



2009 Minerals Yearbook

IRON ORE

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U.S. iron ore production in 2009 was one-half that of 2008; consumption during this same period decreased by 40%. World iron ore production and consumption once again rose in 2009, but by only 2%. China, by far the leading consumer, led gross tonnage production of iron ore with relatively low-grade ore. China was the leading producer of iron ore in terms of iron content, followed by Australia and Brazil (tables 1, 17). For the eighth consecutive year, world iron ore trade increased. World prices dropped significantly compared with those of 2008.

Iron ore is the basic raw material for producing iron and steel. The supply of iron ore is critical to the economies of all industrialized nations. Scrap, a supplement to iron ore in steelmaking, is also an extremely important feed material, but owing to lack of supply of high-quality scrap, its use has limitations. Direct reduced iron (DRI) is an alternative to scrap, but requires iron ore for its production.

Two iron oxides—hematite (Fe_2O_3) and magnetite (Fe_3O_4)—are the primary ore minerals of iron. Taconite, the primary iron ore mined in the United States, contains hematite and magnetite in varying proportions and is found in hard, fine-grained, banded iron formations with low iron content, between 20% and 30%. Almost all domestic iron ore production is transformed into molten iron in blast furnaces by the iron and steel industry. Most molten iron then goes directly to a basic oxygen furnace (BOF) for conversion to steel by removing most of the residual carbon. The remainder is poured into molds to produce pig iