on the industries identified by the U.S. Government in the 2013 Presidential Policy Directive 21 (PPD-21).[34] The Secretary believes that the range of industries identified in PPD-21 is comparable to the range of critical industries analyzed in the 2001 Report.

Pursuant to PPD-21, there are 16 designated critical infrastructure sectors in the United States, many of which use high volumes of steel (*see* Appendix I).[35] The 16 sectors include chemical production, communications, dams, energy, food production, nuclear reactors, transportation systems, water, and waste water systems.

Increased quantities of steel will be needed for various critical infrastructure applications in the coming years. The American Society of Civil Engineers estimates that the United States needs to invest $4.5 trillion in infrastructure by 2025, and a substantial portion of these projects require steel content.[36]

3. Domestic Steel Production is Essential for National Security Applications

Domestic steel production is essential for national security. Congress, in Section 232(d), directed the Secretary of Commerce and the President to consider domestic production and the economic welfare of the United States in determining whether imports threaten to impair national security.

In the case of steel, the history of U.S. Government actions to ensure the continued viability of the U.S. steel industry demonstrates that, across decades and Administrations, there has been consensus that domestic steel production is vital to national security.

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[34] PPD-21 can be viewed at https://obamawhitehouse.archives.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil

[35] Department of Homeland Security, "Critical Infrastructure Sectors," https://www.dhs.gov/critical-infrastructure-sectors#

[36] 2017 Infrastructure Report Card, American Society of Civil Engineers, https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-Infrastructure-Report-Card.pdf

The updated analysis in Appendix I shows that 49.1 percent of domestic steel consumption in 2007 was used in critical industries. Domestic production in 2007 was 110 million metric tons. The 49.1 percent of domestic consumption used in critical industries equals 54 million metric tons, compared to 30.56 million metric tons (or 33.68 million short tons) used in critical industries in 1997. Thus in 10 years the demand for steel in critical industries increased by 63 percent.

B. Imports in Such Quantities as are Presently Found Adversely Impact the Economic Welfare of the U.S. Steel Industry

In the steel sector, foreign competition is characterized by substantial and sustained global overcapacity and production in excess of foreign domestic demand.

1. Imports of Steel Products Continue to Increase

The United States is the world's largest steel importer. The top 20 sources of U.S. imports of steel products accounted for approximately 91 percent of the roughly 36 million metric tons of steel the United States is expected to import in 2017 (*see* Figure 2).

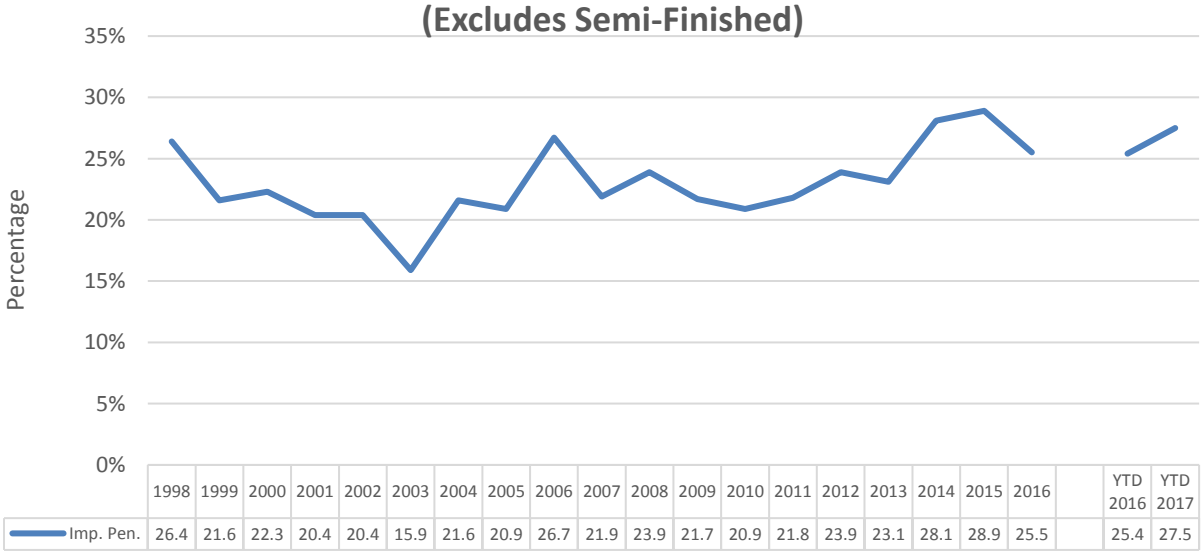
Total U.S. imports rose from 25.9 million metric tons in 2011, peaking at 40.2 million metric tons in 2014 at the height of the shale hydrocarbon drilling boom. For 2017 (first ten months) imports are increasing at a double-digit rate over 2016, pushing finished steel imports consistently over 30 percent of U.S. consumption.

Moreover, U.S. industry has already spent hundreds of millions of dollars in recent years on AD/CVD cases, with seemingly no end in sight to their outlays. Smaller steel manufacturers are financially unable to afford these type of cases, or are hesitant to file cases in light of possible market entry retaliation in foreign markets for finished steel products.[42]

2. High Import Penetration

In contrast to the situation in the 2001 Report, where imports of semi-finished steel represented approximately 7 percent of domestic consumption,[43] imports of finished steel products (i.e. not including semi-finished steel) currently represent over 25 percent of U.S. consumption (*see* Figure 3).[44] If imports of semi-finished products are included, the import penetration level has been above 30 percent for the first ten months of 2017. Import penetration of steel pipe and tube was 74 percent in 2016 and further increased in 2017.

Figure 3. U.S. Import Penetration of Finished Steel Products (Excludes Semi-Finished)



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		YTD 2016	YTD 2017
Imp. Pen.	26.4	21.6	22.3	20.4	20.4	15.9	21.6	20.9	26.7	21.9	23.9	21.7	20.9	21.8	23.9	23.1	28.1	28.9	25.5		25.4	27.5

Source: American Iron and Steel Institute. YTD data source is through October 2016 and October 2017. Excludes semi-finished imports.

[42] Congress has specifically expressed concern about the need to maintain small suppliers and the potential adverse impact on military readiness caused by the loss of small suppliers. *See* 50 U.S.C. § 4502(a)(8).

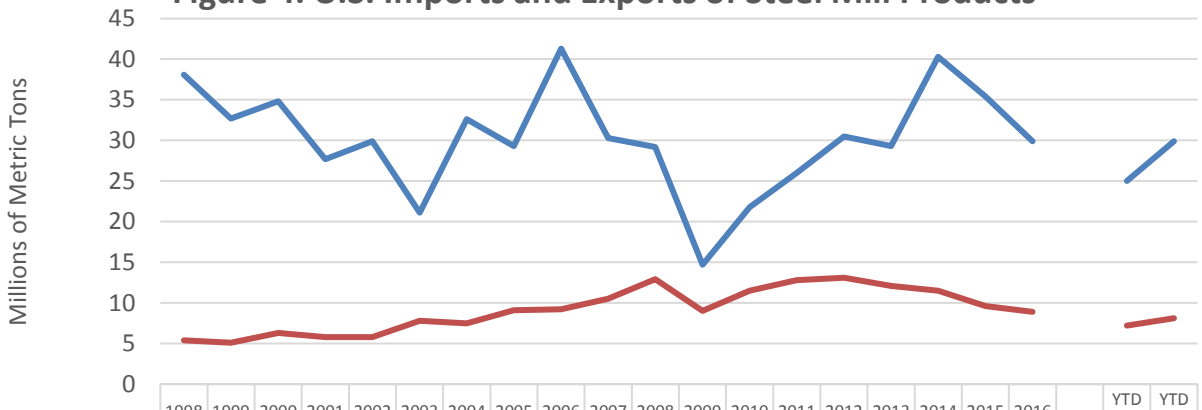
[43] 2001 Report at 31.

[44] AISI's statistical yearbook reports that about 8 percent of U.S. shipments are made of imported substrate.

3. High Import to Export Ratio

U.S. imports of steel products, which displace demand for domestic steel and lower production at U.S. plants, reached nearly four times the level of exports of U.S. steel products in 2016 (*see* Figure 4). The expansion of steel production capacity outside of the United States in the last decade (Asia, the Middle East, and South America), much of it subsidized by national governments, continues to depress world steel prices while making it increasingly difficult for U.S. companies to export their steel products. While U.S. steel producers saw a mild increase in steel exports from 2005 to 2013, more recently sales to foreign customers have been declining. Exports fell to nine million metric tons in 2016 from a 20-year high of 12 million metric tons annually from 2011 to 2013. Most U.S. steel exports are auto industry related and are sent to Canada (50 percent by weight in 2016) and Mexico (39 percent by weight in 2016). Flat products represent the majority of these exports – 57 percent of U.S. steel exports for Canada and 64 percent of steel exports for Mexico.

Figure 4. U.S. Imports and Exports of Steel Mill Products



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		YTD 2016	YTD 2017
Imports	38.1	32.7	34.8	27.7	29.9	21.1	32.6	29.3	41.3	30.3	29.2	14.7	21.8	26	30.5	29.3	40.3	35.4	30		25	29.9
Exports	5.4	5.1	6.3	5.8	5.8	7.8	7.5	9.1	9.2	10.5	12.9	9	11.5	12.8	13.1	12.1	11.5	9.6	8.9		7.2	8.1

Sources: IHS Markit Global Trade Atlas
YTD through October 2016 & 2017.

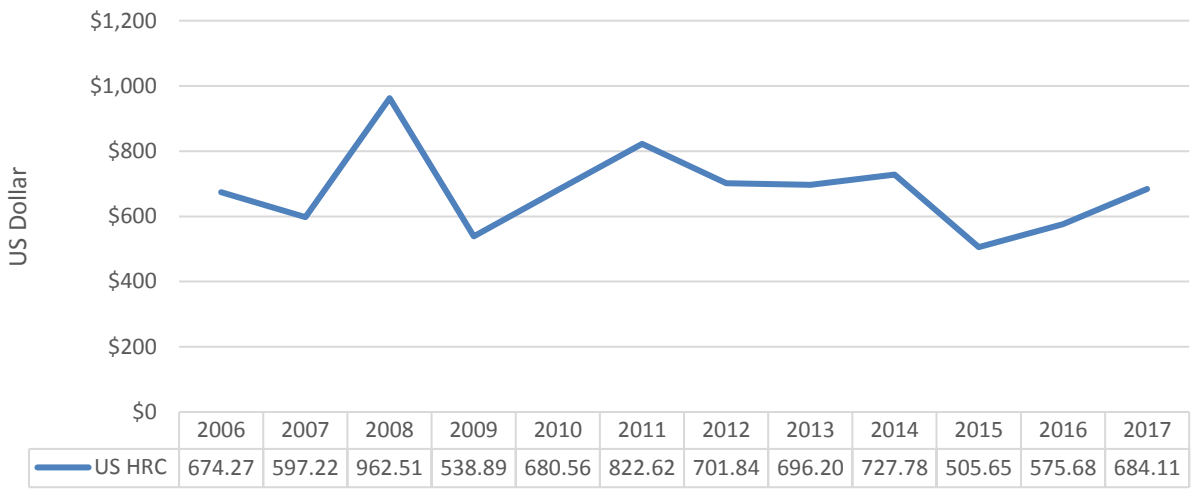
The same is true in the line pipe sector. The United States exports a minimal amount of line pipe. Exports of line pipe reached a recent peak of 525 thousand metric tons in 2013 before declining significantly. Exports totaled just 60 thousand metric tons in 2016, a decrease of 89 percent from 2013, and were less than one-

twentieth of the size of line pipe imports. Canada represents the largest destination for U.S. line pipe exports, with 39 percent of 2016 exports going to Canada, followed by Mexico with 13 percent.

4. Steel Prices

Hot-rolled coil prices are a benchmark price indicator for a common type of steel (*see* Figure 5). Hot rolled coil is considered a "benchmark" because it is a commodity product with a fairly common definition globally.

Figure 5. Hot Rolled- USA Domestic Hot Rolled Coil (FOB Midwest Mill) $/mt



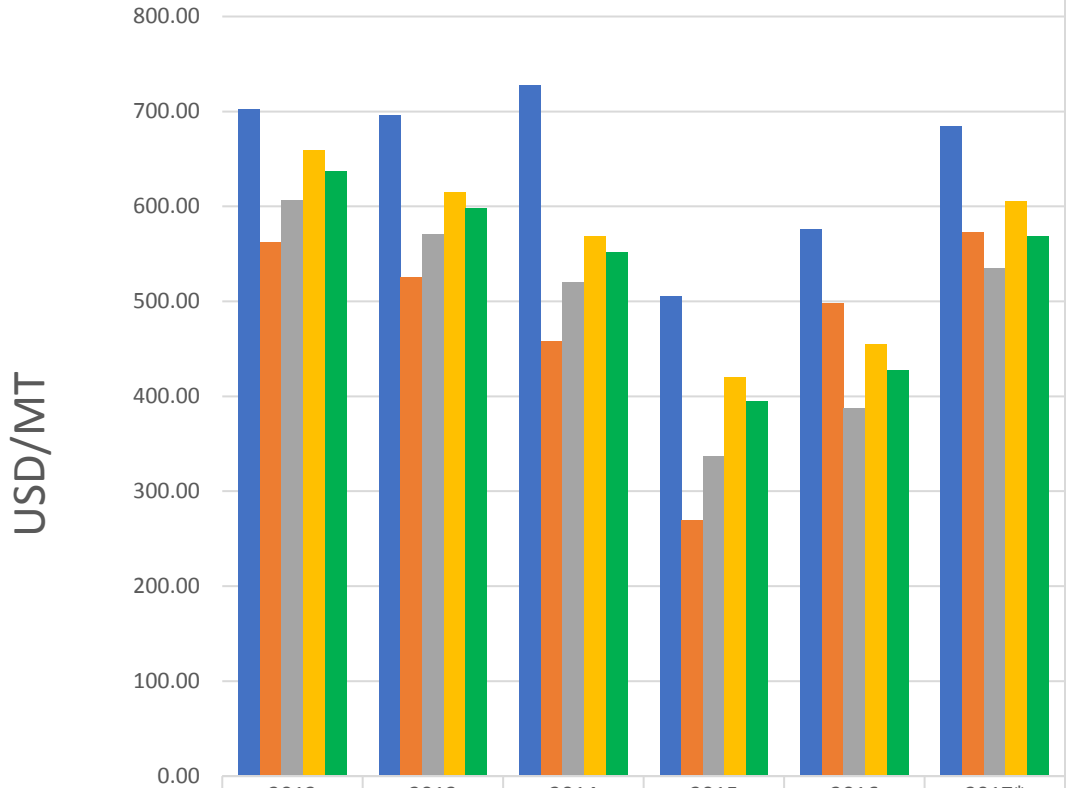
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
US HRC	674.27	597.22	962.51	538.89	680.56	822.62	701.84	696.20	727.78	505.65	575.68	684.11

Source: Platts (accessed from Bloomberg Financial) 2017 reflects the price through December (as of December 21, 2017.

U.S. prices for hot-rolled steel coil have been higher than in other countries since 2010. U.S. domestic benchmark prices for this product class dipped especially low in 2015 at $505.65/metric ton before recovering in 2016 to $575.68/metric ton. In 2016, the price of freight-on-board stowed China port steel hot-rolled coil was 14 percent lower than U.S. domestic hot-rolled coil. In the case of ASEAN nations, import prices for hot-rolled coil were 33 percent lower and North Europe domestic hot-rolled coil was 21 percent lower. Each region saw a price decline in 2015 (*see* Figure 6). U.S. prices remained higher than other regions' prices for this commodity level product throughout the period. Such higher prices are attributable to higher taxes, healthcare, environmental standards,

and other regulatory expenses. Moreover, lower prices in steel producing regions backed by state-subsidized enterprises adds pressure on U.S. competitors to export their steel products to the U.S. Again in 2016, all categories of steel in all countries continued to experience pressure to lower prices compared to what could be charged in 2012.

Figure 6. Regional Comparison of Hot Rolled Coil Bench Mark Prices (USD/MT)



	2012	2013	2014	2015	2016	2017*
USA Domestic Hot Rolled Coil	701.84	696.20	727.78	505.65	575.68	684.11
Steel Hot Rolled Coil (FOB Stowed China Port)	562.50	525.00	457.50	269.50	497.50	572.00
Asean Import Hot Rolled Coil	605.66	570.43	519.89	336.55	386.81	534.75
North Europe Domestic Hot Rolled Coil	659.54	614.41	568.41	420.19	455.29	604.90
South Europe Domestic Steel Rebar	636.59	598.34	551.66	394.11	427.68	568.53

Source: Bloomberg, Platts, Antaike. 2017 prices are through December 20, 2017.

In 2015, steel prices fell globally. As the OECD noted, the combined effect of weakening global steel demand, including in the United States, growing exports in many economies, and decreases in steelmaking costs led to a very sharp decline

in steel prices in 2015. Notwithstanding these effects, prices for steel in the U.S. remained substantially higher than in any other area. However, relative to prices between 2010 and 2013, prices are still relatively depressed.

Global excess steel production weakens the pricing power of U.S. steel producers. U.S. steel producers' costs are higher than the costs for producers in other regions due to higher taxes, healthcare, environmental, and other regulatory expenses. Higher U.S. steel prices incentivize importing lower-cost foreign steel. Moreover, excess production and lower prices in regions proximate to state subsidized enterprises displace purchases from market based steel exporters and add pressure on those market based suppliers to export to the U.S. The effect of global excess steel production on U.S. steel prices and import levels is discussed in greater detail in Appendix L.

5. Steel Mill Closures

U.S. steel mill closures continue eroding overall U.S. steel mill capacity and employment. Many U.S. steel mills have been driven out of business due to declining steel prices, global overcapacity, and unfairly traded steel. Since 2000, the United States has lost over 25 percent of its basic oxygen furnace facilities with the closure of six facilities: RG Steel in Sparrows Point, Maryland; RG Steel in Steubenville, Ohio; RG Steel in Warren, Ohio; ArcelorMittal in East Chicago, Indiana; ArcelorMittal in Weirton, West Virginia; and U.S. Steel in Fairfield, Alabama.

In addition, four electric arc furnace steel facilities have closed: Evraz in Claymont, Delaware; ArcelorMittal in Georgetown, South Carolina; Gerdau in Sand Springs, Oklahoma; and Republic Steel in Lorain, Ohio. Most recently, ArcelorMittal has announced the closure of its plate rolling mill in Conshohocken, Pennsylvania, because of sagging commercial sales attributed to surging imports of low-cost steel product and flat defense demand.[45]

The closures of these facilities have had a significant impact on the U.S. industrial workforce and local economies. RG Steel suffered three closures:

[45] Cowden, M. "Arcelor Mittal to Shut PA Plate Mill," American Metal market, September 18, 2017.

owned enterprises, U.S. steel producers have lost out on U.S. business opportunities. Some examples include Chinese companies providing steel for the eastern span of the San Francisco-Oakland Bay Bridge as well as the Alexander Hamilton Bridge over the Harlem River in New York.[53]

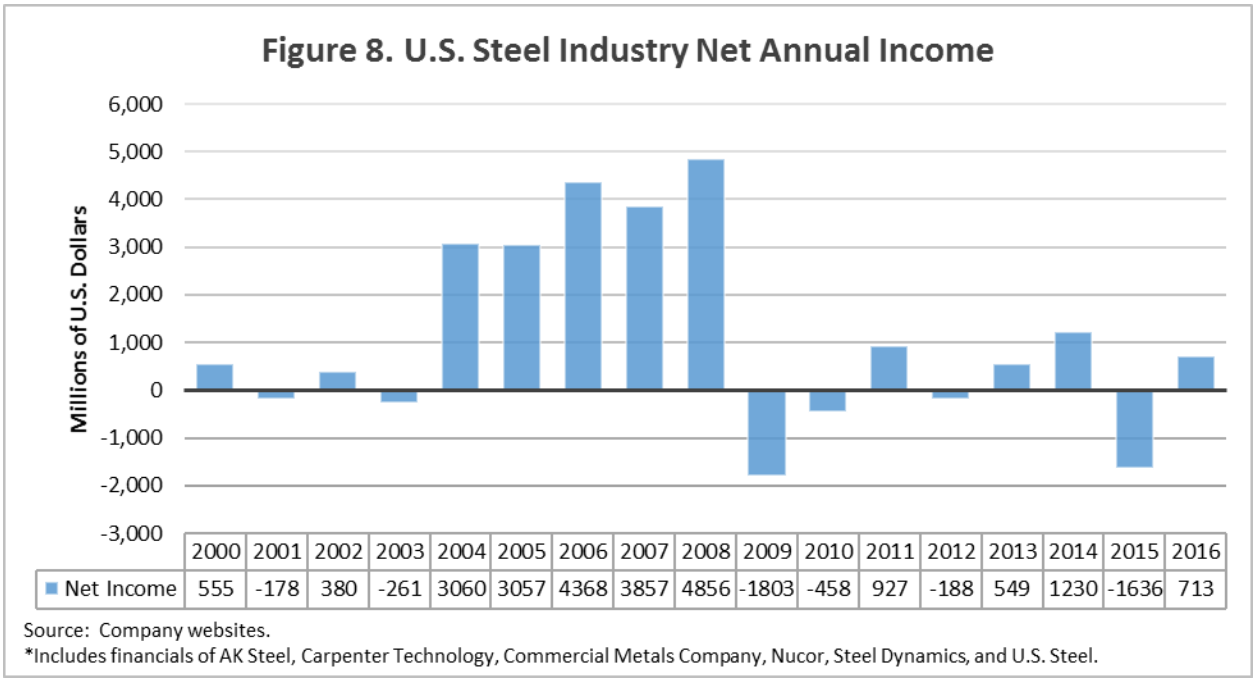
The Alliance for American Manufacturing's statement before the Congressional Steel Caucus (March 2017) identified three other recent infrastructure projects in New York that have used or will use heavily subsidized or possibly dumped foreign steel: the Verrazano-Narrows Bridge, LaGuardia Airport, and the Holland Tunnel. Two major U.S. cities – Boston and Chicago – have contracted with Chinese companies to build new subway cars, primarily constructed with imported steel, for their respective transportation systems.[54]

9. Financial Distress

Rising levels of imports of steel continue to weaken the U.S. steel industry's financial health. Years of running on low-profit margins or at a loss have weakened an industry that continues to face an ever-increasing wave of steel imports. The U.S. industry, as a whole, has operated on average with negative net income from 2009-2016. Net income for U.S.-owned steel companies has averaged only $162 million annually since 2010, challenging the financial viability of this vital industry (*see* Figure 8).

[53] New York Times, "Bridge Comes to San Francisco With a Made-in-China Label," June 25, 2011, http://www.nytimes.com/2011/06/26/business/global/26bridge.html

[54] Reuters, "China's CRRC lands $1.3 billion China rail car project," March 10, 2016, http://www.reuters.com/article/us-crrc-usa-idUSKCN0WC17I



The Stern School of Business at New York University calculates that U.S. steel industry participants in the last five years experienced negative net income of 17.8 percent. Compounded growth in revenue for the past five years in the steel industry has been a negative 7 percent.[55] The loss of revenue has caused U.S. steel manufacturers, both large and small, to defer or eliminate production facility capital investments and funding for research and development. Even though there was a slight uptick in net income for the first quarter in 2017 over the fourth quarter of 2016 margins remain poor compared to historic levels.

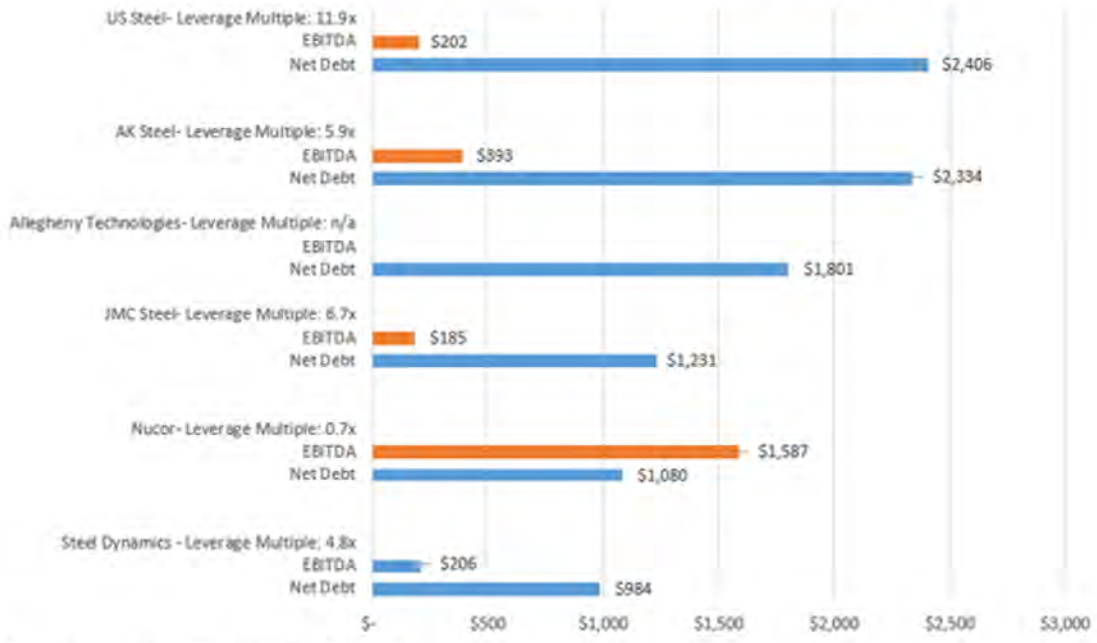
Not only have earnings before interest, taxes, depreciation, and amortization (EBITDA) been shallow for steel producers in the United States, many of them are burdened with high levels of debt, as much as 11.9 times of earnings for one major producer (*see* Figure 9).[56] While some companies are starting to pay down debt,

[55] "Historical (Compounded Annual) Growth Rates by Sector," Aswath Damodaran, New York University Stern School of Business, January 2017. (*see* http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile /histgr.html)

[56] Nucor operates mini-mills that use electric arc furnaces to produce high demand steel products primarily with recycled steel scrap. From a financial perspective, this business model allows Nucor to be highly price competitive, but the company produces a narrower range of flat steel products than integrated steel mills. The mini-mills can weather bad economic times because they have lower energy costs and can regulate production

others have not been able to do so primarily because of slack demand for domestically produced steel in the face of competition from imported products. Absent increases in steel production volume and pricing, one leading law firm specializing in insolvency, White & Case, observes that some steelmakers in the United States may soon have to renegotiate loan agreements to extend maturities; those that are not able to may have to consider Chapter 11 bankruptcy.[57]

Figure 9. U.S. Steel Industry Leverage Analysis (FY 2015)



Source: Debtwire, Bloomberg, NYSE, White & Case LLP
*EBITDA unavailable; debt is estimated

Note: Nucor has only electric arc furnaces (EAF). EAFs can be quickly stopped (or used for fewer shifts) and then restarted more easily than blast furnaces, where the furnace must be kept hot. This attribute makes Nucor slightly more flexible to adapt their production to demand and likely more profitable than large BOF producers. Nucor's key end-markets include nonresidential construction and energy.

JMC Steel is now part of Zekelman Industries

No capital intensive industry can survive with such poor margins over the longer term. The extensive leverage in the industry shown in Figure 9 adds to the

more easily. Basic oxygen furnace plants have higher fixed operating costs because they directly convert iron ore and other raw materials along with scrap into steel using more energy-intensive processes.

[57] "Losing Strength: U.S. Steel Industry Analysis," Scott Griesman, White & Case, April 16, 2016 (*see* https://www.whitecase.com/publications/article/losing-strength-us-steel-industry-analysis).

likelihood of further closures if the present high level of imports continues to force U.S. steel mills to operate well below profitable capacity utilization rates.

10. Capital Expenditures

The ability of U.S. manufacturers of iron and steel products to fund capital expenditures for new production plants as well as facility modernization and advanced manufacturing equipment has been limited by falling revenue and reduced profits. As shown in Figure 10, annual capital expenditures for companies making iron and steel ingot, bars, rods, plate and other semi-finished products wavered from $5.7 billion to $5.1 billion for 2010-2012, before ramping to $7.1 billion in 2013.

Figure 10. Annual Capital Expenditures

	Iron, Steel, and Ferroalloys Steel NAICS Codes 3311 and 3312 Combined	Millions of Current Dollars					
	Annual Capital Expenditures Survey	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
A.	Structures [New & Used Structures Combined]	1,026	1,322	1,564	1,157	724	580
B.	Equipment [New & Used Equipment Combined]	4,634	4,572	3,592	5,954	3,139	2,531
C.	Total Capital Expenditures	5,661	5,894	5,157	7,111	3,863	3,110
D.	(Unweighted) Payroll of Reporters / Total Payroll of Firms Classified in Industry group	86%	84%	80%	61%	86%	84%

Source: U.S. Census Bureau, Annual Capital Expenditures Survey, www.census.gov/programs-surveys/aces.html

Confronted with receding orders for products and declines in income in 2013, iron and steel companies operating production facilities in the United States started curtailing capital investments. Total capital spending dropped to $3.87 billion in 2014 and slid further to $3.11 billion in 2015 – 32 percent below 2010 levels of $5.66 billion.

The decline in capital expenditures reflected similar drops in net sales, which plummeted from $129.6 billion in 2014 to $102 billion in 2015. Income after taxes

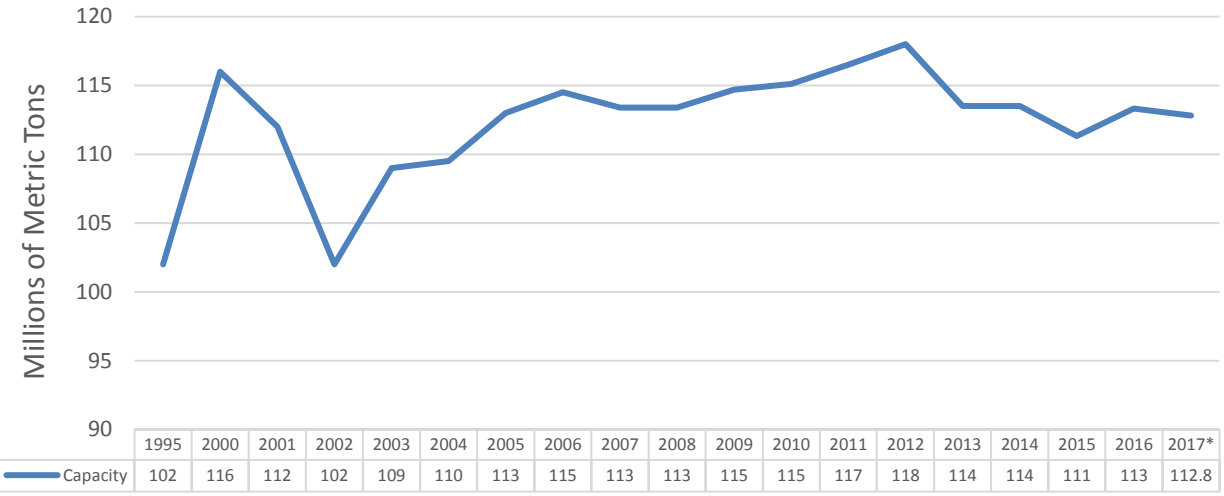
for U.S. iron and steel manufacturers fell from $2.48 billion in the same two-year period to a massive loss of $3.5 billion in 2015.

C. *Displacement of Domestic Steel by Excessive Quantities of Imports has the Serious Effect of Weakening Our Internal Economy*

1. Domestic Steel Production Capacity is Stagnant and Concentrated

According to the OECD, U.S. steel production capacity has remained stagnant at an average of approximately 114.3 million metric tons for more than a decade from 2006-2016 (*see* Figure 11). For 2016, the rated maximum capacity was 113 million metric tons for existing basic oxygen furnace and electric arc furnace facilities.

Figure 11. U.S. Annual Steel Production Capacity



	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*
Capacity	102	116	112	102	109	110	113	115	113	113	115	115	117	118	114	114	111	113	112.8

Source: Organization for Economic Cooperation and Development (OECD), 2017 capacity is a forecast

[redacted]

products, including tire rod steel used in military vehicles and trucks.[62] While the United States has many allies that produce steel, relying on foreign owned facilities located outside the United States introduces significant risk and potential delay for the development of new steel technologies and production of needed steel products, particularly in times of emergency. The Secretary notes that the authority for the Department of Defense to place its order ahead of commercial orders on a mandatory basis does not extend to foreign-owned facilities outside the United States.[63]

In the case of critical infrastructure, the United States is down to only one remaining producer of electrical steel in the United States (AK Steel – which is highly leveraged). Electrical steel is necessary for power distribution transformers for all types of energy – including solar, nuclear, wind, coal, and natural gas – across the country. If domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the U.S. will become entirely dependent on foreign producers to supply these critical materials and products.[64] Without an assured domestic supply of these products, the United States cannot be certain that it can effectively respond to large power disruptions affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner.

2. Production is Well Below Demand

Demand for steel products in the United States (*see* Figure 15), increased from 100.1 million metric tons in 2011 to 117.5 million metric tons in 2014, then declined to 99.8 million metric tons in 2016. Demand in 2017 is projected to rebound to 107.7 million metric tons. During the 2011 to 2016 period, U.S. production of steel products dropped from 86.4 million metric tons in 2011 to 78.6 million metric tons in 2016, with a four percent increase expected in 2017.

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[62] Letter from Defense Logistics Agency, Columbus, OH to BIS/OTE, August 1, 2017.

[63] *See* Defense Priorities and Allocations System Program (DPAS), www.dcma.mil/DPAS

[64] United States Congress, Congressional Steel Caucus. Statement of Roger Newport, CEO, AK Steel Corporation (on behalf of the American Iron and Steel Institute). March 29, 2017.

For the six-year period, U.S. domestic steel production supplied only 70 percent of the average demand, even though available U.S. domestic steel production capacity during that period could have, on average, supplied up to 100 percent of demand (U.S. steel producers would be running at 92 percent capacity utilization for this period) with approximately 13 million metric tons of additional capacity remaining.

Figure 15. U.S. Steel Market Snapshot (millions of metric tons)

	2011	2012	2013	2014	2015	2016	2017 YTD	*2017 Annualized*
Total Demand for Steel in U.S. (Production + Imports - Exports)	100.1	106.6	104.6	117.5	104.9	99.8	80.7	***107.3***
U.S. Annual Capacity	116.5	118.0	113.5	113.5	111.3	113.3	---	**---**
U.S. Annual Production (Liquid)	86.4	88.7	86.9	88.2	78.8	78.6	61.5	***81.9***

Sources: United States Department of Commerce, Bureau of the Census. American Iron and Steel Institute. Calculations based on industry and trade data.

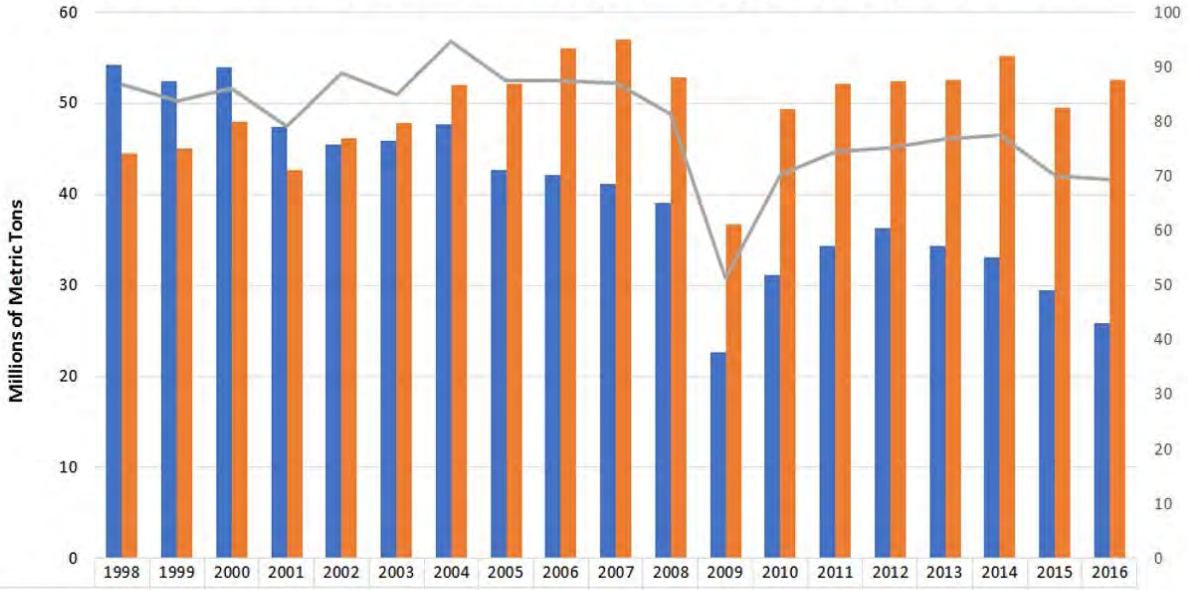
3. Utilization Rates are Well Below Economically Viable Levels

Overall, steel mill production capacity utilization has declined from 87 percent in 1998, to 81.4 percent in 2008, to 69.4 percent in 2016 (*see* Figure 16). For the most recent six-year period (2011- 2016), the average utilization rate was 74 percent.

Industry analysts note that utilization of 80 percent or more is typically necessary for sustained profitability, among other factors.[65] For most capital and energy-intensive U.S. steel producers, capacity levels of 80 percent or higher are required to maintain facilities, carry out periodic modernization, service company debt, and fund research and development.

[65] Market Realist, "Why steel investors are mindful of capacity utilization rates," October 2, 2014, http://marketrealist.com/2014/10/investors-mindful-capacity-utilization-rate/. *See also* http://marketrealist.com/2015/09/upstream-exposure-impact-steel-companies/

Figure 16. U.S. Crude Steel Production by Furnace Type and Capacity Utilization



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Basic Oxygen	54.2	52.3	54.0	47.4	45.4	45.9	47.7	42.7	42.1	41.1	39.1	22.7	31.1	34.3	36.3	34.3	33.0	29.4	25.9
Electric Arc Furnace	44.5	45.1	47.9	42.7	46.1	47.8	52.0	52.2	56.1	57.0	52.8	36.7	49.4	52.1	52.4	52.6	55.2	49.4	52.6
Capacity Utilization (%)	86.8	83.8	86.1	79.2	88.8	84.9	94.6	87.5	87.5	87	81.4	51.2	70.4	74.4	75.2	76.7	77.5	70.1	69.4

Source: American Iron and Steel Institute

When steel factory utilization falls, costs per unit of steel product rises, reducing profit margins and product pricing flexibility. Higher capacity utilization usually results in lower per-unit product costs and higher overall profit.[66] Over 80 percent is a healthy capacity utilization rate and a rate at which most companies would be profitable.

The U.S. steel industry uses 80 percent as a benchmark for minimum operational efficiency. Moreover, the steel industry is capable of reaching and sustaining 80 percent capacity utilization or higher. During the 2002-2008 period, U.S. steel companies operated at an average 87.4 percent level.[67]

These industry assessments are consistent with a 1983 report on "Critical Materials Requirements in the U.S. Steel Industry" in which the Department

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66 Houston Chronical, "Capacity Utilization and Effects on Product and Profit," http://smallbusiness.chron.com/capacity-utilization-effects-product-profit-67046.html; steel industry sources.

67 http://marketrealist.com/2015/09/upstream-exposure-impact-steel-companies.html ("It's important to note how changes in capacity utilization rates impact a company's earnings. For example, we see a big jump in earnings when utilization rates improve from 80 percent to 85 percent. However, incremental benefits are lower when utilization rates increase from 90 percent to 95 percent.").

THE EFFECT OF IMPORTS OF STEEL ON THE NATIONAL SECURITY

U.S. Department of Commerce
Bureau of Industry and Security
Office of Technology Evaluation

APPENDICES

January 11, 2018

Testimony of Roger K. Newport
Chief Executive Officer
AK Steel Corporation

Thank you Secretary Ross. My name is Roger Newport, and I am the CEO of AK Steel Corporation. I want to thank you for the opportunity to testify on behalf of AK Steel and our 8,500 U.S.-based employees.

AK Steel welcomes the Department of Commerce's Section 232 investigation of the serious threat posed by imported steel to our national security. For decades, the steel industry has battled global overcapacity and the oversupply of U.S. imports, many of them dumped and subsidized. Just since the beginning of 2015, over 14,000 steel workers have been laid off and numerous production facilities have been idled, including AK Steel's blast furnace and steelmaking operations in Ashland, Kentucky. Unfortunately, unfairly traded imports remain a severe threat to the long-term viability of the domestic steel industry.

AK Steel is the only company in the United States that produces a combination of flat-rolled carbon steel, stainless steel, and electrical steel products. While I can certainly speak to the adverse impact of imports on each of these types of steel, I would like to focus my remarks today on electrical steel. AK Steel is the sole domestic producer of grain-oriented electrical steel, or GOES, which is used in cores and core assemblies for the production of electrical transformers. Transformers are a key component of our nation's electricity grid, from the large step-up transformers that transmit power across the entire grid, to the smaller pole- and pad-mounted transformers that deliver power to individual homes and businesses. AK Steel is also the sole domestic producer of high-end non-oriented electrical steel, or NOES, products. NOES

is also critical for the electrical grid, as it forms the heart of massive generators that actually create electrical energy.

About 2,000 highly-skilled workers melt and finish electrical steel products at our Butler Works facility in Pennsylvania and finish electrical steel at our Zanesville Works facility in Ohio. AK Steel also conducts extensive electrical steel research and development at our state-of-the-art Research and Innovation Center in Middletown, Ohio.

While we strongly believe that electrical steel plays a crucial role in our national security, so do many others. Pursuant to policy directives issued by both President Obama and President George W. Bush, the Department of Energy has identified electricity transmission systems as infrastructure that is critical to our national security and that requires urgent attention. The government has identified equipment failure and aging infrastructure in the U.S. as threats to our national security. Because virtually all households and businesses rely on electricity, the security and long-term viability of U.S. electrical infrastructure is a critical, national imperative.

A secure, reliable supply of electrical steel is necessary to maintain the electrical grid. Major blackouts, such as the one in San Francisco last month that shut down the financial center of the city, demonstrate that the lack of reliable electrical grid infrastructure is a major threat to our national economy. Major blackouts may occur as a result of grid obsolescence, severe weather events like Hurricane Katrina or Superstorm Sandy, or cyber, terrorist or other attacks on our electrical infrastructure. A secure, domestic source of electrical steel is more important than ever before. Fortunately, AK Steel has sufficient production capacity to meet current and future estimated demand within the United States.

Due to competition from dumped and subsidized imports, the only other U.S. producer of GOES, Allegheny Technologies, shuttered a plant and discontinued GOES production in 2016.

High-end electrical steel is an incredibly difficult product to manufacture, as it requires a significant amount of dedicated, capital equipment and a sophisticated, well-trained workforce. Therefore, if AK Steel were to exit the market, there would be no operational electrical steel manufacturing equipment in the United States, the specialized labor and related expertise in operations would be lost, and many of AK Steel's talented operators and researchers would either re-locate to other businesses, industries and/or foreign countries, or become unemployed.

AK Steel strongly supports Presidential action to stem the surge of imported electrical steel. We are, however, very concerned that importers will simply side-step the relief that covers steel by using foreign electrical steel to build cores and transformers abroad, then import those cores and transformers into the United States. Therefore, to effectively address the vital national security interests of the United States and to protect the domestic electrical grid for the long-run, the Department of Commerce must include imported cores and transformers in any relief that covers imports of electrical steel. Without addressing this supply chain issue, any remedy on electrical steel will be easily circumvented. Keeping imports of electrical steel, cores, and transformers at a reasonable level would balance the interests of protecting our national security with allowing a reasonable level of imports to meet the ongoing needs of buyers of these materials. Complete reliance on imports for these critical products, however, would ultimately lead to dependency on foreign sources for the materials needed to maintain and modernize the electrical grid.

Thank you again for the opportunity to testify. I would be pleased to answer your questions.

[END]

Uses of Steel for Critical Infrastructure

Pursuant to Presidential Policy Directive 21 (PPD-21), there are 16 designated critical infrastructure sectors in the United States, many of which use high volumes of steel (*see* Figure I1).[1]

Figure I1. DHS Critical Infrastructure Sectors – Use of Steel

	Sectors		***Steel End-Uses***
1.	Chemical Production		Centrifuges, Conduit, Fire Suppression, Flange Heaters, Incubators, Piping, Stainless Steel Heaters, Storage Tanks, Safety Showers
2.	Commercial Facilities		Structural Beams, Electrical Conduit, Kitchen Equipment, Elevators, Escalators, Waste Pipes, Metal Framing and Studs, Machinery, Valves, Manufacturing Plants, Chemical Processing Plants
3.	Communications		Antennas, Radio/TV Antenna Masts, and Transmissions Towers, Tower Cables
4.	Critical Manufacturing		Blast Furnaces, Rolling Mills, Extrusion, Casting, Forging Production Plants; Fabrication Facilities (i.e. Bend, Cut, Mold, and Stamp steel materials). Specialty Metals Production (i.e. Stainless Steel, Alloy Steel, Magnetic/Electronic, High Strength Alloy Steel, Carbon Steel), Plates, Hot Rolled Round Bar, Cold Finished Steel Bars, Steel Wire, Rebar
5.	Dams		Reinforced Dams and Reservoirs (Rebar, Piping, Structural Supports, Flood Gates, Water Release Gates and Valves, Turbine Supports)
6.	Defense Industrial Base		Armored Personnel Carriers, Heavy Weapons (i.e. Cannon, Machine Guns, Missiles), Humvees, Jet Aircraft, Submarines, Munitions, Aircraft Engines, Fighting Vehicles, Tanks, Ship Propulsion Systems
7.	Emergency Services		Ambulances, Fire Trucks, Helicopters, Portable/Temporary Shelters
8.	Energy		Petroleum Refineries (i.e. Specialty Pipe, Valves, Fittings), Oil and Gas Pipelines (i.e. Steel Plate, Heavy Gauges), Storage Tanks, Electricity Power Generating Plants, Electric Power Transmission Towers, Power Distribution Grids and Stations, Transformers, Utility Distribution Poles, Transformer Cores, Wind Turbines

[1] Department of Homeland Security, "Critical Infrastructure Sectors," https://www.dhs.gov/critical-infrastructure sectors (accessed May 2017).

9.	Financial Services		Steel Safes, Bank Vaults, Lockers, Armored Trucks, Building Doors and Barriers
10.	Food and Agriculture		Canned Goods, Harvesters, Mechanical Planters, Balers, Tractors, Storage Silos, Partitions, Gates, Watering Systems, Fencing Systems (i.e. Gates, Barb Wire, Posts)
11.	Government Facilities		Structural Steel, Elevators/Escalators, Furniture, Piping, Vehicle, Barriers, Vault Doors, Barracks, Storage Buildings, Shelving, Records Storage, Fences
12.	Health Care/Public Health		Elevators/Escalators, Hospital Framing, Structural Supports, Roofing, Operating Tables, Furniture, Wheel Chairs, Bed Frames, Waste Pipes and Fire Suppression Pipe, Medical Devices (i.e. Drug Delivery Needles, Surgical Pins and Screws)
13.	Information Technology		Data Center Cooling Systems, Data Center Structural Supports, Electronic System Racks, Electrical Conduit, System Cabinets,
14.	Nuclear Reactors, Materials, and Waste Sector		Structural Steel, Pressurizers, Reactor Pressure Vessels, Safety Water Tanks, Containment Vessels, Primary Pumps and Steam Water Lines, Steam Generator Components, Cooling Towers, Overhead Cranes for Reactor Maintenance.
15.	Transportation Systems		Airports, Aircraft, Bridges, Highways, Railroads, Mass Transit Systems, Seaports, Navigation Systems, Shipbuilding, Trucks, Trailers, Boats, Ships
16.	Water and Waste Water Systems		Water Distribution Pipes, Storage Tanks and Towers, Valves, Storm Water Distribution (i.e. Culverts, Flood Control Gates), Waste Water and Sewage Treatment Facilities
Note: Presidential Policy Directive (PPD-21) on Critical Infrastructure Security and Resilience, issued in February 2013, identified 16 industrial sectors. *See*: https://www.dhs.gov/critical-infrastructure-sectors.			
Source: Bureau of Industry and Security, multiple industrial references, http://www.ssina.com/news/releases/pdf_releases/steel_and_national_defense_0107.pdf			

These 16 sectors require reliable supplies of steel for new construction as well as maintenance and repairs.[2]

[2] End-use markets for U.S. steel: According to AISI industry statistics about end use markets for U.S. steel shipments in 2015, the majority (2/3) of U.S. produced steel mill products were sold by steel companies directly to end use markets. Construction consumed approximately 42 percent of steel sales. Infrastructure and commercial construction projects increase the demand for structural steel and cut length plates. The automotive market comprises 27 percent of U.S. sales. Automotive is the largest market category for sheet products and is also increasingly the market for high strength steels. Other key markets include machinery (9 percent), containers (4 percent), and pipe and energy (7 percent) by weight for sales.

1. **Flat Products: Produced by rolling semi-finished steel through varying sets of rolls. Includes sheets, strips, and plates. Used most often in the automotive, tubing, appliance, and machinery manufacturing sectors.**

Similar to defense, flat steel products have a wide range of applications in commercial and industrial systems. Plate products find application in a variety of places, such as storage tanks, ships and railcars, and large diameter pipe and machinery parts.

In the commercial sector steel plate is used for offshore drilling rigs, construction and mining equipment, bridges, tool and die production, and petro-chemical applications.

Pipelines, the mode by which petroleum and natural gas is most often delivered to refineries and then on to consumers, are made from technically demanding steel plate in wide and very heavy gauges.[6]

The electrical grid of the United States relies on the availability specially engineered conventional and high-permeability flat electrical steel. Domain-refined grain-oriented electrical steels (GOES) is the key component of cores and core assemblies in electrical transformers used to control the distribution of electricity.

GOES is used in both the large step-up transformers that power the electrical grid by enabling the transport of electricity over great distances and in smaller step-down transformers that power individual neighborhoods and businesses.[7]

Non-oriented electrical steel (NOES) is also critical for the electrical grid, because it is the used to make the large cores for electrical power generators. In addition, NOES is used in industrial applications and motors for hybrid and electric automobiles. Importantly, there is today only one remaining domestic producer of GOES and NOES in the United States: AK Steel. It is also the only producer of these products in North America.[8]

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[6] American Iron and Steel Institute (AISI), www.steel.org

[7] AISI

[8] AISI

Global Excess Capacity in Steel Production

The excess capacity situation for steel is a global problem, and steel-producing nations have committed, in principle, to work together on possible solutions. In December 2016, G20 economies and interested Organization for Economic Cooperation and Development (OECD) members formally launched the Global Forum on Steel Excess Capacity (Global Forum), a multilateral effort mandated by G20 Leaders during the September 2016 Hangzhou Summit to enhance communication and cooperation and to take effective steps to address the global excess capacity challenge so as to enhance market function and encourage adjustment. The Global Forum brings together more than 30 economies representing more than 93 percent of the world's steel production.

Consistent with the G20 Leaders' mandate for increased information sharing, one of the first tasks of the Global Forum was to develop a mechanism to exchange data on crude steel capacity, as well as subsidies and other government supports that contribute to steel excess capacity. All 33 members of the Global Forum participated to some degree in the information-sharing exercise, but much work remains, including with respect to the completeness, review and analysis of information provided.

The Hangzhou mandate was highlighted at the G20 Hamburg Summit in July 2017 where Leaders called on members to rapidly develop concrete policy solutions that reduce excess steel capacity and to produce a substantive report with such solutions by November 2017.

In response to both the Hangzhou and Hamburg mandates, the Global Forum developed a set of six principles to serve as the basis for policy action by members which include, among other measures, enhancing market function by refraining from market-distorting subsidies and government support measures, fostering a level playing field in the steel industry and ensuring market-based outcomes, as well as encouraging adjustment. With these principles as guidance, the Global Forum outlined a series of recommendations for concrete policy solutions to reduce excess capacity and enhance market function in the steel sector. These voluntary policy recommendations are contained in the report concluded at a November 30, 2017

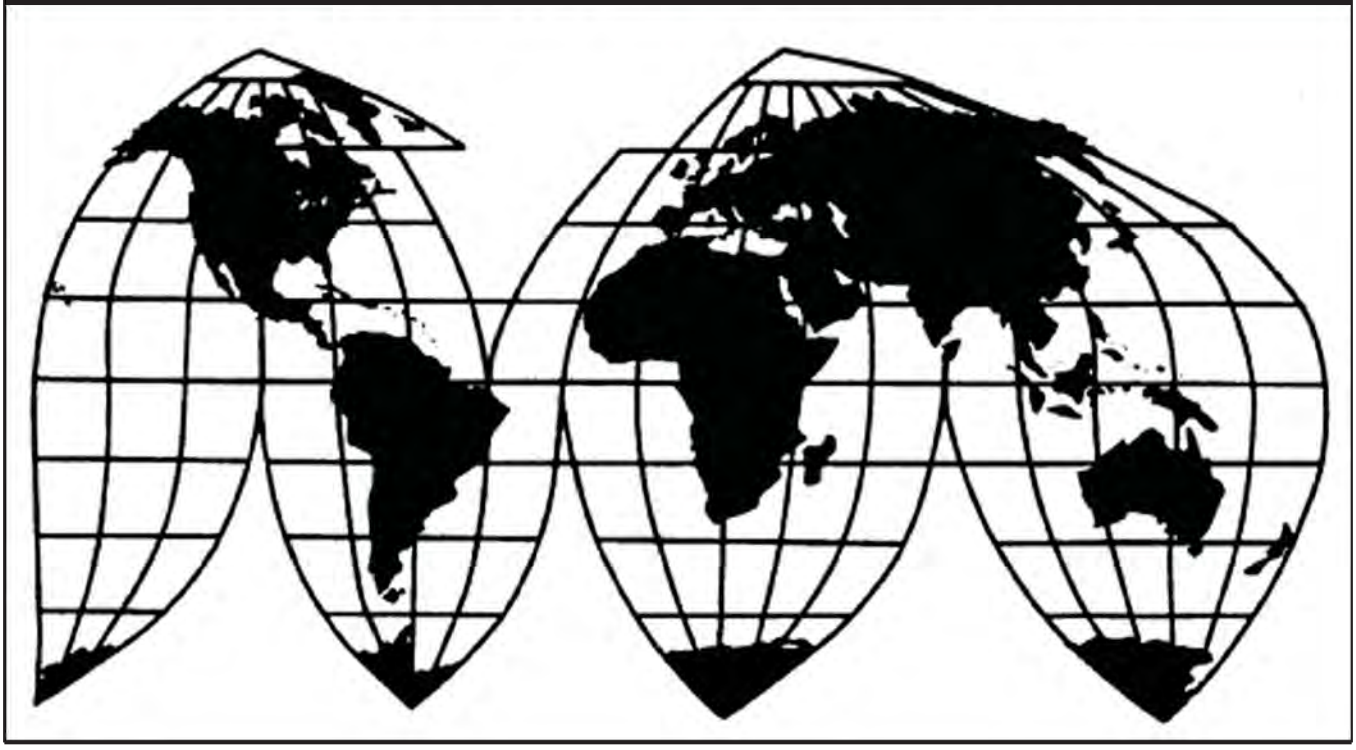
EXHIBIT 3

Grain-Oriented Electrical Steel from Germany, Japan, and Poland

Investigation Nos. 731-TA-1233, 1234, and 1236

Publication 4491 **September 2014**

U.S. International Trade Commission



Washington, DC 20436

dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.[15] The Commission looks for clear dividing lines among possible like products and disregards minor variations.[16] Although the Commission must accept Commerce's determination as to the scope of the imported merchandise that is subsidized or sold at less than fair value,[17] the Commission determines what domestic product is like the imported articles Commerce has identified.[18]

B. Product Description

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

> GOES. GOES is a flat-rolled alloy steel product containing by weight at least 0.6 percent but not more than 6 percent of silicon, not more than 0.08 percent of carbon, not more than 1.0 percent of aluminum, and no other element in an amount that would give the steel the characteristics of another alloy steel, in coils or in straight lengths. The GOES that is subject to this investigation is currently classifiable under subheadings 7225.11.0000, 7226.11.1000, 7226.11.9030, and 7226.11.9060 of the Harmonized Tariff Schedule of the United States (HTSUS). Although the HTSUS subheadings are provided for convenience and customs purposes, the written description of the scope of these investigations is dispositive. Excluded are flat-rolled products not in coils that, prior to importation into the United States, have been cut to a shape and undergone all

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(…Continued)
manufacturing facilities, production processes, and production employees; and, where appropriate, (6) price. *See Nippon*, 19 CIT at 455 n.4; *Timken Co. v. United States*, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

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

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

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

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

punching, coating, or other operations necessary for classification in Chapter 85 of the HTSUS as a transformer part (*i.e.*, laminations).[19]

GOES is sold in either sheet or strip form and either in coils or in straight lengths. GOES, which typically contains approximately 3.2 percent by weight of silicon, is subject to specialized rolling and annealing (heat treatment) processes, which produce grain structures uniformly oriented in the rolling (lengthwise) direction of the steel sheet. This uniformly oriented grain structure permits the steel sheet to conduct a magnetic field with a high degree of efficiency in the direction of rolling compared with other steels, such as non-oriented silicon electrical steel ("NOES"). As a result, GOES has superior magnetic properties compared with NOES, both in terms of higher permeability and lower core loss.[20] Both domestic and imported GOES are produced in compliance with specifications issued by ASTM International ("ASTM")[21] or proprietary specifications.

The domestic industry produces a wide range of GOES, including conventional GOES in standard gauges (thicknesses), ranging from 0.007 inch (0.18 mm) through 0.0138 inch (0.35 mm), and high-permeability GOES in two standard thicknesses. The conventional products in the standard thicknesses are often referred to by the U.S. grade or American Iron and Steel Institute ("AISI") grades M2 through M6.[22] ASTM standards can be matched with the U.S. grade nomenclature by the product thickness. Within each type of GOES, magnetic characteristics may differ in that the same product manufactured by two producers may have different average core losses.[23]

GOES is used primarily in the production of laminated cores for large- and medium-sized electrical power transformers and distribution transformers.[24] Because thinner laminations

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[19] 79 Fed. Reg. 42501, 42503 (July 22, 2014).

[20] "Permeability" refers to the ease with which magnetic lines of force distribute themselves throughout (flow through) a material, or more generally, the ease of magnetization of the GOES product in response to a magnetic field. "Core loss" refers to the measured amount of electrical energy that is lost as heat from eddy currents generated when a magnetic flux flows through the steel. CR at I-18 n.33, PR at I-14 n.33.

[21] ASTM International was previously known as the American Society for Testing and Materials. Specification ASTM A876/A876M sets maximum core-loss standards by ASTM grade and by testing standards for conventional GOES, high-permeability GOES, and laser-scribed high-permeability GOES. CR at I-19 n.34, PR at I-14 n.34.

[22] The U.S. GOES industry continues to use the "M" grades as a legacy nomenclature. The U.S. grade nomenclature was developed by AISI, which was responsible for establishing the grading and testing standards for GOES until the 1980s when ASTM undertook the responsibility. CR at I-19 n.35, PR at I-14 n.35.

[23] CR at I-19, PR at I-14 – I-15.

[24] A transformer is an electrical apparatus that transfers electrical energy from one electrical circuit to another without any direct electrical connection by the electromagnetic induction of an alternating electrical current between two or more magnetically coupled coils or windings. Transformers are used to either increase (step-up) or decrease (step-down) the voltage (electrical potential) of an alternating electrical current within the circuitry of electrical equipment or systems. CR at I-21 n.39, PR at I-15 n.39.

yield lower core losses in transformers, thinner gauge GOES is often preferred despite the added cost for both the steel and the manufacturing of the transformer core. Laminations for transformer cores are oriented within transformers to take advantage of the directional magnetic properties of the steel.[25]

The directional magnetic properties of the GOES allow for the transformation of the electrical potential (voltage) for an alternating electrical current. Power transformers are designed to raise the voltage of electrical current from the level at which it is generated by an electric power plant to a higher level for more efficient transmission and to lower the voltage to levels more suitable for local distribution. Distribution transformers, in turn, further lower the electrical voltage to levels suitable for commercial and residential consumers.[26]

In addition to differences in thickness, GOES is produced in different levels of magnetic permeability, distinguished by the size and orientation precision of the grains within the steel. "Conventional" GOES has smaller but less precisely oriented grains, while "high-permeability" GOES has more precisely oriented but larger grains. High-permeability product allows a transformer to operate at a higher level of flux (flow) density[27] than the conventional product, thus permitting a transformer to be smaller and have lower energy operating losses. High-permeability product is also produced as a domain-refined (surface-treated) type that has even lower core loss at high flux density. Domain refinement occurs by scribing thin lines onto the surface of the steel, which subdivides larger oriented grains into smaller ones to produce "domain-refined GOES," using laser scribing, mechanical scribing or electrolytic etching. Product undergoing laser scribing does not retain its enhanced magnetic characteristics when it is annealed (heat treated) to relieve internal stresses. As a result, laser-scribed GOES (or "non-heat-proof GOES") is not suitable for producing wound-core transformers,[28] which require superior core-loss properties, but must undergo heat treatment to relieve internal stresses (which increase core losses) accumulated from the manufacturing process. By contrast, domain-refined GOES produced by mechanical scribing or electrolytic etching (*i.e.*, "heat-proof GOES") retains its enhanced magnetic characteristics even through stress-relief treatment. There is no known production of mechanically scribed or electrolytically etched heat-proof GOES in the United States.[29]

[25] CR at I-21, PR at I-15.

[26] CR at I-21, PR at I-15.

[27] "Flux density" generally refers to the total number of magnetic lines of force per unit area. It can also be understood as the density of magnetic lines of force, or magnetic flux lines, passing through a specific area. CR at I-23 n.43, PR at I-18 n.43.

[28] Electrical transformers are produced with either stacked or wound cores. Stacked cores are used in larger distribution and power transformers, while wound cores are used in smaller distribution transformers that step down the voltage from the transmission line and provide power. CR at I-24 – I-25, PR at I-19- I-20.

[29] CR at I-23 – I-24, PR at I-18.

C. Arguments of the Parties

Petitioners argue that the Commission should define the domestic like product as all GOES, including both conventional and high-permeability GOES, which is coextensive with the scope of the investigations, as it did in its preliminary determinations.[30]

Two respondents, NLMK and JFE Steel, argue that the Commission should find multiple domestic like products. NLMK argues, as it did in the preliminary phase of the investigations, that due to changes in applicable Department of Energy ("DOE") regulations, explained below, a clear dividing line exists between lower grade GOES and higher grade GOES, the latter of which can be used to meet the new DOE regulations.[31]

JFE Steel contends that the Commission should treat heat-proof domain-refined GOES as a separate like product from other forms of GOES. It claims that the physical characteristics of heat-proof domain-refined GOES and other forms of GOES make them quite different. Conventional GOES cannot be used in high-efficiency, low core loss transformer applications, and domain-refined GOES using a laser scribing process cannot be annealed and, therefore, cannot substitute for heat-proof domain-refined GOES.[32] Moreover, heat-proof domain-refined GOES cannot be substituted with other types of GOES.[33] JFE Steel also maintains that because petitioners do not produce heat-proof domain-refined GOES, manufacturing facilities for the two types of products are distinct and customers perceive them differently.[34] JFE Steel also argues that the prices of heat-proof domain-refined GOES are higher than the prices of any other type of domain-refined GOES.[35]

D. Domestic Like Product Analysis

In its preliminary determinations, the Commission defined a single domestic like product that was coextensive with the scope. In terms of physical characteristics and end uses, it found that all types of GOES, whether conventional or high-permeability, are flat-rolled alloy steel products having a grain-oriented structure that permits the product to conduct a magnetic field in a specific direction with a high degree of efficiency. It also found that all types of GOES share common chemistry and that GOES is used primarily in the production of laminated cores for large and medium-sized electrical power transformers and distribution transformers.[36] In terms

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[30] Petitioners' Prehearing Brief at 2-3.

[31] NLMK's Prehearing Brief at 6.

[32] JFE Steel's Prehearing Brief at 62-63; *see* JFE Steel's Posthearing Brief, Responses to Commissioners' Questions at 32.

[33] JFE Steel's Prehearing Brief at 64.

[34] JFE Steel's Prehearing Brief at 64-66; JFE Steel's Posthearing Brief at 12. Petitioners argue that the Commission cannot legally define heat-proof, domain-refined GOES to be a separate like product because it is not produced by the domestic industry. Petitioners' Posthearing Brief, Exh. 1 at 54.

[35] JFE Steel's Prehearing Brief at 66; JFE Steel's Posthearing Brief at 14.

[36] *Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia*, Inv. Nos. 701-TA-505 and 731-TA-1231-1237 (Preliminary), USITC Pub. 4439 (Nov. 2013) ("Preliminary Determinations"), at 9.

conventional grades,[108] while most shipments of the subject imports were high-permeability products.[109] We find that the record indicates, overall, that the domestic like product and the subject imports are at least moderately substitutable.

4. Other Conditions

Although price is an important factor in purchasing decisions, quality and availability are other top factors.[110] While quality was most frequently cited by purchasers as their top factor in purchasing GOES, price was second. Seven of 21 responding purchasers indicated that price was the most important factor in considering a purchase, and 17 of 21 purchasers indicated that price was one of the three most important purchasing factors.[111]

Raw material costs comprised *** to *** percent of U.S. producers' cost of goods sold during 2011 to 2013. The domestic industry's per-ton raw material costs declined between 2011 and 2013, but were higher in interim 2014 than in interim 2013. Steel scrap and silicon are the predominant material inputs in GOES. Prices for ferrosilicon and ferrous scrap have declined since January 2011, decreasing overall by 10 and 15 percent, respectively, by June 2014. Aside from seasonal fluctuations, the industrial price of electricity generally remained at the same level since January 2011.[112]

U.S. producers and importers reported selling GOES mostly through contracts. U.S. producers reported making almost *** percent of their sales using short term contracts and just over *** percent using long term contracts, with the remainder being spot sales. Most importers reported making the bulk of their sales with short term contracts.[113] U.S. producers use raw material surcharges in contract prices, with the *** primary surcharge elements being ***.[114] Importers reported that they do not impose surcharges.[115]

GOES is sold to distributors, slitters/laminators, and end users. U.S. producers sold mainly to end users during the period of investigation, as did importers of subject product from China, Japan, Korea, Poland, and Russia. Particularly with respect to imports from ***, certain

[108] Indeed, conventional grade M-3 alone accounted for *** percent of the domestic industry's U.S. shipments of GOES in 2013. CR/PR at Table III-7.

[109] *Compare* CR/PR at Table III-8 *with* Tables IV-5 – IV-11.

[110] CR at II-23, PR at II-13 – II-14, CR/PR at Table II-5.

[111] CR at II-23, PR at II-14, CR/PR at Table II-5. Eleven of 21 responding purchasers reported that quality was the most important factor in considering a purchase, and 20 of 21 purchasers reported that quality was one of the three most important purchasing factors. CR at II-23, PR at II-14, CR/PR at Table II-5.

[112] CR at V-1 – V-2, PR at V-1.

[113] CR at V-3 – V-4, PR at V-2 – V-3; *see* ABB's Posthearing Brief at 5-6 n.17, 12 (ABB's contracts to purchase imported GOES ***).

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

[115] *See* ABB's Posthearing Brief at 5-6 n.17, 12.

end users were themselves the importers of record.[116] Importers of subject merchandise from Germany sold GOES primarily to slitters and laminators, while importers of subject product from Czech Republic sold *** of their product to slitters and laminators.[117] While there have been *** direct exports of GOES from China to the United States since January 2011, GOES was exported from China to processors located in Canada and Mexico that perform slitting operations to customer specifications, store the slit GOES in facilities for resale to the United States, and re-sell the slit GOES to purchasers in the United States for just-in-time delivery.[118]

All responding purchasers but one require their GOES suppliers to be or become certified. Purchasers reported that the amount of time required to qualify a new supplier ranged from 15 to 360 days, with most certifications requiring 100 to 180 days. Six purchasers reported instances since 2011 when either a domestic or foreign supplier had failed in its attempt to qualify product, or a supplier had lost its approved status. *** were each named by three purchasers as failing to qualify, along with *** and the ***.[119]

C. Volume of Subject Imports

Section 771(7)(C)(i) of the Tariff Act provides that the "Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States, is significant."[120]

The volume of cumulated subject imports increased between 2011 and 2013. It was 26,234 short tons in 2011, 31,182 short tons in 2012, and 29,161 short tons in 2013.[121] Most of the change in the volume of subject imports between 2011 and 2013 occurred as a result of the increase in shipments of high-permeability GOES, particularly the heat-proof domain-refined GOES uniquely supplied by Japan. As previously stated, during the period, U.S. GOES demand

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[116] CR/PR at II-1. Direct importation by these end users accounted for *** percent of total reported subject imports from Japan, *** percent of subject imports from Poland and *** percent of subject imports from Russia during the period of investigation. Petitioners' Prehearing Brief at 15.

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

[118] CR at VII-7, PR at VII-4. The producer in China is not the U.S. importer of record. However, the GOES that is ultimately imported into the United States retains its Chinese origin for Customs purposes because slitting is not a significant manufacturing operation. *Id*.

[119] CR at II-28, PR at II-17. Although *** was reported as a producer that failed to qualify, *id*., it appears from other evidence in the record that this firm is an importer. *See* *** Importer Questionnaire Response.

[120] 19 U.S.C. § 1677(7)(C)(i).

[121] CR/PR at Table IV-15. The volume of cumulated subject imports was 7,940 short tons in interim 2013 and 3,122 short tons in interim 2014. *Id*. The petitions were filed on September 18, 2013, and most importers' lead times for product made to order ranged up to *** days, CR at II-22, PR at II-13. Seven of 11 importers made *** of their sales to order. Because of the lag time between order and delivery, orders placed after the filing of the petition would be unlikely to reach U.S. ports until December 2013 or later. Thus, we do not attribute the decline in subject import volume and market share from 2012 to 2013 to the filing of the petition. By contrast, we do attribute the reduced volume of subject imports in interim 2014 to the filing of the petition, and we exercise our discretion to accord less weight to these interim data. *See* 19 U.S.C. § 1677(7)(I).

There are a relatively small number of large purchasers of GOES in the United States, which are generally producers of power and distribution transformers. Leading purchasers include ***, ***, and ***.

Apparent U.S. consumption of GOES totaled *** short tons ($***) in 2013. U.S. producers' U.S. shipments of GOES totaled *** short tons ($***) in 2013, and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value. U.S. imports from subject sources totaled 29,161 short tons ($71.4 million) in 2013 and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value. U.S. imports from nonsubject sources totaled 2,516 short tons ($6.7 million) in 2013 and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value.

SUMMARY DATA AND DATA SOURCES

A summary of data collected in these investigations is presented in appendix C, table C-1. Except as noted, U.S. industry data are based on questionnaire responses of two firms that accounted for 100 percent of U.S. production of GOES during 2013. U.S. imports are based on official U.S. import statistics, as adjusted.

PREVIOUS AND RELATED INVESTIGATIONS

GOES has been the subject of several prior petitions and proceedings before the Commission. These petitions and proceedings are described below.

Safeguard investigations

The domestic GOES industry previously sought relief pursuant to section 201 of the Trade Act of 1974. In 1984, following a request from the United States Trade Representative ("USTR"), the Commission initiated a section 201 investigation on U.S. imports of carbon and certain alloy steel products, including U.S. imports of GOES. In that investigation, the Commission determined that certain steel products, including GOES, were being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the domestic industry and recommended a five-year program of tariffs and quotas. President Reagan, however, determined that import relief was not in the national economic interest, and instead established a national policy for the steel industry that led to the creation of several voluntary restraint agreements. GOES was among the products subject to a voluntary restraint agreement until the program expired in 1992.

Following receipt of a request from USTR on June 22, 2001, the Commission instituted investigation No. TA-201-73, *Steel*, under section 202 of the Trade Act of 1974[5] to determine whether certain steel products, including GOES, were being imported into the United States in

[5] 19 U.S.C. § 2252.

such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industries producing articles like or directly competitive with the imported article.[6] On July 26, 2001, the Commission received a resolution adopted by the Committee on Finance of the U.S. Senate ("Senate Finance Committee" or "Committee") requesting that the Commission investigate certain steel imports under section 201 of the Trade Act of 1974.[7] Consistent with the Senate Finance Committee's resolution, the Commission consolidated the investigation requested by the Committee with the Commission's previously instituted investigation No. TA-201-73.[8] On December 20, 2001, the Commission issued its determinations and remedy recommendations. The Commission made a negative determination with respect to GOES.[9]

Patent infringement proceeding

Domestic producer Allegheny Ludlum filed a petition under section 337 of the Act in 1988, alleging that GOES produced by Nippon Steel Corp. and imported into the United States was produced in violation of a patent held by Allegheny Ludlum. The Commission did not initiate a section 337 investigation because Allegheny Ludlum did not produce a product pursuant to its own patent and, therefore, did not satisfy the statute's definition of an "industry."[10]

Antidumping and countervailing duty proceedings

Original investigations

In 1993, GOES was the subject of antidumping and countervailing duty investigations with respect to imports from Italy and Japan. Following affirmative determinations by Commerce and the Commission, a countervailing duty order covering U.S. imports of GOES from Italy was published on June 7, 1994, an antidumping duty order was published on U.S. imports of GOES from Japan on June 10, 1994, and an antidumping duty order was published on imports of GOES from Italy on August 12, 1994.[11]

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[6] *Institution and Scheduling of an Investigation under Section 202 of the Trade Act of 1974 (19 U.S.C. 2252) (the Act)*, 66 FR 35267, July 3, 2001.

[7] 19 U.S.C. § 2251.

[8] *Consolidation of Senate Finance Committee Resolution Requesting a Section 201 Investigation with the Investigation Requested by the United States Trade Representative on June 22, 2001*, 66 FR 44158, August 22, 2001.

[9] *Steel; Import Investigations*, 66 FR 67304, December 28, 2001.

[10] *Grain-Oriented Silicon Electrical Steel From Italy and Japan, Inv. Nos. 701-TA-355 and 731-TA-659-660 (Review)*, USITC Publication 3396, February 2001, p. I-2.

[11] *Grain-Oriented Silicon Electrical Steel From Italy and Japan, Inv. Nos. 701-TA-355 and 731-TA-659-660 (Review)*, USITC Publication 3396, February 2001, p. I-2.

Third remand

On June 15, 2005, the Court issued an opinion affirming in part and remanding in part the Commission's affirmative determination on second remand.[18] Upon consideration of the third remand order, the Commission determined that revocation of the countervailing duty order on GOES from Italy and the antidumping duty orders on GOES from Italy and Japan would not likely lead to the continuation or recurrence of material injury to an industry in the United States within a reasonably foreseeable time.[19]

On May 30, 2006, the CIT affirmed the Commission's third remand determination. Following an appeal by the domestic industry to the U.S. Court of Appeals for the Federal Circuit, the CIT's decision was reversed and vacated. On October 10, 2007, and pursuant to the Federal Circuit's mandate, the CIT sustained the Commission's second remand determination and reinstated the affirmative injury determination.[20]

Second five-year reviews

On February 1, 2006, Commerce initiated and the Commission instituted the second five-year reviews of the antidumping and countervailing duty orders.[21] At that time, the domestic industry chose not to participate in the reviews because it believed subject imports from Italy and Japan were unlikely to cause a recurrence of material injury to the domestic industry.[22] As a result, the antidumping and countervailing duty orders on GOES from Italy and Japan were revoked effective March 14, 2006.[23]

(…*continued*)
Commissioner Miller, and Commissioner Lane made affirmative determinations, while Chairman Okun, Vice Chairman Hillman, and Commissioner Pearson made negative determinations.

[18] *Nippon Steel Corp., et al. v. United States*, Slip Op. 05-72, June 15, 2005.

[19] *Grain-Oriented Silicon Electrical Steel From Italy and Japan, Inv. Nos. 701-TA-355 (Review) (Third Remand) and 731-TA-659-660 (Review) (Third Remand)*, USITC Publication 3798, September 2005, p. 1. Vice Chairman Okun and Commissioners Hillman and Pearson made negative determinations, while Chairman Koplan and Commissioner Lane made affirmative determinations. Commissioner Aranoff did not participate in the third remand proceeding.

[20] *Nippon Steel Corp. v. United States*, 31 C.I.T. 1588 (2007).

[21] *Initiation of Five-Year ("Sunset") Reviews*, 70 FR 5243, February 1, 2006; and *Grain-Oriented Silicon Electrical Steel from Italy and Japan*, 70 FR 5376, February 1, 2006.

[22] Petition, p. 8.

[23] *Grain-Oriented Electrical Steel From Italy and Japan: Final Results of Sunset Reviews and Revocation of Orders*, 59 FR 15376, March 28, 2006.

On July 22, 2014, Commerce published a notice in the *Federal Register* of its final determinations of sales at LTFV with respect to imports from Germany, Japan, and Poland, [29] which are also shown in Table I-3. Commerce made no changes to its preliminary determinations in the investigations concerning GOES from Germany, Japan, and Poland.

Table I-3
GOES: Commerce's weighted-average LTFV margins with respect to imports from China, the Czech Republic, Germany, Japan, Korea, Poland, and Russia

Manufacturer/exporter	Preliminary dumping margin (*percent*)	Final dumping margin (*percent*)
China		
PRC-wide entity	159.21	--
Czech Republic		
ArcelorMittal Frýdek-Místek	11.45	--
Sujani Enterprises, Inc.	10.35	--
All others	10.38	--
Germany		
ThyssenKrupp Electrical Steel GmbH	241.91	241.91
All others	133.70	133.70
Japan		
JFE Steel Corporation	172.30	172.30
Nippon Steel & Sumitomo Metal Corporation	172.30	172.30
All others	93.36	93.36
Korea		
POSCO	5.34	--
All others	5.34	--
Poland		
Stalprodukt S.A.	99.51	99.51
All others	78.10	78.10
Russia		
OJSC Novolipetsk Steel/VIZ-Steel LLC	119.88	--
All others	68.98	--

Source: 79 FR 26936-26943, May 12, 2014; 79 FR 42501-42503, July 22, 2014.

[29] *Grain-Oriented Electrical Steel From Germany, Japan, and Poland: Final Determinations of Sales at Less Than Fair Value and Certain Final Affirmative Determination of Critical Circumstances*, 79 FR 42501, July 22, 2014.

THE SUBJECT MERCHANDISE

Commerce's scope

Commerce has defined the scope of these investigations as follows:

> *The scope of these investigations covers grain-oriented silicon electrical steel (GOES). GOES is a flat-rolled alloy steel product containing by weight at least 0.6 percent but not more than 6 percent of silicon, not more than 0.08 percent of carbon, not more than 1.0 percent of aluminum, and no other element in an amount that would give the steel the characteristics of another alloy steel, in coils or in straight lengths. The GOES that is subject to these investigations is currently classifiable under subheadings 7225.11.0000, 7226.11.1000, 7226.11.9030, and 7226.11.9060 of the Harmonized Tariff Schedule of the United States (HTSUS). Although the HTSUS subheadings are provided for convenience and customs purposes, the written description of the scope of these investigations is dispositive. Excluded are flat-rolled products not in coils that, prior to importation into the United States, have been cut to a shape and undergone all punching, coating, or other operations necessary for classification in Chapter 85 of the HTSUS as a transformer part (i.e., laminations).*[30]

Tariff treatment

The merchandise subject to these investigations is classified in subheadings 7225.11.00, 7226.11.10, and 7226.11.90 of the Harmonized Tariff Schedule of the United States ("HTS") and imported under statistical reporting numbers 7225.11.0000, 7226.11.1000, 7226.11.9030, and 7226.11.9060. The column-1 general (normal trade relations) rate of duty for these subheadings, applicable to the merchandise subject to these investigations, is "free."

[30] *Grain-Oriented Electrical Steel From Germany, Japan, and Poland: Determinations of Sales at Less Than Fair Value and Certain Final Affirmative Determination of Critical Circumstances*, 79 FR 42501, July 22, 2014.

THE PRODUCT[31]

Description and applications

The product covered by these investigations, as defined by Commerce, is grain-oriented electrical steel ("GOES"), which is a flat-rolled alloy steel product containing by weight at least 0.6 percent but not more than 6 percent of silicon, not more than 0.08 percent of carbon, not more than 1.0 percent of aluminum, and no other element in a proportion that would give the steel the characteristics of another alloy steel.

GOES is sold as either sheets or strips, in either coils or in straight lengths. GOES, which typically contains approximately 3.2 percent by weight of silicon,[32] is subject to specialized rolling and annealing (heat treatment) processes, which produce grain structures uniformly oriented in the rolling (lengthwise) direction of the steel sheet. This uniformly oriented grain structure permits the steel sheet to conduct a magnetic field with a high degree of efficiency in the direction of rolling compared with other steels, such as non-oriented silicon electrical steel ("NOES"). As a result, GOES has superior magnetic properties compared with NOES, both in terms of higher permeability and lower core loss.[33] Both domestic and imported GOES are produced in compliance with specifications issued by ASTM International ("ASTM")[34] or proprietary specifications. The domestic industry produces a wide range of GOES, including conventional GOES in standard gauges (thicknesses), ranging from 0.007 inch (0.18 mm) through 0.0138 inch (0.35 mm), and high-permeability GOES in two standard thicknesses. The conventional products in the standard thicknesses are often referred by the U.S. grade or American Iron and Steel Institute ("AISI") numbers M2 through M6.[35] ASTM standards can be

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[31] Except as noted, information presented in the "Description and Applications" and "Manufacturing Processes" is drawn from *Grain-Oriented Silicon Electrical Steel from Italy and Japan, Inv. Nos. 701-TA-355 and 731-TA-659-660 (Review)*, USITC Publication 3396, February 2001; and from *Grain-Oriented Silicon Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia, Inv. Nos. 701-TA-505 and 731-TA-1231-1237 (Preliminary)*, USITC Publication 4439, November 2013.

[32] Silicon, the primary alloying element in GOES, enhances the electro-magnetic properties (i.e., minimizes energy lost as heat) within the steel by promoting the crystal-orientation process and its resulting oriented-grain structure. AK Steel, *Selection of Electrical Steels for Magnetic Cores*, p. 7.

[33] "Permeability" refers to the ease with which magnetic lines of force distribute themselves throughout (flow through) a material, or more generally, the ease of magnetization of the GOES product in response to a magnetic field. "Core loss" refers to the measured amount of electrical energy that is lost as heat from (eddy) currents generated when a magnetic flux flows through the steel.

[34] ASTM International was previously known as the American Society for Testing and Materials. Specification ASTM A876/A876M sets maximum core-loss standards by ASTM grade and by testing standards for conventional GOES, high-permeability GOES, and laser-scribed high-permeability GOES.

[35] The U.S. GOES industry continues to use the "M" grades as a legacy nomenclature. The U.S. grade nomenclature was developed by AISI, which was responsible for establishing the grading and testing standards for GOES until the 1980s when ASTM undertook the responsibility. Counsel to petitioners, e-mail correspondence with Commission staff, June 13, 2014, p. 2.

matched with the U.S. grade nomenclature by the product thickness (table I-4).[36] Within each type of GOES, magnetic characteristics may differ in that the same product manufactured by two producers may have different average core losses. Nevertheless, the GOES that is available from domestic producers reportedly either meets or outperforms the maximum specified core-loss standards.[37] [38]

GOES is used primarily in the production of laminated cores (described below) for large- and medium-sized electrical power transformers and distribution transformers.[39] Because thinner laminations yield lower core losses in transformers, thinner gauge GOES is often preferred despite the added cost for both the steel and the manufacturing of the transformer core.[40] Laminations for transformer cores are oriented within transformers to take advantage of the directional magnetic properties of the steel.

The directional magnetic properties of the GOES allow for the transformation of the electrical potential (voltage) for an alternating electrical current (figure I-1). Power transformers are designed to raise the voltage of electrical current from the level at which it is generated by an electric power plant to a higher level for more efficient transmission, and to lower the voltage to levels more suitable for local distribution. Distribution transformers, in turn, further lower the electrical voltage to levels suitable for commercial and residential consumers.

[36] Counsel to petitioners, e-mail correspondence with Commission staff, June 13, 2014, p. 2.

[37] Counsel to petitioners, e-mail correspondence with Commission staff, June 13, 2014, pp. 2-3.

[38] According to an importer, transformer manufacturers consider the "typical core loss" level of delivered GOES rather than the "maximum core loss" level guaranteed by GOES producers. Representative of ***, e-mail correspondence with Commission staff, October 30, 2013.

[39] A transformer is an electrical apparatus that transfers electrical energy from one electrical circuit to another without any direct electrical connection by the electromagnetic induction of an alternating electrical current between two or more magnetically coupled coils or windings. Transformers are used to either increase (step-up) or decrease (step-down) the voltage (electrical potential) of an alternating electrical current within the circuitry of electrical equipment or systems.

[40] According to a petitioners' witness, thinner gauge M2 and M3 account for the vast majority of GOES used for cores in distribution transformers. Hearing transcript, p. 62 (Polinski).

Table I-4
GOES: U.S. (AISI) grades and ASTM A876/A876M specifications for conventional and high-permeability GOES

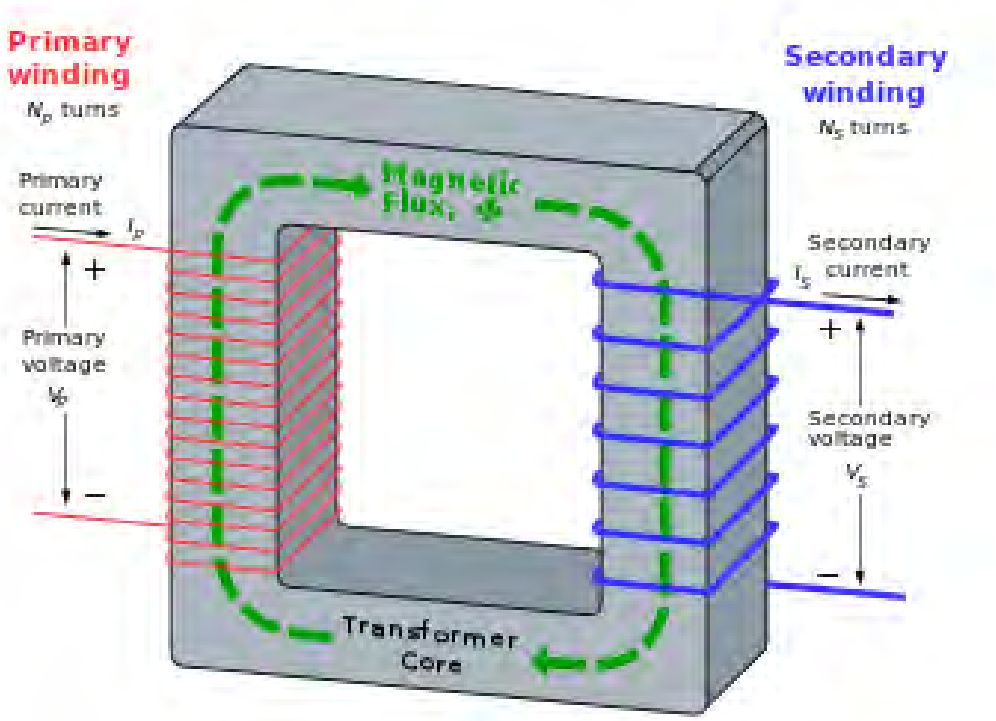
U.S. (AISI) grade	ASTM grade	Nominal thickness	Maximum specific core loss	
			At frequency of 60 hertz[1]	At frequency of 50 hertz[2]
		Inch (millimeter)	*Watts per pound (watts per kilogram)*	
Conventional GOES (tested at 15 kilogauss (1.5 tesla) by test method A343/A343M):				
M2	18G041	0.0070 (0.18)	0.41 (0.90)	0.21 (0.68)
M3	23G045	0.0090 (0.23)	0.45 (0.99)	0.34 (0.75)
M4	27G051	0.0106 (0.27)	0.51 (1.12)	0.39 (0.85)
M5	30G058	0.0118 (0.30)	0.58 (1.28)	0.44 (0.97)
M6	35G066	0.0138 (0.35)	0.66 (1.46)	0.50 (1.11)
Conventional GOES (tested at 17 kilogauss (1.7 tesla) by test method A343/A343M):				
M3	23H070	0.0090 (0.23)	0.70 (1.54)	0.53 (1.17)
M4	27H074	0.0106 (0.27)	0.74 (1.63)	0.56 (1.24)
M5	30H083	0.0118 (0.30)	0.83 (1.83)	0.63 (1.39)
M6	35H094	0.0138 (0.35)	0.94 (2.07)	0.71 (1.57)
High-permeability GOES (tested at 17 kilogauss (1.7 tesla) by test method A343/A343M):				
H0	23P060	0.0090 (0.23)	0.60 (1.32)	0.46 (1.01)
H1	27P066	0.0106 (0.27)	0.66 (1.46)	0.50 (1.11)
Laser-inscribed, high-permeability GOES (tested at 17 kilogauss (1.7 tesla) by test method A343/A343M):				
H0 DR	23Q054	0.0090 (0.23)	0.54 (1.19)	0.41 (0.90)
H1 DR	27Q057	0.0106 (0.27)	0.57 (1.26)	0.43 (0.96)

[1] In the United States, a frequency of 60 hertz (cycles per second) is standard for the alternating current (AC) transmitted through the national electricity grid.
[2] A frequency of 50 hertz is common for the AC electricity grids in certain European countries and one-half of Japan.

Source: Counsel to petitioners, e-mail correspondence with Commission staff, June 13, 2014, pp. 1-3; and representative of ***, e-mail correspondence with USITC staff, October 31, 2013.

Figure I-1

GOES: An alternating current flowing in the primary winding induces a varying magnetic flux in the transformer core and secondary winding, which induces a secondary voltage for the alternating current flowing in the secondary winding



Source: Galco Industrial Electronics website, found at http://www.galco.com/comp/prod/trnsfmrs.htm, retrieved October 18, 2013.

In addition to differences in thickness, GOES is produced in different levels of magnetic permeability, distinguished by the size and orientation precision of the grains within the steel: "conventional" with smaller but less precisely oriented grains versus "high-permeability" with more precisely oriented but larger grains.[41] [42] High-permeability product allows a transformer to operate at a higher level of flux (flow) density[43] than the conventional product, thus permitting a transformer to be smaller and have lower energy operating losses. High-permeability product is also produced as a domain-refined (surface-treated) type that has even lower core loss at high flux density. Domain refinement occurs by scribing thin lines onto the surface of the steel, which subdivides larger oriented grains into smaller ones[44] (to produce "domain-refined GOES"),[45] using laser scribing, mechanical scribing, or electrolytic etching.[46] Product undergoing laser scribing does not retain its enhanced magnetic characteristics when it is annealed (heat treated)[47] to relieve internal stresses. As a result, laser-scribed GOES (or "non-heat-proof GOES") is not suitable for producing wound-core transformers (described below), which require superior core-loss properties,[48] but must undergo heat-treatment to relieve internal stresses (which increase core losses)[49] accumulated from the manufacturing process. By contrast, domain-refined GOES produced by mechanical scribing or electrolytic etching (i.e., "heat-proof GOES") retains its enhanced magnetic characteristics even through stress-relief treatment.[50] There is no known production of mechanically scribed or electrolytically etched, heat-proof GOES in the United States.

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[41] One witness compared the grain-size differences as "very, very tiny, about the size of a head of a pencil" for conventional GOES versus "about the size of a silver dollar" for high-permeability GOES. Hearing transcript, pp. 116–117 (Schoen).

[42] One witness characterized GOES thicknesses and grades as a continuum of products based on magnetic capability. A second witness asserted that there is overlap between types of GOES rather than a discrete series of GOES products. Hearing transcript, p. 58–59 (Petersen); and p. 169 (Woolfort), respectively.

[43] "Flux density" generally refers to the total number of magnetic lines of force per unit area. It can also be understood as the density of magnetic lines of force, or magnetic flux lines, passing through a specific area.

[44] Hearing transcript, p. 117 (Schoen).

[45] In contrast to "domain-refined GOES," GOES having surfaces that did not undergo any domain refinement is referred to as "non-domain-refined GOES."

[46] Both the mechanical scribing and electrolytic refining processes impart a dent into the surface of the steel, by physically cutting into or by dissolving out some surface material, respectively. Hearing transcript, p. 117 (Schoen).

[47] Laser scribing imparts a dent into the surface of the steel by melting some surface material, which is nullified by exposure at annealing temperatures. Hearing transcript, p. 104 (Rakowski).

[48] Counsel to Nippon Steel and Sumitomo Metal Corp., comments on draft questionnaires, p. 2.

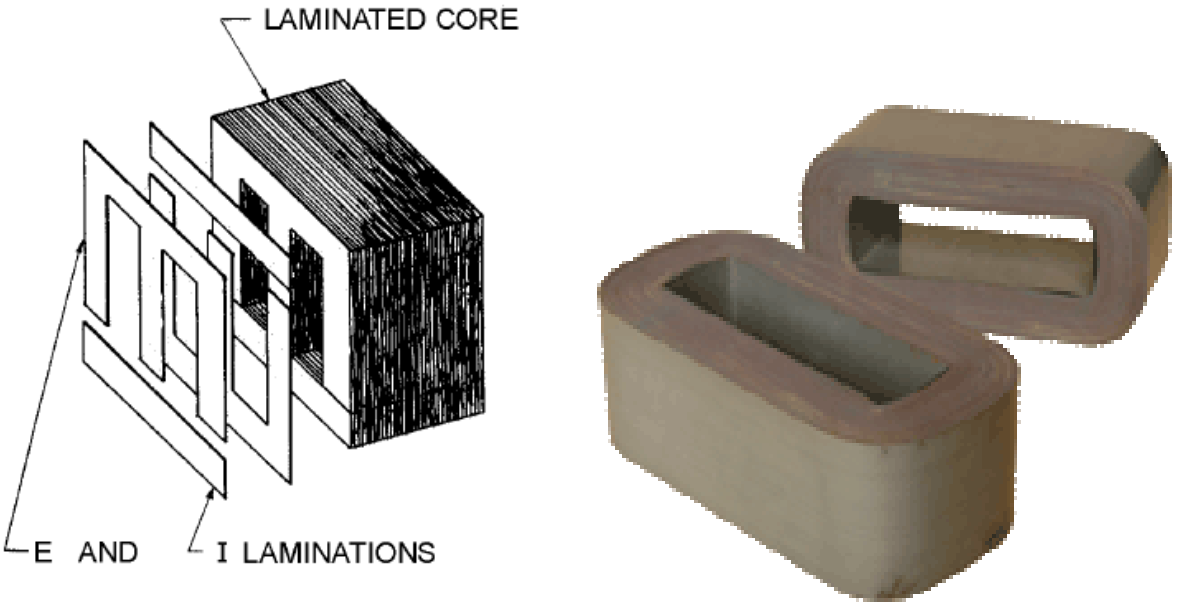
[49] Hearing transcript, p. 103 (Polinski).

[50] According to petitioner's witnesses, thinner gauged (M2 and M3) conventional GOES is also suitable in applications requiring heat-proof GOES, for the M2 and M3 GOES have smaller grain sizes which provide lower core losses. Hearing transcript, p. 49 (Kerwin); pp. 62, 103, and 104–105 (Polinski).

The surface finish on GOES usually consists of an inorganic coating, called "coreplate," which serves as an electrical insulation between laminations. This insulation helps reduce core loss.

Electrical transformers are produced with either stacked or wound cores (figure I-2). When used in stacked cores, GOES is sheared or stamped into individual laminations, which are then stacked together to form the core. In smaller transformers, a special "punching-quality" finish may be applied to stamped laminations that comprise the core. When used in wound cores, a continuous length of GOES is wound around a mandrel multiple times to form the core. Wound cores must undergo heat-treatment to relieve internal stresses following their manufacturing. Copper windings (electricity conductors) are wrapped around both stacked and wound cores.

Figure I-2
GOES: Examples of a stacked core (left) versus wound cores (right)



Source: Navy-Marine Corps Military Auxiliary Radio System (MARS), found at http://www.navymars.org/national/training/nmo_courses/NMO2/Module2/14174_ch5.pdf, retrieved October 18, 2013; Technical Associated Ltd. website, found at http://www.techasso.com/Single%20Phase%20Wound%20Core%20transformers.htm, retrieved October 18, 2013.

Stacked cores are used in larger distribution and power transformers while wound cores are used in smaller (e.g., either pole- or pad-mounted) distribution transformers that step down

the voltage from the transmission line and provide power to residences and offices.[51] In general, high-permeability grades are more commonly used in stacked cores and conventional grades M2 through M6 are used most effectively in wound cores.[52] In wound-core applications, for example, "ABB would use with an M2 or M3, but the ultimate choice is predicated on the requirements of the customer and their total evaluated losses. As the size of the transformer increases, there is more movement toward lower-loss high-permeability domain-refined steels."[53] Petitioners contend that conventional grades M2 and M3 GOES are more efficient than some high-permeability GOES, resulting in a significant overlap among end-use applications of all types of GOES.[54]

Based on AK Steel's sales experience in 2013, petitioners estimated market shares (table I-5) for high-permeability GOES at *** percent and conventional grades M2 through M6 GOES at *** percent of stacked-core transformers. In contrast, high-permeability GOES was *** percent and conventional grades M2 through M6 GOES *** percent of wound-and-annealed core transformers.[55]

Table I-5
GOES: Sales shares for GOES, by core types and grades

Core type	GOES grades	Market sales shares (*percent*)
Stacked-core transformers	High-permeability	***
	M2 and M3 conventional	***
	M4, M5, and M6 conventional	***
	Total	100
Wound- and annealed-core transformers	High-permeability	***
	M2 and M3 conventional	***
	M4, M5, and M6 conventional	***
	Total	100

Source: Petitioners' posthearing brief, "Petitioners' Responses to Commission Hearing Questions," p. 56.

Manufacturing processes

The production of GOES begins with the steel melting process, during which ferrous (iron and steel) scrap and/or iron ore, and ferroalloys (primarily ferrosilicon) are melted either in an electric-arc furnace or a basic-oxygen furnace. Molten steel is then transferred to a vacuum degassing station, where the steel's chemistry is refined by reducing both dissolved gasses and the carbon content. The steel is then either continuously cast into slabs or is cast into ingots that are subsequently hot-rolled into slabs.

[51] ABB Inc.'s posthearing brief, "Answers to Commissioner Questions," p. 3.
[52] Petitioners' posthearing brief, exhibit 13.
[53] ABB Inc.'s posthearing brief, "Answers to Commissioner Questions," p. 3.
[54] Petitioners' posthearing brief, "Petitioners' Responses to Commission Hearing Questions," p. 55.
[55] Petitioners' posthearing brief, "Petitioners' Responses to Commission Hearing Questions," p. 56.

The slabs may be reheated and rolled on a continuous hot-strip mill to produce hot-rolled coils. The coils are then annealed and pickled (cleaned with acid to remove surface oxide) in a continuous processing line, and then cold-reduced on either a multi-stand tandem cold-rolling mill or a reversing cold-rolling mill. The coils undergo this process twice to reach the final thickness.

The product is then processed through a line in which it is decarburized by heating in a controlled atmosphere and then coated with magnesium oxide, which will serve as an insulator when the GOES is assembled into transformer cores.[56] It is then annealed at a high temperature in its coil form, a process that takes 5 or 6 days, during which highly oriented grains form within the steel.[57] The magnesium oxide prevents the layers of the coils from sticking together during the annealing process and also partially fuses, thereby forming a glass-like coating on the surface on the steel, referred to as "mill-glass" or "glass film," even though it is not technically a glass. The mill-glass coating is also known as "C-2 coreplate."

Each coil is processed through a continuous line in which excess magnesium oxide is removed by scrubbing. The coil is then heat-flattened and a second coating of magnesium oxide is applied.[58] To manufacture punching-quality GOES, the mill-glass or C-2 coating is removed by pickling in acid before the second coreplate coating is applied. The coating applied to produce punching-quality GOES is an inorganic or mostly inorganic coating, called "C-5 coreplate," with ceramic fillers or film-forming components to increase the insulating ability of the coating. Finally, the product may be slit to a final width, if necessary, and packaged for shipment.[59]

Foreign producers in China, the Czech Republic, Germany, Japan, Korea, Poland, and Russia generally use the same processes to produce GOES.[60] Although there is no known production of GOES in Canada, slitting operations are undertaken in Burlington, Ontario, by electrical transformer core and components manufacturers Cogent Power Inc.[61] and Tempel

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[56] Hearing transcript, p. 21 (Petersen).

[57] Hearing transcript, p. 21 (Petersen).

[58] AK Steel produces domain-refined GOES by laser-scribing lines on the surface of the steel using equipment installed on its heat-flattening and coating lines. The laser scribing occurs after scrubbing and heat-flattening, but before the coating is applied to the steel.

[59] GOES may be slit from uncoiled or straight-length sheets into narrower strips, which may then be recoiled or left as straight lengths. GOES that undergoes trimming, filing, slitting, or cutting abroad that does not otherwise materially alter the characteristics of the good, but merely its dimensions, is imported into the United States under the same statistical reporting numbers (HTS 7225.11.0000, 7226.11.1000, 7226.11.9030, and 7226.11.9060) as the original-dimension GOES, according to U.S. Customs and Border Protection (CBP). See, e.g.: CBP, ruling letter HQ 224283, March 17, 1993; ruling letter HQ 225368, February 1, 1995; ruling letter HQ 226152, July 23, 1996; and ruling letter HQ W228610, February 27, 2002.

[60] Hearing transcript, p. 21 (Petersen).

[61] Cogent Power, "Products," found at http://www.cogentpowerinc.com/Products.htm, retrieved June 23, 2014.

Steel.[62] Both U.S. producers of GOES manufacture additional products ***. AK Steel also produces NOES ***.

DOMESTIC LIKE PRODUCT ISSUES

The Commission's decision regarding the appropriate domestic products that are "like" the subject imported product is based on a number of factors including: (1) physical characteristics and uses; (2) common manufacturing facilities and production employees; (3) interchangeability; (4) customer and producer perceptions; (5) channels of distribution; and (6) price. Information regarding past Commission determinations in related proceedings concerning the domestic like product, the petitioners' and respondents' positions on the domestic like product in these proceedings, and the factors the Commission considers in making a domestic like product determination is discussed below.

In the original investigations and first five-year reviews concerning GOES from Italy and Japan, the Commission found that all types of GOES comprised a single domestic like product. The Commission rejected arguments advanced in the original investigations by the Japanese producers that high-permeability and conventional grades of GOES constituted separate domestic like products, finding that the different grades represented a continuum of products. The Commission further found that the different grades of GOES were chemically alike, possessed essentially the same physical characteristics, were marketed through the same channels of distribution, had similar uses, were interchangeable to a certain degree, and shared common production facilities. In the first five-year reviews concerning the orders on GOES imports from Italy and Japan, parties raised no new like product issues, there were no significant changes in the nature, uses, and manufacture of GOES since the original investigations, and there was no information that indicated a need to revisit the Commission's definition of the domestic like products in the original determinations.[63]

Petitioners proposed that the Commission should define the domestic like product in these investigations to encompass all GOES, including both conventional and high-permeability GOES products, co-extensive with the scope of the case.[64] Petitioners argued that a determination by the Commission defining the domestic like product as co-extensive with the scope of the investigation would be consistent with past Commission findings and the Commission's traditional like product analysis: (1) all GOES has the same basic physical characteristics - both with respect to its physical form and chemistry – and virtually all GOES has the same uses - in the production of electric power and distribution transformers; (2) conventional and high-permeability GOES are made in common manufacturing facilities, using

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[62] Tempel Steel, "Tempel Global Operations & Capabilities, Burlington, Canada," found at http://www.tempel.com/capabilities/manufacturing-facilities, retrieved June 23, 2014. See Part IV for more information about ***.

[63] *Grain-Oriented Silicon Electrical Steel From Italy and Japan, Inv. Nos. 701-TA-355 and 731-TA-659-660 (Review)*, USITC Publication 3396, February 2001, p. 5.

[64] Petition, p. 14.

U.S. demand

Based on available information, the overall demand for GOES is likely to experience small changes in response to changes in price. The main contributing factors are the somewhat limited range of substitute products and the small cost share of product in most of its end-use products.

End uses

U.S. demand for GOES depends on the demand for U.S.-produced power and distribution transformers. GOES is used primarily in the production of laminated cores for large and medium-sized electrical power transformers and distribution transformers. Power transformers are used to raise the voltage of electric power from the level at which it is generated by a power plant to a higher level for more efficient transmission, and to lower voltage to levels suitable for local distribution. Distribution transformers, in turn, further reduce electrical voltage to levels suitable for commercial and residential consumers. In addition to these end users, stampers may also use GOES to punch laminations that are used in equipment having smaller transformers, including appliances and aerospace, aeronautical, and electronic equipment.[3]

There are two main drivers of transformer demand: replacement and new transformer demand. Petitioners stated that the degree to which utilities replace transformers is a demand driver in the replacement market, which currently makes up about 65 to 70 percent of the market for GOES and made up 75 to 80 percent of the market in 2011. They indicate that because of aging transformers, there has been a small increase in the replacement market over the historical rate of 3 percent per year.[4]

Petitioners also indicated that increases in new energy generation can increase demand.[5] Housing starts are the biggest driver for demand in the new transformer market for GOES.[6] Japanese respondents indicated that the trend is not linear, as transformer demand is somewhat dependent on the location and type of housing being constructed.[7] Seasonally adjusted housing starts increased by 42 percent between January 2011 and June 2014, (figure II-2). Housing starts, however, remain well below historic averages.[8] Japanese respondents also indicated that utility capital investment correlates less closely with demand for GOES for new power transformers, and that three new power transformer manufacturers have opened plants in the U.S. market within the past few years, increasing demand. Capital expenditures by

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[3] Petition, p. 9.

[4] Conference transcript, pp. 64-65 (Pfeiffer), pp. 65-66 (Polinski). Petitioners' postconference brief, Response to Commission staff questions, pp. 7-8.

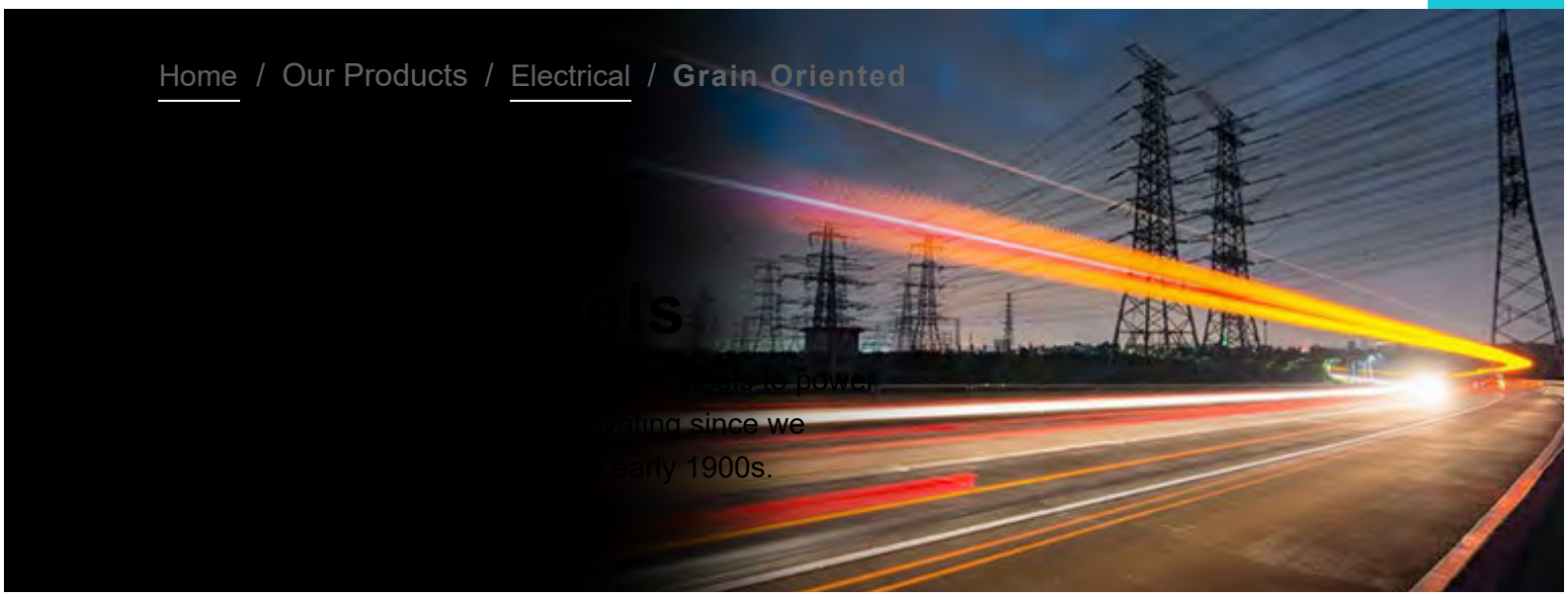
[5] Conference transcript, pp. 64-65 (Pfeiffer), pp. 65-66 (Polinski). Petitioners' postconference brief, Response to Commission staff questions, pp. 7-8.

[6] Conference transcript, p. 63 (Pfeiffer), p. 168 (Suzuki).

[7] Japanese producers' postconference brief, Response to staff questions, pp. 9-10.

[8] U.S. Census Bureau, New Residential Construction (updated August 6, 2014). http://www.census.gov/construction/nrc/historical_data/

EXHIBIT 4



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1 2

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CARLITE®	PDF
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EXPLORE POWER TRANSFORMERS

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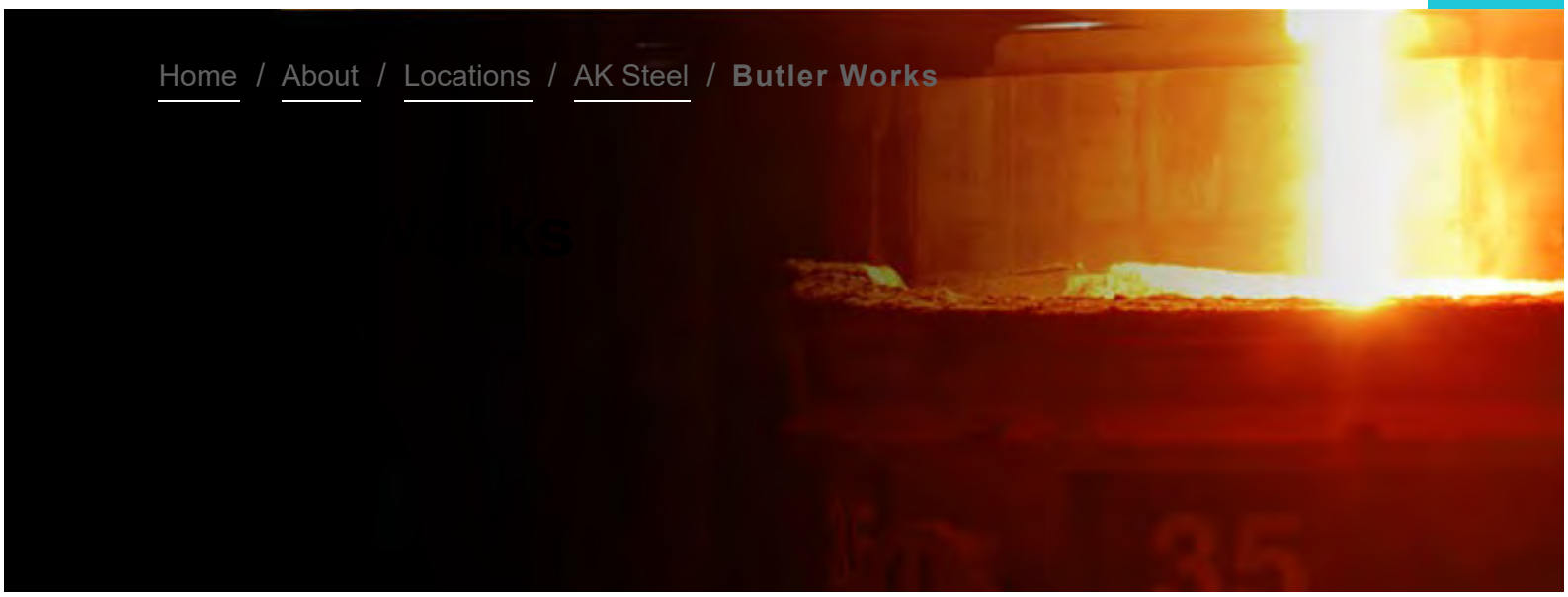
EXHIBIT 5



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- Anneal and pickle lines
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- Weld and trim units

Our Products

Butler Works is a leading producer of flat rolled electrical and stainless steels, as well as a supplier of stainless and carbon semi-finished slabs.

- TRAN-COR® is the only high-permeability electrical steel made in the United States, which is used in power transformers.
- Regular Grain-Oriented (RGO) products are used for power and distribution transformers. AK Steel is the only producer of this in the United States.
- Cold Rolled Non-Oriented (CRNO) grades are used primarily in electric motors, generators and lighting ballasts. Ferritic (Chrome) grades used in applications that need to withstand extreme heat and corrosive conditions.
- Chrome Austenitic (Nickel) grades of stainless steel are designed for applications that demand extraordinary strength, durability, and corrosion resistance.
- Carbon Slabs are produced on one of the two dual-strand casters. Butler Works can produce ultra-low sulfur steel, which is beneficial for many carbon steel applications including Advanced High Strength Steels (AHSS). These slabs are then finished at AK Steel's other manufacturing plants.

Quality

Butler Works has earned IATF 16949 and IS0-9001 certification. The plant is a recipient of several quality awards, including a "Best Operational Improvements" award from American Metal Market, a leading metal industry publication. Butler Works has also received the "Pennsylvania Governor's Award" for labor management cooperation.

LEARN MORE

OUR VALUES

Safety | Quality | Productivity | Innovation

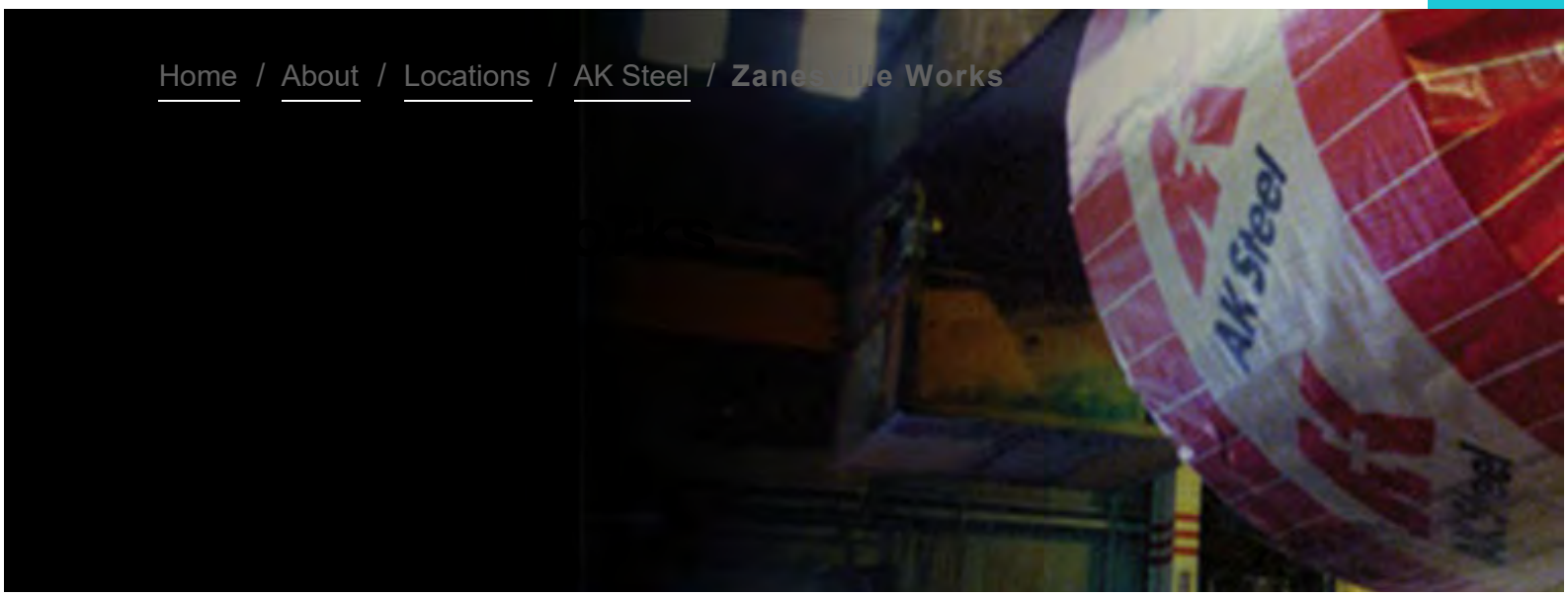
9227 Centre Pointe Drive
West Chester, Ohio 45069
P 513.425.5000

Customer Service
P 844.783.3599

Quick Links

- CLEVELAND-CLIFFS INC
- AK COATINGS
- AK STEEL INTERNATIONAL
- AK TUBE
- MOUNTAIN STATE CARBON
- WEBSITE SALES
- IATF 16949 AND ISO 9001
- ISO 14001
- OUTSIDE PROCESSING
- RETIREES
- SURCHARGES - ELECTRICAL STEELS
- SURCHARGES - STAINLESS STEELS

EXHIBIT 6



About
Leadership and Governance
Corporate Citizenship
Locations
AK Steel
Ashland Works
Butler Works
AK Steel Corporate Offices
Coshocton Works
Dearborn Works
Mansfield Works
Middletown Works

Steel Production in Zanesville, Ohio

Our Facility

Zanesville Works is located on the Muskingum River in east central Ohio. Zanesville Works finishing facilities for electrical and stainless lines bring specialty flat rolled process and product technology together with steels that meet the exact specifications and delivery requirements of our customers.

Production Facilities

- Anneal and pickle line
- Three strip anneal lines
- Electric box annealing furnaces
- Sendzimir (Z) mill
- Two coating lines
- One pickle/coat line
- Slitting line
- Packaging line

Research and Innovation Center

Rockport Works

Zanesville Works

Cleveland-Cliffs

AK Steel International

AK Tube

Mountain State Carbon

Retirees

Our Products

Steels from Zanesville Works include:

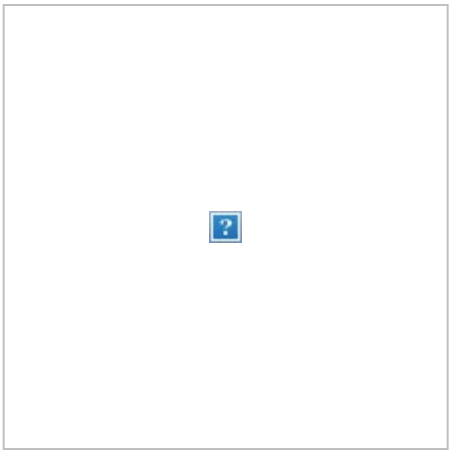
- Regular Grain-Oriented (RGO) electric steels for power and distribution transformers offer an outstanding degree of grain orientation. The result is far lower transformer core loss than possible with non-oriented electrical steels.
- Cold Rolled Non-Oriented (CRNO) electrical steels in which magnetic properties are practically the same in any direction of magnetism. Non-oriented grades have superior permeability at high inductions, low average core loss and good gauge uniformity.
- Ferritic (Chrome) stainless steel grades that are used in applications that need to withstand extreme heat and corrosive conditions.

Zanesville's specialty flat rolled steels enable customers to create a variety of products, including motors, generators, transformers and a host of other electrical devices.

Quality

Zanesville Works has earned IATF 16949 and ISO-9001 certification. The plant is also a recipient of several customer quality awards.

LEARN MORE



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- **AK STEEL INTERNATIONAL**
- **AK TUBE**
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- **WEBSITE SALES**
- **IATF 16949 AND ISO 9001**
- **ISO 14001**
- **OUTSIDE PROCESSING**
- **RETIREES**
- **SURCHARGES - ELECTRICAL STEELS**
- **SURCHARGES - STAINLESS STEELS**

EXHIBIT 7

AFFIDAVIT OF [ ]

1. My name is [ ] AK Steel Corporation ("AK Steel"), a subsidiary of Cleveland-Cliffs Inc. ("Cleveland-Cliffs"). [

] I have personal knowledge of the facts and information set forth below.

2. AK Steel's predecessor company, Armco, invented grain-oriented electrical steel ("GOES") in 1926. For almost 100 years, we have been a reliable producer of high-quality GOES and a stable source of supply for consumers of GOES in the United States. With our skilled workers, AK Steel has long been at the forefront of developing the newest and best GOES products in the world. Today, we can make any grade of GOES used in this market, including the highest-quality and most efficient high-permeability grades. AK Steel produces GOES to meet every application required to build and support the U.S. electrical grid -- from the initial power generation stage through the transfer of power across the grid and ultimately to end-user applications.

3. Entry into the GOES market is limited because GOES production requires specialized equipment and expertise that is effectively cost prohibitive. GOES is a highly engineered product that requires certain unique steps to produce. For example, it must be coated with magnesium oxide. It must also be annealed at a high temperature while in coil form -- a process that takes five or six days -- during which highly oriented grains form within the steel. If these and other delicate steps are not performed at a very precise level, the GOES in question will not meet customer specifications.

4. Due to our extensive experience with this product, AK Steel has a highly-trained and sophisticated workforce with specialized knowledge regarding both how to make GOES and how to conduct research and development into new grades of that product. These employees have the knowledge and experience necessary to manufacture this distinct and challenging product, create the next generation of GOES products, and meet high-grade and high-efficiency standards. Many employees at AK Steel's Butler, Pennsylvania and Zanesville, Ohio plants, along with researchers at its Research and Innovation Center in Middletown, Ohio, are electrical steel experts. These experienced employees are critical to AK Steel's production of GOES.

5. AK Steel also has a mature supply chain for raw materials that support the company's production of GOES. It would be extremely challenging and time-consuming for any other company to re-establish such a supply chain if AK Steel were forced out of the GOES market.

6. With its experienced work force and established supply chain, AK Steel makes GOES in facilities that contain specific equipment that is used only to make this product. [

] In other words, if AK Steel stops making GOES, the United States will be left totally dependent on foreign companies for this vital product.

7. The consequences of such dependence could be catastrophic. For example, whenever the United States experiences a major weather disaster -- such as a hurricane -- there is often an urgent demand for new transformers to repair the electrical grid. Those transformers require GOES. There is only one U.S. producer of GOES. There are no producers of GOES in

Mexico or Canada. So without AK Steel, the United States would be separated by an ocean from any major supplier of GOES. Under such circumstances -- and even assuming that foreign producers would be able and willing to quickly expand their production of GOES to address the emergency -- it could take a minimum of three months for U.S. transformer producers to obtain the GOES necessary to return normal electrical service.

8. There are producers of laminations, stacked cores, and wound cores in Canada and Mexico. But downstream GOES products imported from Mexico and Canada are made with GOES produced in countries outside of North America because there is no GOES production in Mexico or Canada. Without access to GOES made in the United States, trying to import downstream GOES products from Mexico and Canada would run into the same difficulties of waiting for GOES to arrive from across an ocean. If anything, shipping GOES from foreign countries to Mexico or Canada for companies in those countries to make laminations and cores for U.S. customers would take even longer than importing GOES directly to the United States.

9. AK Steel's experience with electrical grid disasters highlights the importance of having GOES production in the United States. [

] This example underscores the need for a domestic supply of GOES.

10. In addition to being an essential component of electrical grid equipment, electrical steel is also critical for [

]

11. For the reasons explained above, preserving a domestic supply of GOES is vital to U.S. national security. The United States also has a strong interest in ensuring that future generations of GOES products will be made here. The U.S. Department of Energy ("DOE") periodically reviews and increases its efficiency standards for GOES. To meet these standards, [

]

12. For example, [

]

13. With sufficient trade relief that allows AK Steel to make a profit and invest in GOES, AK Steel and its talented employees will continue to develop critical cutting-edge GOES products in the United States that will help the U.S. electrical grid become more efficient and

meet the DOE's increasing efficiency standards. Ensuring that the best technology and new GOES products are developed and made in the United States is in the interest of the U.S. Government, utilities, consumers, and the national security of the United States.

14. For many years, AK Steel has carefully analyzed market conditions for GOES. As part of these efforts, we study official U.S. Census import data for GOES and downstream GOES products. In recent years, the value of imports of cores and laminations from Canada and Mexico has increased significantly. Based on our understanding of the market, this substantial increase in value is the result of U.S. importers importing larger and heavier units of cores and laminations that – as a consequence – result in fewer imported units. Notably, the Census data for these products measures number of units, not weight. If the Census data were measured by weight, the data would certainly show a significant increase in volume.

15. The increase in the value of imports cannot be explained by rising prices of GOES or downstream GOES products. GOES prices, which are the dominant driver of the prices of cores and laminations, have been flat or declining. I estimate that GOES accounts for approximately [ ] of the price of laminations, [ ] of the price of wound cores, [ ] of the price of stacked cores. Similarly, [ ] downstream GOES products are regularly being offered at prices that are lower than our prices in order to take sales from AK Steel in the U.S. market. Under these circumstances, the only possible explanation for the decline in units but increase in value of imports in the Census data is that U.S. importers are importing larger and heavier units of cores and laminations.

16. This explanation is consistent with the significant increase in core-making capacity in foreign countries in recent years. After AK Steel and Allegheny Ludlum, LLC ("Allegheny Ludlum") filed petitions against unfairly-traded GOES in 2013, there was a

dramatic rise in new core-making capacity outside of the United States, particularly in Canada and Mexico. With minimal additional processing the GOES could be converted into cores and laminations and then imported into the United States. Even after the U.S. International Trade Commission reached a negative determination on AK Steel and Allegheny Ludlum's GOES petition, foreign producers continued to use supply chains in Canada and Mexico for shipping downstream GOES products into the United States.

17. For years, AK Steel lost sales to imports of GOES prior to the Section 232 tariffs were imposed. Even after the other U.S. producer of GOES -- Allegheny Ludlum -- left the market in 2016, a surge of imports quickly took the small increase in market share that AK Steel had gained. AK Steel is now losing sales due to imports of downstream products made from GOES. Our [

]

18. [

]

19. The volume of imports and market penetration of imports of downstream products made from GOES will only increase without trade relief. [

]

20. Imports of downstream products made from GOES are being sold at extremely low prices in the U.S. market, which AK Steel cannot afford to match. In fact, these imports are so significant that [

]

21. For example, [

]

22. [

]

23. [

]

24. [

]

25. Similarly, [

]

26. [

]

27. Because AK Steel has lost so much business -- and been forced to accept unsustainably low pricing for its remaining business -- the United States could soon lose the ability to make electrical steel. These trends are accelerating. In 2020, [

]

28. With sufficient trade relief in this investigation, [

]

29. If this situation continues without relief under Section 232, AK Steel will be unable to maintain production of GOES. Furthermore, [

] AK Steel cannot justify continuing its GOES operations, which would leave the United States without a GOES producer. AK Steel had previously invested $11 million at its Butler Works to increase GOES capacity, but that additional capacity sits unused, as AK Steel has lost sales to unfairly priced imports.

30. Lourenco Goncalves, the CEO of Cleveland-Cliffs – AK Steel's parent company – recently stated in an earnings call that U.S. consumption of GOES is approximately 250,000 short tons each year. This estimate, which accounts for consumption of downstream products made from GOES, is consistent with my assumptions. [

]

31. Even if there were a dramatic spike in GOES demand beyond AK Steel's current GOES capacity, such as a major infrastructure project to modernize the electrical grid, the company would have the ability to increase its capacity. AK Steel could increase its capacity to [ ] if market conditions justified such an action. AK Steel has so far elected not to make the capital investments needed to raise its capacity because it cannot be assured that there will be any return whatsoever in light of imports unfairly taking market share through unreasonably low pricing.

32. Given the significant risks associated with the electrical steel business, [

] In addition, Cleveland-Cliffs has carefully analyzed the GOES business, and has concluded that [

] The key figures for this analysis are shown in **Attachment 1**.

33. The text surrounded by square brackets in this affidavit contains business proprietary information, the release of which would cause serious commercial harm to the submitter.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. This 8th day of June 2020.

[ ]

[ ]

ATTACHMENT 1

AK STEEL OPERATIONS ON GOES (quantities in short tons, values in $1,000)

	Current Projections	Projections With Effective Relief
Net sales (in short tons)	[ ]	[ ]
Net sales values	[ ]	[ ]
Cost of goods sold	[ ]	[ ]
Gross profits	[ ]	[ ]
Other costs before EBITDA	[ ]	[ ]
EBITDA	[ ]	[ ]
Capital expenditures	[ ]	[ ]
EBITDA minus Cap Ex	[ ]	[ ]
Total Capital Deployed	[ ]	[ ]
Return on Capital Deployed	[ ]	[ ]

EXHIBIT 8

Office of the Assistant Secretary of Defense

(Energy, Installations, and Environment)

Department of Defense

Annual Energy Management Report

Fiscal Year 2015

June 2016

COST ESTIMATE
The estimated cost of this report for the Department of Defense is approximately $314,000 in Fiscal Years 2015–2016. This includes $246,000 in expenses and $68,000 in DoD labor. Cost estimate generated on March 30, 2016 / RefID: 3-4DBD001

5. Enhancing Energy Resilience

> *Per DoDI 4170.11,* **energy resilience** *is the ability to prepare for and recover from energy disruptions that impact mission assurance on military installations.*

The Department must be prepared for and have the ability to recover from utility disruptions that impact mission assurance on its installations. DoD relies on commercial power to conduct missions from its installations, and these commercial power supplies can be threatened by natural hazards and other events. DoD recognizes that such events could result in power outages affecting critical DoD missions involving power projection, defense of the homeland, or operations conducted at installations in the U.S. directly supporting warfighting missions overseas. Therefore, it is critical for installation commanders to understand the vulnerabilities and risk of power disruptions that impact mission assurance.

DoD is pursuing a three-pronged strategy to ensure installations have resilient, available, reliable, and continuous power. First, two elements of the facility energy strategy are essential components to improving energy resilience: reducing the installation's demand for energy and expanding the supply of distributed (on-site) energy sources. Second, DoD is actively addressing near-term concerns by (1) pursuing energy resilience initiatives to prepare for and recover from energy disruptions that impact mission assurance on its installations; and (2) actively engaging with Federal agencies, state and local governments, and key industrial players to remediate risk to DoD missions associated with commercial utility outages. Third, DoD is addressing longer-term concerns by pursuing advanced technologies that will help enhance the energy resilience of its installations. DoD publishes the status of its energy resilience program at the following: http://www.acq.osd.mil/eie/IE/FEP_Energy_Resilience.html.

Reporting Requirements

Title 10 U.S.C §2925(a)(11) requires the reporting of utility outages at military installations. The following discussion addresses 10 U.S.C. §2925(a)(11).

In FY 2015, DoD conducted a survey of utility outages on military installations resulting from external, commercial utility interruption of its electric, gas, and water utilities. DoD Components reported approximately 127 utility outages that lasted eight hours or longer in FY 2015, an increase from the 114 events reported in FY 2014. The majority of the utility outages were a result of electric disruptions, and included U.S. and overseas locations. The financial impact of these utility outages was approximately $179,087 per day.[16]

Table 5-1 shows the average cost of utility outages per day for data collected from FY 2013 to FY 2015.

[16] This figure is developed from utility outages that had reported financial impacts in FY 2015.

EXHIBIT 9

ECONOMIC BENEFITS OF INCREASING ELECTRIC GRID RESILIENCE TO WEATHER OUTAGES

Executive Office of the President

August 2013

Discussion

The methodology here is subject to a number of caveats. The (scaled) distribution of outages was estimated based on data from large storms and then applied to smaller storms. Although the analysis here suggests that the shape of the distribution does not depend on storm size, the shape could be different for small and large storms. Additionally, to the extent that businesses are prioritized for power restoration, the estimate in this report may overstate the actual cost of outages. On the other hand, because these estimates only account for storms with widespread outages, and because the majority of costs may come from the more-frequent momentary outages lasting less than 5 minutes (LaCommare and Eto 2005), the small storms neglected here could substantially add to the cost estimates.

Like the estimates discussed in the literature, the estimates in this report are based on private costs borne by customers who lose power. In addition to private costs, outages also produce externalities – both pecuniary and nonpecuniary. For example, outages that limit air transport produce negative network externalities throughout the country. Generally speaking, the costs of major outages are borne not only by those without power, but also by the millions of people inconvenienced in other ways.

The estimate in this report also differs from the effect of weather-related outages on GDP. Some of the lost GDP arising from storms is made up later by overtime hours, additional hiring, and additional consumption. For example, when the electrical grid goes down, the money spent on line crews to repair and replace grid components enters into GDP. Similarly, GDP is increased when a homeowner replace spoiled food. These additional expenditures counteract the negative effect of the storm on GDP, but they do not increase welfare. Essentially, GDP is higher after a homeowner restocks the refrigerator – but the homeowner is worse off for having to do so.

Additional Benefits of Resilience

A more resilient electric grid brings a host of benefits beyond reduced vulnerability to severe weather. Investments in smart grid technology designed to increase resilience can improve the overall effectiveness of grid operations leading to greater efficiencies in energy use with accompanying reductions in carbon emissions, as well as providing greater assurances to businesses upon which our economy depends (U.S. DOE 2010b; 2011b). These technologies can also enhance national security by bolstering the nation's defense against cyber-attacks given that 99 percent of all U.S. Department of Defense installations located within the United States rely on the commercial electric grid for power (Samaras and Willis 2013).

Increased grid resilience may also reduce expenditures not directly captured in this paper's cost estimates: expenditures by firms and individuals on back-up generators, second utility feeds, power conditioning equipment and other items purchased to mitigate the effects of power outages.

EXHIBIT 10

The Cost of Malicious Cyber Activity to the U.S. Economy

The Council of Economic Advisers

February 2018

Another area of concern is an attack on the order-matching system, which would cause a random fraction of trades to be left unmatched and would result in unwanted exposures to risk factors that the trader tried to hedge with a combination of long and short positions in securities. Manipulations of data feeds and news feeds, on which the automated trading systems employed by institutional traders frequently rely without human input, could pose another set of challenges to price efficiency. If the intrusions in the data feeds were small in scale and in scope, they would make it difficult to verify the starting and ending times of an intrusion in order to eventually certify that the data feeds are no longer contaminated. DARPA's efforts focus, among other things, on constructing simulated trading environments and then attacking these environments with various attack vectors in order to evaluate which defense solutions work best.

B. Power grid

An attack on the power grid could have devastating consequences for firms and private citizens.

i. Power grid attack vectors

Lloyd's and the University of Cambridge's Centre for Risk Studies, lay out a scenario for how hackers could attack power grids with malware that could lead to large-scale blackouts in the United States. At the basis of this scenario are real-world examples of attacks on power grids. One such example is the December 2016 attack that cut power in Ukraine. Cybersecurity companies involved in the investigation of the Ukraine attack found a piece of software "capable of ordering industrial computers to shut down electricity transmission." The software, known as Crash Override, can only be detected if the system is actively sending out signals and can cut power for up to a few days in portions of a country. Crash Override is currently capable of attacking power operators across Europe but could be modified to work against the U.S. Crash Override is only the second malware engineered to disrupt industrial control processes (the first was Stuxnet in 2010) (Wired 2017).

According to the scenario, a particular threat actor (e.g., a nation-state) could develop a malware that can infect electricity generation control rooms. Methods for inserting the malware include, but are not limited to: (1) targeting laptops and other personal electronic devices of key personnel with access to multiple power plants, (2) conducting 'phishing' attacks that allow the hackers to compromise the corporate network and establish chain attacks that ultimately lead to the control system (known as pivoting), (3) hacking a remotely accessed control system, and (4) physically entering the locations that monitor the network.

Once the hackers succeed in inserting the malware into the control system, they could keep the malware dormant while it reports information and receives commands. Modern power

companies are vulnerable to such threats since they may mistake additional traffic on their systems as merely a fault or a vendor diagnostic connection.

The attackers can then choose to trigger the malware at their discretion and take control of the generators. They can accomplish this task by forcing the generators to overload and burn out, thus causing additional fires and explosions in some cases. Such an attack could potentially destabilize a large area, such as the entire Northeastern U.S. regional grid. Power could be restored in some areas relatively quickly (within 24 hours), but other areas may be left without power for a number of weeks (Lloyd's of London. 2015).

ii. Potential costs of attacks

A cyberattack on the electrical grid could have large-scale economic impacts as infrastructure damages, loss in output, delayed production, spoiled inventory, and loss of wages all decrease productivity and earnings for the duration of the blackout. Since there are no examples of successful past cyberattacks against the power grid in the U.S., potential damages have to be assessed from adverse weather conditions.

Another example is the August 14, 2003, power outage that affected the Midwest and Northeast United States, as well as parts of Canada, which was attributed to a programming error. The blackout was not weather-related; it lasted two days in most areas, and up to two weeks in some areas, making it the largest power outage in recent history with estimated cost of $6 billion (Minkel 2008).

According to the study conducted by Lloyd's and the University of Cambridge's Centre for Risk Studies, a large-scale cyberattack can lead to both direct and indirect damages. Direct damages would include, but are not limited to, damage to assets, infrastructure, sales revenue of electricity supply companies, sale revenue of other businesses and supply chains. The study estimates that such a malware attack would lead to a $243 billion to $1 trillion loss to the U.S. economy. Indirect costs would include consequences such as the loss to the insurance market. The study estimates that such an attack could cost the insurance industry $21.4 billion to $71.1 billion dollars. This figure could further increase when the calculation takes into account the wide range of claims that could be triggered.

The study also highlighted the specific impacts an attack of this type would have on the economy. Productivity would see a decrease as businesses close from loss of power and people are unable to perform their regular duties. Even as businesses return to power employees may have difficulties getting to work due to limited fuel supply, disabled traffic lights, and limited to no public transportation.

Trade will also be impacted as maritime operating ports are suspended and the ability to load and unload ships becomes difficult to impossible without electricity. In addition, even if goods are able to make it to the limited available ports, there would be backups resulting in a slowdown of production along the supply chain.

Consumption will increase initially as people panic buy commodities; however, this will quickly take a turn. As banks do not have power and businesses either have to close or are limited to cash, people will need to limit their consumption and it will remain low until all affected people and business return to full power.

Finally, rail systems and airports will be shut down as a result of the power outages impacting tourism. The study expects that tourism would decrease severely during the outage and would not return to normal levels for several weeks.[16]

iii. Health and safety

In addition to the economic impacts of a large power outage, there are health and safety concerns. Power outages impacting heating and cooling systems, at home health systems, refrigeration, and slower emergency response will all increase the rate of illnesses and death in the impacted areas. People will suffer from heat related conditions (such as heat stroke) and hypothermia, spoiled food, and difficulty of emergency responders to communicate with those impacted. In addition, riots, looting, and arson attacks as well as lack of lighting and overstretched police will increase crimes and decrease safety.

Water and sewage facilities will also be impacted. There will be a limited supply of clean water as the power outage will impact pumps. This will result in people either having to go without water, using a limited portable water supply, and/or drinking contaminated water. Sewage plants will also experience spills as the facilities will not be able to operate without power (Lloyd's of London 2015).

Finally, hospitals will see a shortage of fuel for backup generators. With the average generator able to hold fuel to provide eight hours of power, a run on the fuel supply as well as high demand will limit the amount that can get to hospitals and other high need locations.

iv. National security

Currently, 85 percent of the DoD's energy comes from commercial sources. The Department "recognizes that such events could result in power outages affecting critical DoD missions

[16] Please see the footnote above.

involving power projection, defense of the homeland, or operations conducted at installations in the U.S."

It is estimated that a loss of power would impact the DoD missions of preventing terrorism and enhancing security, safeguarding and securing cyberspace, and strengthening national preparedness. If power outages affected missions both at home and abroad, United States security would be significantly impacted.[17]

v. Trust

FireEye Horizons published a report in which they noted that an attack could hinder the trust between a government and the people, citing the example of Russian interference in the U.S. Election and the questions surrounding the allegations and the security of the election process. The study explains that, even though no infrastructure was harmed, the "trust placed in the process has been degraded".[18]

An attack on the United States electrical grid could impact consumers' trust in their electrical company and the government security. While this would likely not prevent people from purchasing electricity, it could raise questions regarding national security and consumer safety.

DARPA is performing a large-scale study of how to best prevent and mitigate cyberattacks on the power grid. Among other things, DARPA is building grids that are isolated from the power grid network and using various attack vectors as well as various methods of defense in order to determine the most effective form of defense against the possible attack scenarios.

Cybersecurity experts like to say that in a future war the first shots will be fired in cyberspace. A growing consensus indicates that cyberspace is already being used by nation-states for retaliation against sanctions imposed on them by the international community.

A cyber adversary can utilize numerous attack vectors simultaneously. The back doors that were previously established may be used to concurrently attack the compromised firms for the purpose of simultaneous business-destruction type of attacks that was previously observed in case of Sony. An attack launched against the electric grid could affect large swaths of the U.S. economy because most economic activity is dependent on access to electricity. Financial markets could be attacked as well to reduce trust in the financial system. Economic analysis conducted by various industry studies estimates that cyberattacks on critical infrastructure assets can cause damage up to $1 trillion (Tofan 2016; Lloyd's of London 2015, 2017).

[17] Section 2(e): Assessment of Electricity Disruption Incident Response Capabilities

[18] FireEye Horizons: Smart Cities Growth Presents Opportunities for State Coercion, August 2016.

EXHIBIT 11

U.S. DEPARTMENT OF ENERGY

Strategic Transformer Reserve

Report to Congress
March 2017

United States Department of Energy
Washington, DC 20585

I. Legislative Language

This report responds to legislative language set forth in Section 61004 of the Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94), 129 Stat. 1780, wherein it is stated:

> ... *"(1) PLAN.—Not later than 1 year after the date of enactment of this Act, the Secretary, acting through the Office of Electricity Delivery and Energy Reliability, shall, in consultation with the Federal Energy Regulatory Commission, the Electricity Sub-sector Coordinating Council, the Electric Reliability Organization, and owners and operators of critical electric infrastructure and defense and military installations, prepare and submit to Congress a plan to establish a Strategic Transformer Reserve for the storage, in strategically located facilities, of spare large power transformers and emergency mobile substations in sufficient numbers to temporarily replace critically damaged large power transformers and substations that are critical electric infrastructure or serve defense and military installations."*

II. National Importance of a Strategic Transformer Reserve

A. Background

Electricity is fundamental to most aspects of daily life in the United States, from running appliances to enabling communications and financial transactions, to powering and controlling industry operations. However, beyond its role as an everyday commodity expected to be extremely reliable, electricity is an essential part of public health and safety and national security, and is thereby considered a critical or "lifeline" function. Moreover, the other lifeline functions (telecommunications, transportation, and water) are dependent on electricity.

Thus, ensuring the resilience of the electric grid and its ability to recover from both localized and catastrophic events is sufficiently critical to the economy and national well-being that its provision goes beyond a purely private sector responsibility. While industry has proven that it can respond to a broad range of events affecting a local area or a small region, there remain concerns that more widespread events impacting a large number of large power transformers (LPTs) would be difficult for industry alone to handle with current spares and capabilities. The availability of spare LPTs and/or a strategic transformer reserve would help the United States respond to and recover from events with impacts greater than the nation has thus far experienced. Such high-impact occurrences could be caused by solar geomagnetic disturbances (GMD) or earthquakes, a large electromagnetic pulse (EMP) weapon, or multiple physical and cyberattacks, among others. If the electric grid sustained substantial damage, the process of replacing equipment such as LPTs would be costly and could take months, if not years.

LPTs are critical elements of the electric power transmission and distribution grid (see Figure 1). LPTs pose unique vulnerabilities because of the long lead time it takes to manufacture and acquire replacements, and because of transformers' potential susceptibility to serious and evolving threats and hazards, ranging from localized outages caused by physical attacks to more severe events with widespread potential impact . Concerns about the vulnerabilities of LPTs have focused both government and industry attention on evaluating the need for a reserve capacity of transformers that would increase the ability of both individual utilities and industry partnerships to respond to adverse events and assure that the United States (U.S.) grid is sufficiently resilient to recover from both localized as well as widespread transformer failures.

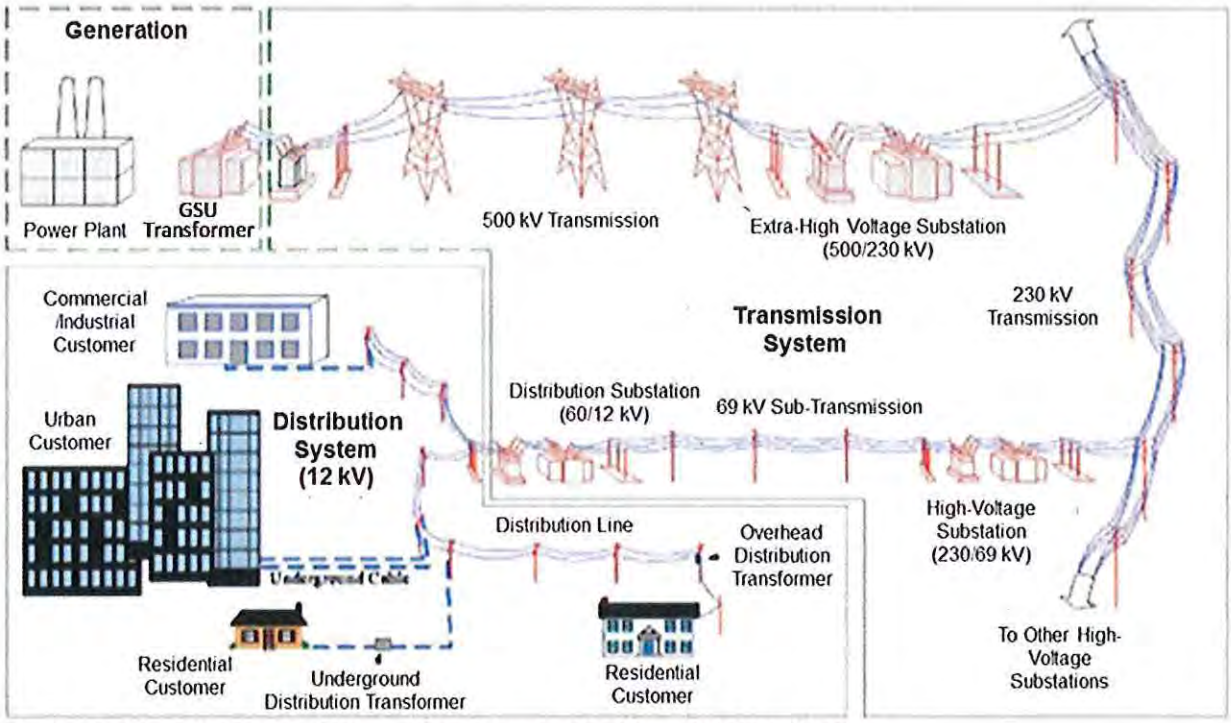


Figure 1: Electric Power Generation, Transmission, and Distribution

Thus, in April 2015 Department of Energy (DOE) Quadrennial Energy Review (QER) recommended that DOE analyze the technical specifications of a potential transformer reserve and assess existing industry equipment sharing efforts as part of a broader initiative to mitigate risks associated with the loss of one or more transformers. This recommendation focused both government and industry attention to the criticality of LPTs and issues related to their vulnerability to potential threats.

B. The FAST Act

Later that year, in December 2015, Congress and the President passed the FAST Act (Pub. L. No. 114-94), focused on improving the Nation's surface transportation infrastructure. The FAST Act directs DOE, plus government and industry partners, to establish and submit to Congress a plan

for the creation of a strategic transformer reserve as quoted in Section I of this report. This Report to Congress is provided in response to the FAST Act direction.

Appendix I of this Report lists additional provisions of the FAST Act regarding the required content of a transformer reserve plan, to include a discussion of the degree to which utility sector actions or initiatives—including individual utility ownership of spare equipment, joint ownership of spare equipment inventory, sharing agreements, or other spare equipment reserves or arrangements—satisfy the requirements of the FAST Act.

C. A Formal Request for Information Regarding Transformers

In July 2015, the DOE Office of Electricity Delivery and Energy Reliability (OE) released a Request for Information (RFI) though the Federal Register seeking comments and information from interested parties to inform its policy development related to the possible establishment of a national reserve of power transformers that support the bulk power grid.[1] This RFI was an initial step in addressing the recommendation in the QER. The focus of the RFI was to solicit information pertinent to the design, implementation, need, and viability—regulatory, economic, and technical—of a strategic transformer reserve.

There were 26 responses from utilities, manufacturers, industry trade groups, and spare-equipment sharing programs. The RFI questions included whether there is a need for a national strategic transformer reserve, as well as what the requirements would be for such a reserve. The responses reflected the industry view that LPTs are critical to the reliability of the grid and that the availability of spares is a key element. Respondents strongly recommended that DOE work in coordination with all stakeholders, including the states, manufacturers, utilities, industry trade associations, and international/Canadian partners to leverage existing spare equipment sharing programs, and to ensure that a reserve would neither negate nor duplicate existing programs.

Respondents recommended that a strategic transformer reserve, if established, be owned and administered by the industry or even utilities themselves, with appropriate input or funding from the government. This would allow the utilities to leverage their procurement procedures and vendors; knowledge about LPT maintenance, storage, and transportation; and operational flexibility in their existing or planned investments in spare equipment. Respondents also indicated that the funding for deployment of LPTs should also be the responsibility of utilities themselves, though some respondents felt government funding is required.

[1] DOE RFI: July 2015 https://www.federalregister.gov/documents/2015/07/09/2015-16784/national-power-transformer-reserve

Figure 4: Representative Transformer Manufacturing Timeline

- The United States has had limited domestic production capacity for LPTs and has heavily relied on foreign suppliers; reported procurement of LPTs from abroad has in recent years been as high as 85 percent. However, domestic production capacity for LPTs has improved. Since April 2010, four new or expanded facilities have begun producing LPTs in the United States, including: Georgia Transformer Corporation in Rincon, Georgia; Hyundai Heavy Industries in Montgomery, Alabama; SPX Transformer Solutions in Waukesha, Wisconsin; Mitsubishi Electric Corporation in Memphis, Tennessee; and the ABB Group in St. Louis, Missouri.

- While global procurement has been a common practice for many utilities and generators to meet their need for LPTs, there are several challenges associated with it. Challenges include the potential for an extended lead time due to unexpected global events or difficulty in transportation competing orders from foreign utilities. The energy industry is also facing the challenge of maintaining an experienced in-house workforce that is able to address procurement and maintenance issues.

- High-voltage bushings are also known to have long lead times and limited supplier sources. Two raw materials, copper and electrical steel, account for more than half of the total cost of LPT materials. Special grade electrical steel is used for the core of a power transformer and is critical to the efficiency and performance of the equipment; AK Steel in Westchester Ohio is currently the only domestic manufacturer. Furthermore, a specially manufactured copper conductor is used for the windings. The price volatility of these commodities in the global market can affect the manufacturing condition and procurement strategy for LPTs.

DOE Transformer Resilience and Advanced Components Program

Transformers, power lines, and substation equipment are often exposed to the elements and are vulnerable to an increasing number of natural and manmade threats. Advanced grid

hardware needs to be designed and built to better withstand and rapidly recover from the impact of lightning strikes, extreme terrestrial or space weather events, electrical disturbances, accidents, equipment failures, deliberate attacks, and other unknowns. This will ensure a reliable and resilient electric power system and achieve the full value of ongoing grid modernization, Next-generation technologies can improve the performance and lifetime of transformers and other equipment over current designs, and unleash new and expanded capabilities for the grid.

To help address this need, DOE is establishing the Transformer Resilience and Advanced Components (TRAC) program, which aims to accelerate modernization of the grid by addressing challenges to LPTs and other critical grid components. With $5 million of funding in 2016 and a request for $15 million in 2017, TRAC will support research and development to understand the physical impact that the evolving grid will have on LPTs and other equipment, and will encourage the adoption of new technologies and approaches. Most recently, TRAC made five awards totaling mote that $1.5 million to stimulate innovative LPT designs that are more flexible and adaptable so they can be readily used in different substations. These designs will increase the ability to share transformers and accelerate recovery in the event of the loss of one or more transformers. The awarded projects are:

- **Modular Controllable Transformers for a Resilient Grid.** *Georgia Tech Research Corporation, with Oak Ridge National Laboratory, Delta Star, and Southern Company.* This project will design an innovative modular controllable transformer that can be paralleled as needed to realize a range of higher power ratings (100-500 MVA), supporting continued grid operations under single or multiple transformer failures and provide flexibility in terms of configuration, load balancing, ease of transportation, and faster restoration time following a large outage.
- **A Modular and Flexible High-Frequency-Link Transformer with 63% Reduction in Device Count and Zero High-Side Devices.** *NextWatt, the National Center for Reliable Electric Power at the University of Arkansas, and General Electric.* This project will explore the design of a solid-state, modular high frequency link LPT rated at 100 MVA with a high-side voltage of 115 kV, variable low-side voltage, and variable impedance capability. The design can provide a three times reduction in both volume and weight compare to a conventional LPT, easing transportation concerns.
- **Grid Ready, Flexible Large Power Transformer.** *General Electric Global Research and Prolec GE.* This project will design a flexible LPT capable of accommodating multiple standard voltage ratios in the transmission network as well as providing an adjustable impedance to match that of a failed LPT. The key innovations in this project include multiple transmission class voltage taps at the low voltage side; a method for selecting the transformer impedance without changing the voltage ratio; and arrangement and connection of all the extra windings to minimize stresses.
- **Novel Concept for Flexible and Resilient Large Power Transformers.** *ABB Inc. with University of Tennessee-Knoxville.* This project will investigate the feasibility of

For this option, the costs to the Federal Government would be driven by the research programs run by DOE and others; assessments of the scenarios that the reserves should be designed to cover; the efforts to enable transportation of LPTs in times of need: and FERC's development and compliance oversight of the performance standards for industry. These costs are significantly lower than those for the procurement of a full reserve of transformers.

An approach to ensuring an adequate supply of LPT capacity that builds on existing Federal standards and industry-led activities would have numerous advantages, including greater flexibility to industry, lower federal costs, and expedited application. Key will be finding ways to assure that federal resiliency standards are met, and that assistance is provided to smaller utilities so that they may participate fully.

VI. Conclusions and Proposed Next Steps

To protect public health and safety, enhance national security, and ensure the resilience of the Nation's electric grid, there is an imperative to take actions that require industry and government to increase grid resilience, such as the measures called out in the FAST Act. However, DOE does not recommend creation of a Federally-owned reserve. Rather, the most efficient and effective approach is one which builds on industry-based approaches and their ongoing efforts to achieve greater transformer resilience in the face of the evolving threats. This approach would combine application of NERC Reliability Standards (e.g., CIP-014) and enhanced partnerships between government and the utility industry (including the ESCC), operators of sparing programs, and equipment manufacturers to facilitate the creation of a transformer reserve strategy that meets the needs of the Nation and benefits all utilities regardless of size.

Based on FERC data, utility industry cooperation, and the technical analysis conducted by the ORNL team, it appears that there are more un-energized LPTs available to industry than were previously recognized. Certain industry programs such as EEI's STEP program can be activated formally in a terrorist event and non-disclosure agreements have been signed in advance between all utility participants. Relatively recent companies and programs such as Wattstock, Grid Assurance, and RESTORE are supplementing the more established programs like STEP and SpareConnect. The NERC standards provide additional guidance on ensuring resilience to owners and operators. Such programs collectively support an industry-led solution as best positioned to meet transmission owner and operator needs.

To this end, DOE proposes working in close collaboration with the utility industry to:

- Develop a mechanism for independently assessing resilience of critical transformers, which could be those at facilities deemed critical under CIP-014.

Appendix I – Legislative Requirements: Strategic Transformer Reserve

The FAST Act calls for:

(2) INCLUSIONS.—The Strategic Transformer Reserve plan shall include a description of—

(A) the appropriate number and type of spare large power transformers necessary to provide or restore sufficient resiliency to the bulk-power system, critical electric infrastructure, and defense and military installations to mitigate significant impacts to the electric grid resulting from—

(i) physical attack;
(ii) cyber attack;
(iii) electromagnetic pulse attack;
(iv) geomagnetic disturbances;
(v) severe weather; or
(vi) seismic events;

(B) other critical electric grid equipment for which an inventory of spare equipment, including emergency mobile substations, is necessary to provide or restore sufficient resiliency to the bulk-power system, critical electric infrastructure, and defense and military installations;

(C) the degree to which utility sector actions or initiatives, including individual utility ownership of spare equipment, joint ownership of spare equipment inventory, sharing agreements, or other spare equipment reserves or arrangements, satisfy the needs identified under subparagraphs (A) and (B);

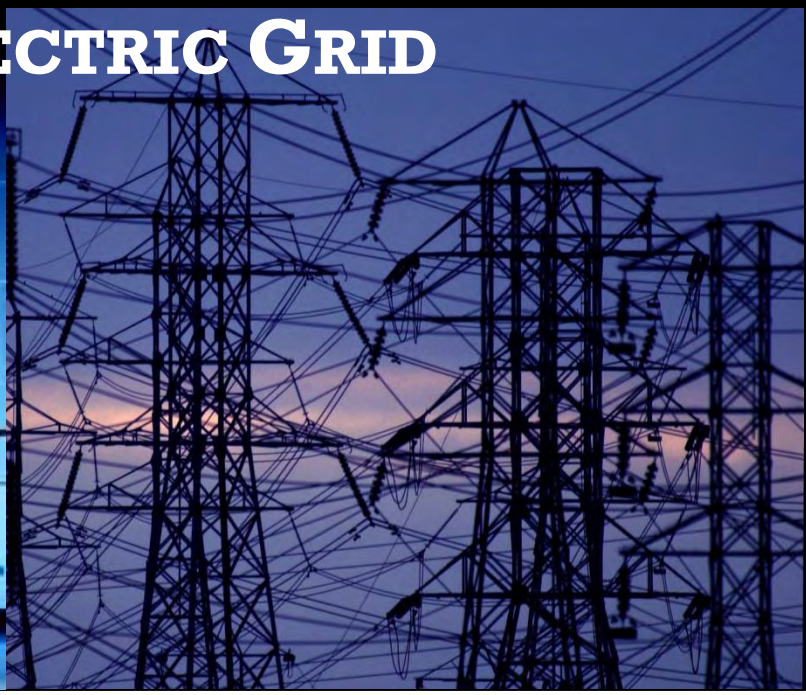
(D) the potential locations for, and feasibility and appropriate number of, strategic storage locations for reserve equipment, including consideration of—

(i) the physical security of such locations;
(ii) the protection of the confidentiality of such locations; and
(iii) the proximity of such locations to sites of potentially critically damaged large power transformers and substations that are critical electric infrastructure or serve defense and military installations, so as to enable efficient delivery of equipment to such sites;

(E) the necessary degree of flexibility of spare large power transformers to be included in the Strategic Transformer Reserve to conform to different substation configurations, including consideration of transformer—

EXHIBIT 12

Large Power Transformers and the U.S. Electric Grid



Infrastructure Security and Energy Restoration
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy

April 2014 Update

reliance on foreign manufacturers was even greater for extra high-voltage (EHV) power transformers with a maximum voltage rating greater than or equal to 345 kilovolts (kV).

However, the domestic production capacity of LPTs in the United States has seen some improvements. Since April 2010, four new or expanded facilities have begun producing LPTs in the United States, including: Efacec's first U.S. transformer plant, which began production in Rincon, Georgia, in April 2010; Hyundai Heavy Industries' new manufacturing facility, which was inaugurated in Montgomery, Alabama, in November 2011; SPX Transformer Solution's facility in Waukesha, Wisconsin, which completed expansion in April 2012; and Mitsubishi's new power transformer plant in Memphis, Tennessee, which became operational in April 2013.

The upward trend of transmission infrastructure investment in the United States since the late 1990s is one of the key drivers for the recent addition of domestic manufacturing capacity for power transformers. Power transformers are globally-traded equipment, and the demand for this machinery is forecasted to continue to grow at a compound annual growth rate of three percent to seven percent in the United States according to industry sources. In addition to the need for the replacement of aging infrastructure, the United States has a demand for transmission expansion and upgrades to accommodate new generation connections and maintain electric reliability.

While global procurement has been a common practice for many utilities to meet their growing need for LPTs, there are several challenges associated with it. Such challenges include: the potential for an extended lead time due to unexpected global events or difficulty in transportation; the fluctuation of currency exchange rates and material prices; and cultural differences and communication barriers. The utility industry is also facing the challenge of maintaining an experienced in-house workforce that is able to address procurement and maintenance issues.

The U.S. electric power grid is one of the Nation's critical life-line functions on which many other critical infrastructure depend, and the destruction of this infrastructure can have a significant impact on national security and the U.S. economy. The electric power infrastructure faces a wide variety of possible threats, including natural, physical, cyber, and space weather. While the potential effect of these threats on the infrastructure is uncertain, public and private stakeholders in the energy industry are considering and developing a variety of risk management strategies to mitigate the effects. This DOE report updates the prior 2012 study and includes the following additional discussions:

- Updated information about global electrical steel supply conditions;
- The increased domestic production of LPTs resulting from four new or expanded plants;
- The historical assessment of risks to power transformers by an insurance firm; and
- New government and industry efforts to augment risk management options for critical electricity infrastructure, including power transformers.

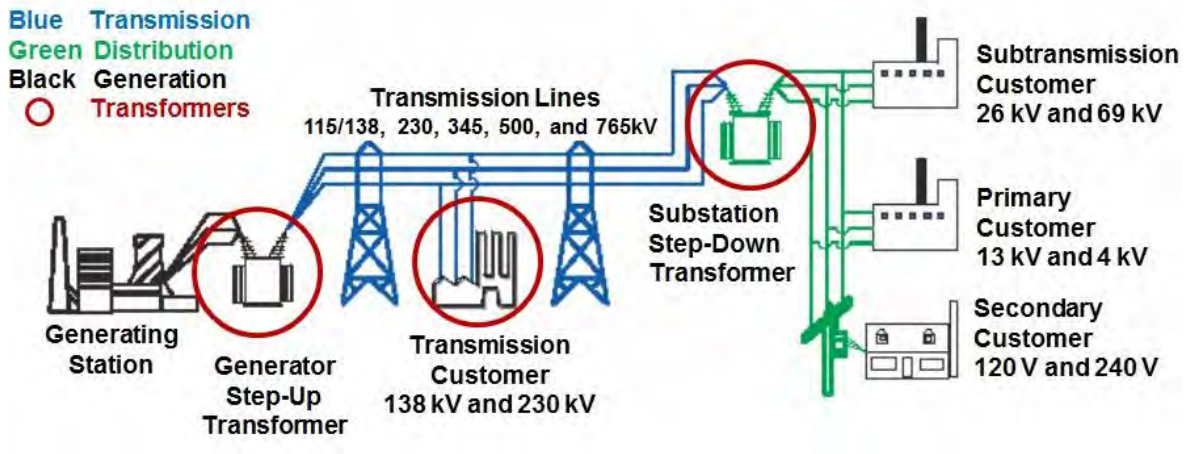
Through these and the assessment of the manufacturing and supply issues related to LPTs, this report provides information to help the industry's continuous efforts to build critical energy infrastructure resilience in today's complex, interdependent global economy.

2. POWER TRANSFORMER CLASSIFICATION

2.1 Power Transformers in the Electric Grid

North America's electricity infrastructure represents more than $1 trillion U.S. dollars in asset value and is one of the most advanced and reliable systems in the world. The U.S. bulk grid consists of approximately 390,000 miles of transmission lines, including more than 200,000 miles of high-voltage lines, connecting to more than 6,000 power plants.[18] Power transformers are a critical component of the transmission system, because they adjust the electric voltage to a suitable level on each segment of the power transmission from generation to the end user. In other words, a power transformer steps up the voltage at generation for efficient, long-haul transmission of electricity and steps it down for distribution to the level used by customers.[19] Power transformers are also needed at every point where there is a change in voltage in power transmission to step the voltage either up or down. Figure 1 illustrates a simplified arrangement of the U.S. electric grid system.

Figure 1. Electric Power Grid Representation



Source: DOE, 2006; see footnote 13. Modified based on industry review.

2.2 Physical Characteristics of Large Power Transformers

An LPT is a large, custom-built piece of equipment that is a critical component of the bulk transmission grid. Because LPTs are very expensive and tailored to customers' specifications, they are usually neither interchangeable with each other nor produced for extensive spare inventories.[20] According to an industry source, approximately 1.3 transformers are produced for each transformer design. Figure 2 illustrates a standard core-type LPT and its major internal components.

Although LPTs come in a wide variety of sizes and configurations, they consist of two main active parts: the core, which is made of high-permeability, grain-oriented, silicon electrical steel,

[18] 2013 NERC Electricity Supply & Demand Database, http://www.nerc.com/pa/RAPA/ESD/Pages/default.aspx (accessed March 26, 2014).
[19] Electricity is generally produced at 5 to 34.5 kV and distributed at 15 to 34.5 kV, but transmitted at 115 to 765 kV for economical, low-loss, long-distance transmission on the grid.
[20] "Large Power Transformers from Korea," USITC, Publication 4256, September 2011.

are a significant factor in power transformer prices. Transportation is also an important element of the total LPT cost because an LPT can weigh as much as 410 tons (820,000 pounds (lb)) and often requires long-distance transport.

Table 2. Estimated Magnitude of Large Power Transformers in 2011

Voltage Rating (Primary-Secondary)	Capability MVA Rating	Approximate Price	Approximate Weight and Dimensions
Transmission Transformer			
Three Phase			
230–115kV	300	$2,000,000	170 tons (340,000 lb) 21ft W–27ft L–25ft H
345–138kV	500	$4,000,000	335 tons (670,000 lb) 45ft W–25ft L–30ft H
765–138kV	750	$7,500,000	410 tons (820,000 lb) 56ft W–40ft L–45ft H
Single Phase			
765–345kV	500	$4,500,000	235 tons (470,000 lb) 40ft W–30ft L–40ft H
Generator Step-Up Transformer			
Three Phase			
115–13.8kV	75	$1,000,000	110 tons (220,000 lb) 16ft W–25ft L–20ft H
345-–13.8kV	300	$2,500,000	185 tons (370,000 lb) 21ft W–40ft L–27ft H
Single Phase			
345–22kV	300	$3,000,000	225 tons (450,000 lb) 35ft W–20ft L–30ft H
765–26kV	500	$5,000,000	325 tons (650,000 lb) 33ft W–25ft L–40ft H

Note: Prices are FOB factory and do not include taxes, transportation, special features and accessories, special testing (short-circuit, etc.), insulating oil, field installation, and/or optional services. The total installed cost is estimated to be about 25 percent to 30 percent higher.

Source: "Special Report: Spare Equipment Database System," NERC, 2011; see footnote 17.

LPTs require substantial capital and a long-lead time (in excess of six months) to manufacture, and its production requires large crane capacities, ample floor space, and adequate testing and drying equipment. The following section provides further discussions on the production processes and requirements of LPTs, including transportation and key raw commodities.

3. Large Power Transformer Procurement and Manufacturing Process

3.1 Overview

This section provides an overview of key steps in the procurement and manufacturing process of an LPT, including bidding, production, and transportation. This overview is then followed by a discussion of key raw materials—electrical steel and copper—which are integral to LPTs. The several distinct steps and procedures, as well as the estimated lead time for each step required in power transformer manufacturing and procurement, are illustrated in Figure 3.

3.1.3 Production

The typical manufacturing process of an LPT consists of the following steps:[28]

1. **Engineering and design:** LPT design is complex, balancing the costs of raw materials (copper, steel, and cooling oil), electrical losses, manufacturing labor hours, plant capability constraints, and shipping constraints.
2. **Core building:** The core is the most critical component of an LPT, which requires a highly-trained and skilled workforce and cold-rolled, grain-oriented (CRGO) laminated electrical steel.
3. **Windings production and assembly of the core and windings:** Windings are predominantly copper and have an insulating material.
4. **Drying operations:** Excess moisture must be removed from the core and windings because moisture can degrade the dielectric strength of the insulation.
5. **Tank production:** A tank must be completed before the winding and core assembly finish the drying phase so that the core and windings do not start to reabsorb moisture.
6. **Final assembly of the LPT:** The final assembly must be done in a clean environment; even a tiny amount of dust or moisture can deteriorate the performance of an LPT.
7. **Testing:** Testing is performed to ensure the accuracy of voltage ratios, verify power ratings, and determine electrical impedances.

In the manufacturing process, certain parts can be produced either at the transformer plant or at another vendor or subsidiary location, depending on how vertically integrated the particular plant is and whether the plant has the necessary tools and capabilities, as well as for economic reasons.[29]

3.1.4 Lead Time

In 2010, the average lead time between a customer's LPT order and the date of delivery ranged from five to 12 months for domestic producers and six to 16 months for producers outside the United States.[30] The LPT market is characterized as a cyclical market with a correlation between volume, lead time, and price. In other words, the average lead time can increase when the demand is high, up to 18 to 24 months.[31] This lead time could extend beyond 20 months and up to five years in extreme cases if the manufacturer has difficulty obtaining any key inputs, such as bushings and other key raw materials, or if considerable new engineering is needed.[32] An industry source noted that high-voltage (HV) bushings often have a long lead time, extending up to five months. Another industry source added that HV bushings are usually customized for each power transformer and there are limited bushing manufacturers in the United States. Manufacturers must also secure supplies of specific raw materials or otherwise they could endure an extended lead time.[33]

Once completed, a power transformer is disassembled for transport, including the removal of oil, radiators, bushings, convertors, arrestors, and so forth. The proper transportation of a power

[28] "Large Power Transformers from Korea," USITC, Publication 4256, September 2011, pp. I-9–I-10.
[29] Conference Hearing for Investigation No.731-TA-1189, USITC, August 4, 2011, p. 95.
[30] Ibid., p. II-7.
[31] SPX Transformer Solutions Analyst Day Presentation, September 11, 2012.
[32] Industry source estimate.
[33] "Large Power Transformers from Korea," USITC, Publication 4256, September 2011, p. II-7.

When an LPT is transported on the road, it requires obtaining special permits and routes from the department of transportation of each state on the route of the LPT being transported. According to an industry source, obtaining these special permits can require an inspection of various infrastructure (e.g., bridges), which can add delay. In addition, transporting LPTs on the road can require temporary road closures due to traffic issues, as well as a number of crew and police officers to coordinate logistics and redirect traffic. The transport modular shown in Figure 4 is 70 feet long with 12 axles and 192 wheels, and occupies two lanes of traffic.

Logistics and transportation accounted for approximately three percent to 20 percent of the total cost of an LPT for both domestic and international producers.[39] While important, this is less significant than the cost of raw materials and the potential sourcing concerns surrounding them. The next section describes some of the issues concerning raw materials vital to LPT manufacturing.

3.2 Raw Materials Used in Large Power Transformers

The main raw materials needed to build power transformers are copper conductors, silicon iron/steel, oil, and insulation materials. The cost of these raw materials is significant, accounting for well over 50 percent of the total cost of a typical LPT. Specifically, manufacturers have estimated that the cost of raw materials accounted for 57 percent to 67 percent of the total cost of LPTs sold in the United States between 2008 and 2010.[40] Of the total material cost, about 18 percent to 27 percent was for copper and 22 percent to 24 percent was for electrical steel.[41] For this reason, this section examines the issues surrounding the supply chain and price variability of the two key raw materials used in LPTs—copper and electrical steel.

3.2.1 Electrical Steel and Large Power Transformers

The electrical steel used in power transformer manufacture is a specialty steel tailored to produce certain magnetic properties and high permeability. A special type of steel called cold-rolled grain-oriented electrical steel (hereinafter refer to as "electrical steel") makes up the core of a power transformer. Electrical steel is the most critical component that has the greatest impact on the performance of the power transformer, because it is designed to provide low core loss and high permeability, which are essential to efficient and economical power transformers.

Electrical steel is produced in different levels of magnetic permeability: conventional and high-permeability. Conventional products are available in various grades from M-2 through M-6, with thickness and energy loss increasing with each higher number (see Figure 5).[42] High-permeability product allows a transformer to operate at a higher level of flux density[43] than conventional products, thus permitting a transformer to be smaller and have lower operating

[39] "Large Power Transformers from Korea," USITC, Publication 4256, September 2011, p. V-1, and an industry source estimate.
[40] Ibid.
[41] Ibid., p. VI-1.
[42] "Grain-Oriented Electrical Steel from China, Czech Republic, Germany, Japan, Korea, Poland, and Russia," USITC, Publication 4439, November 2013, http://www.usitc.gov/publications/701_731/pub4439.pdf (accessed March 25, 2014).
[43] "Flux density" generally refers to the total number of magnetic lines of force per unit area (i.e., the density of magnetic lines of force, or magnetic flux lines, passing through a specific area.) Source: Ibid.

- Fluctuations in currency exchange rates and the prices of materials during the time in which a power transformer is being manufactured can quickly change the competitive bid price for the order.
- Cultural differences and other communication barriers can be challenging. In many cultures, what the buyer-manufacturer relationship entails may vary from what is written in the contract.
- Foreign factories may not understand the U.S. standards such as the Institute of Electrical and Electronics Engineers (IEEE) and the National Institute of Standards and Technology (NIST) or have appropriate testing facilities.
- Foreign vendors may not have the ability to repair damaged power transformers in the United States.
- It is expensive to travel overseas for quality inspections and to witness factory acceptance testing.
- The utility industry is also facing the challenge of maintaining an experienced, well-trained in-house workforce that is able to address power transformer procurement and maintenance issues.

Utilities can minimize the potential risks related to global sourcing by focusing on proactive business strategies, planning effectively, and managing a portfolio of qualified and experienced suppliers.

6. RISKS TO POWER TRANSFORMERS

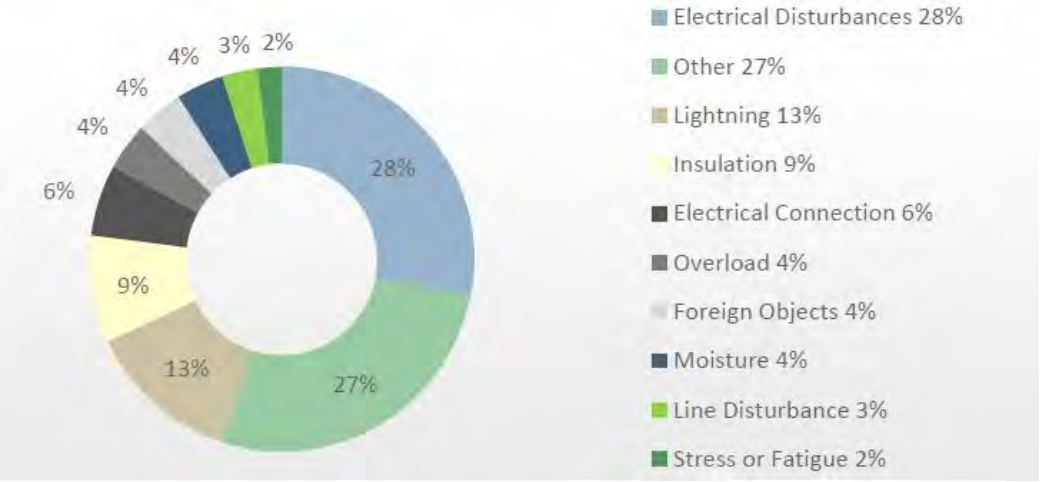
As discussed in this report, LPTs are significant investment pieces that are critical to the reliable operation of the electric grid; therefore, the assessment of the health of and risks to LPTs is an essential part of proper maintenance of the equipment. Figure 18 is an analysis of the main causes of power transformer failures between 1991 and 2010. This figure is based on the examination of historical insurance claims for various utility type transformers during the 20-year period, which included several hundred transformer failures.[93] This assessment was based on an insurance firm's own internal investigation of the failures. As shown in Figure 18, electrical disturbances were the leading cause for power transformer failures, responsible for 28 percent of the total failures that occurred during this 20-year period.[94] "Electrical disturbances" included phenomena such as switching surges, voltage spikes, line faults/flashovers, and other utility abnormalities, but excludes lightning.

Although age is not included as a cause of transformer failure in Figure 18, age is certainly a contributing factor to increases in transformer failures. Various sources, including power equipment manufacturers, estimated that the average age of LPTs installed in the United States is 38 to 40 years, with approximately 70 percent of LPTs being 25 years or older.[95] According to an industry source, there are some units well over 40 years old and some as old as over 70+ years that are still operating in the grid. An LPT is subjected to faults that result in high radial and

[93] Bartley, William H., "Analysis of Transformer Failures," Hartfort Steam Boiler Inspection & Insurance Co., 79th International Conference of Doble Clients, March 25 – 30, 2012, Boston, MA.
[94] Ibid.
[95] Conference Hearing for Investigation No.731-TA-1189, USITC, August 4, 2011, pp. 147–148.

compressive forces, as the load and operating stress increase with system growth.[96] In an aging power transformer failure, typically the conductor insulation is weakened to the degree at which it can no longer sustain the mechanical stresses of a fault.[97]

Figure 18. Causes of Transformer Failures Between 1991 and 2010 (as a Percentage of Total Failures)



Source: SPX; 2012 Doble Engineering Company—79th Annual International Doble Client Conference; Analysis of Transformer Failures, by William H. Bartley P.E., Hartford Steam Boiler Inspection & Insurance Co.

Given the technical valuation that a power transformer's risk of failure is likely to increase with age, many of the LPTs in the United States are potentially subject to a higher risk of failure. Although age can be a factor, the life expectancy of a power transformer varies depending on how it is used. In addition, according to an industry source, there were also some bad batches of LPTs from certain vendors. The same source also estimated that the failure rate of LPTs is around 0.5 percent. In addition to these traditional threats to power transformers, the physical security of transformers at substations has become a public safety concern due to a coordinated physical attack on cyber infrastructure of a California substation in 2013. Efforts are under way to increase utilities' awareness of possible substation vulnerabilities.

In recognition of the importance of LPTs with regard to the reliability of the grid, there are various ongoing efforts to enhance the resilience of power transformers. Specifically, there is an increasing amount of activities to address the potential threats to LPTs, including the following:

- On March 7 2014, the Federal Energy Regulatory Commission (FERC) directed NERC to develop mandatory physical security standards within 90 days in the wake of attacks on transmission facilities in the United States in 2013. Owners and operators are to first identify critical facilities, and then develop and implement plans to protect against physical attacks that may compromise the operability or recovery of such facilities.[98]
- NERC, under the direction of FERC, are developing reliability standards that are intended to mitigate the effects of GMDs on the reliable operation of the electric power

[96] Bartley, W.H., Hartford Steam Boiler Inspection & Insurance Co., 2012.
[97] Ibid.
[98] "Reliability Standards for Physical Security Measures," FERC, Order Directing Filing for Standards, March 7, 2014, http://www.ferc.gov/CalendarFiles/20140307185442-RD14-6-000.pdf (accessed April 1, 2014).

EXHIBIT 13

EXECUTIVE ORDERS

Executive Order on Securing the United States Bulk-Power System

INFRASTRUCTURE & TECHNOLOGY

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By the authority vested in me as President by the Constitution and the laws of the United States of America, including the International Emergency Economic Powers Act (50 U.S.C. 1701 *et seq*.) (IEEPA), the National Emergencies Act (50 U.S.C. 1601 *et seq*.) (NEA), and section 301 of title 3, United States Code,

I, DONALD J. TRUMP, President of the United States of America, find that foreign adversaries are increasingly creating and exploiting vulnerabilities in the United States bulk-power system, which provides the electricity that supports our national defense, vital emergency services, critical infrastructure, economy, and way of life. The bulk-power system is a target of those seeking to commit malicious acts against the United States and its people, including malicious cyber activities, because a successful attack on our bulk-power system would present significant risks to our economy, human health and safety, and would render the United States less capable of acting in defense of itself and its allies.

I further find that the unrestricted acquisition or use in the United States of bulk-power system electric equipment designed, developed, manufactured, or supplied by persons owned by, controlled by, or subject to the jurisdiction or direction of foreign adversaries augments the ability of foreign adversaries to create and exploit vulnerabilities in bulk-power system electric equipment, with potentially catastrophic effects.

I therefore determine that the unrestricted foreign supply of bulk-power system electric equipment constitutes an unusual and extraordinary threat to the national security, foreign policy, and economy of the United States, which has its source in whole or in substantial part outside the United States. This threat exists both in the case of individual acquisitions and when acquisitions are considered as a class. Although maintaining an open investment climate in bulk-power system electric equipment, and in the United States economy more generally, is important for the overall growth and prosperity of the United States, such openness must be balanced with the need to protect our Nation against a critical national security threat. To address this threat, additional steps are required to protect the security, integrity, and reliability of bulk-power system electric equipment used in the United States. In light of these findings, I hereby declare a national emergency with respect to the threat to the United States bulk-power system.

Accordingly, I hereby order:

Section 1. Prohibitions and Implementation. (a) The following actions are prohibited: any acquisition, importation, transfer, or installation of any bulk-power system electric equipment (transaction) by any person, or with respect to any property, subject to the jurisdiction of the United States, where the transaction involves any property in which any foreign country or a national thereof has any interest (including through an interest in a contract for the provision of the equipment), where the transaction was initiated a. er the date of this order, and where the Secretary of Energy (Secretary), in coordination with the Director of the Office of Management and Budget and in consultation with the Secretary of Defense, the Secretary of Homeland Security, the Director of National Intelligence, and, as appropriate, the heads of other executive departments and agencies (agencies), has determined that:

(i) the transaction involves bulk-power system electric equipment designed, developed, manufactured, or supplied, by persons owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary; and

(ii) the transaction:

(A) poses an undue risk of sabotage to or subversion of the design, integrity, manufacturing, production, distribution, installation, operation, or maintenance of the bulk-power system in the United States;

(B) poses an undue risk of catastrophic effects on the security or resiliency of United States critical infrastructure or the economy of the United States; or

(C) otherwise poses an unacceptable risk to the national security of the United States or the security and safety of United States persons.

(b) The Secretary, in consultation with the heads of other agencies as appropriate, may at the Secretary's discretion design or negotiate measures to mitigate concerns identified under section 1(a) of this order. Such measures may serve as a precondition to the approval by the Secretary of a transaction or of a class of transactions that would otherwise be prohibited pursuant to this order.

(c) The prohibitions in subsection (a) of this section apply except to the extent provided by statutes, or in regulations, orders, directives, or licenses that may be issued pursuant to this order, and notwithstanding any contract entered into or any license or permit granted prior to the date of this order.

(d) The Secretary, in consultation with the heads of other agencies as appropriate, may establish and publish criteria for recognizing particular equipment and particular vendors in the bulk-power system electric equipment market as pre-qualified for future transactions; and may apply these criteria to establish and publish a list of pre-qualified equipment and vendors. Nothing in this provision limits the Secretary's authority under this section to prohibit or otherwise regulate any transaction involving pre-qualified equipment or vendors.

Sec. 2. Authorities. (a) The Secretary is hereby authorized to take such actions, including directing the timing and manner of the cessation of pending and future transactions prohibited pursuant to section 1 of this order, adopting appropriate rules and regulations, and employing all other powers granted to the President by IEEPA as may be necessary to implement this order. The heads of all agencies, including the Board of Directors of the Tennessee Valley Authority, shall take all appropriate measures within their authority as appropriate and consistent with applicable law, to implement this order.

(b) Rules and regulations issued pursuant to this order may, among other things, determine that particular countries or persons are foreign adversaries exclusively for the purposes of this order; identify persons owned by, controlled by, or subject to the jurisdiction or direction of foreign adversaries exclusively for the purposes of this order; identify particular equipment or countries

with respect to which transactions involving bulk-power system electric equipment warrant particular scrutiny under the provisions of this order; establish procedures to license transactions otherwise prohibited pursuant to this order; and identify a mechanism and relevant factors for the negotiation of agreements to mitigate concerns raised in connection with subsection 1(a) of this order. Within 150 days of the date of this order, the Secretary, in consultation with the Secretary of Defense, the Secretary of Homeland Security, the Director of National Intelligence, and, as appropriate, the heads of other agencies, shall publish rules or regulations implementing the authorities delegated to the Secretary by this order.

(c) The Secretary may, consistent with applicable law, redelegate any of the authorities conferred on the Secretary pursuant to this section within the Department of Energy.

(d) As soon as practicable, the Secretary, in consultation with the Secretary of Defense, the Secretary of the Interior, the Secretary of Homeland Security, the Director of National Intelligence, the Board of Directors of the Tennessee Valley Authority, and the heads of such other agencies as the Secretary considers appropriate, shall:

(i) identify bulk-power system electric equipment designed, developed, manufactured, or supplied, by persons owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary that poses an undue risk of sabotage to or subversion of the design, integrity, manufacturing, production, distribution, installation, operation, or maintenance of the bulk-power system in the United States, poses an undue risk of catastrophic effects on the security or resiliency of United States critical infrastructure or the economy of the United States, or otherwise poses an unacceptable risk to the national security of the United States or the security and safety of United States persons; and

(ii) develop recommendations on ways to identify, isolate, monitor, or replace such items as soon as practicable, taking into consideration overall risk to the bulk-power system.

Sec. 3. Task Force on Federal Energy Infrastructure Procurement Policies Related to National Security. (a) There is hereby established a Task Force on Federal Energy Infrastructure Procurement Policies Related to National Security (Task Force), which shall work to protect the Nation from national security threats through the coordination of Federal Government procurement of energy infrastructure and the sharing of risk information and risk management

practices to inform such procurement. The Task Force shall be chaired by the Secretary or the Secretary's designee.

(b) In addition to the Chair of the Task Force (Chair), the Task Force membership shall include the following heads of agencies, or their designees:

(i) the Secretary of Defense;

(ii) the Secretary of the Interior;

(iii) the Secretary of Commerce;

(iv) the Secretary of Homeland Security;

(v) the Director of National Intelligence;

(vi) the Director of the Office of Management and Budget; and

(vii) the head of any other agency that the Chair may designate in consultation with the Secretary of Defense and the Secretary of the Interior.

(c) The Task Force shall:

(i) develop a recommended consistent set of energy infrastructure procurement policies and procedures for agencies, to the extent consistent with law, to ensure that national security considerations are fully integrated across the Federal Government, and submit such recommendations to the Federal Acquisition Regulatory Council (FAR Council);

(ii) evaluate the methods and criteria used to incorporate national security considerations into energy security and cybersecurity policymaking;

(iii) consult with the Electricity Subsector Coordinating Council and the Oil and Natural Gas Subsector Coordinating Council in developing the recommendations and evaluation described in subsections (c)(i) through (ii) of this section; and

(iv) conduct any other studies, develop any other recommendations, and submit any such studies and recommendations to the President, as appropriate and as directed by the Secretary.

(d) The Department of Energy shall provide administrative support and funding for the Task Force, to the extent consistent with applicable law.

(e) The Task Force shall meet as required by the Chair and, unless extended by the Chair, shall terminate once it has accomplished the objectives set forth in subsection (c) of this section, as determined by the Chair, and completed the reports described in subsection (f) of this section.

(f) The Task Force shall submit to the President, through the Chair and the Director of the O. ice of Management and Budget:

(i) a report within 1 year from the date of this order;

(ii) a subsequent report at least once annually thereafter while the Task Force remains in existence; and

(iii) such other reports as appropriate and as directed by the Chair.

(g) In the reports submitted under subsection (f) of this section, the Task Force shall summarize its progress, findings, and recommendations described in subsection (c) of this section.

(h) Because attacks on the bulk-power system can originate through the distribution system, the Task Force shall engage with distribution system industry groups, to the extent consistent with law and national security. Within 180 days of receiving the recommendations pursuant to subsection (c)(i) of this section, the FAR Council shall consider proposing for notice and public comment an amendment to the applicable provisions in the Federal Acquisition Regulation to implement the recommendations provided pursuant to subsection (c)(i) of this section.

Sec. 4. Definitions. For purposes of this order, the following definitions shall apply:

(a) The term “bulk-power system” means (i) facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof); and (ii) electric energy from generation facilities needed to maintain transmission reliability. For the purpose of

this order, this definition includes transmission lines rated at 69,000 volts (69 kV) or more, but does not include facilities used in the local distribution of electric energy.

(b) The term "bulk-power system electric equipment" means items used in bulk-power system substations, control rooms, or power generating stations, including reactors, capacitors, substation transformers, current coupling capacitors, large generators, backup generators, substation voltage regulators, shunt capacitor equipment, automatic circuit reclosers, instrument transformers, coupling capacity voltage transformers, protective relaying, metering equipment, high voltage circuit breakers, generation turbines, industrial control systems, distributed control systems, and safety instrumented systems. Items not included in the preceding list and that have broader application of use beyond the bulk-power system are outside the scope of this order.

(c) The term "entity" means a partnership, association, trust, joint venture, corporation, group, subgroup, or other organization.

(d) The term "foreign adversary" means any foreign government or foreign non-government person engaged in a long-term pattern or serious instances of conduct significantly adverse to the national security of the United States or its allies or the security and safety of United States persons.

(e) The term "person" means an individual or entity.

(f) The term "procurement" means the acquiring by contract with appropriated funds of supplies or services, including installation services, by and for the use of the Federal Government, through purchase, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated.

(g) The term "United States person" means any United States citizen, permanent resident alien, entity organized under the laws of the United States or any jurisdiction within the United States (including foreign branches), or any person in the United States.

Sec. 5. Recurring and Final Reports to the Congress. The Secretary is hereby authorized to submit recurring and final reports to the Congress regarding the national emergency declared in this order, consistent with section 401(c) of the NEA (50 U.S.C. 1641(c)) and section 204(c) of IEEPA (50 U.S.C. 1703(c)).

Sec. 6. General Provisions. (a) Nothing in this order shall be construed to impair or otherwise affect:

(i) the authority granted by law to an executive department or agency, or the head thereof; or

(ii) the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(b) This order shall be implemented consistent with applicable law and subject to the availability of appropriations.

(c) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

DONALD J. TRUMP

THE WHITE HOUSE,
May 1, 2020.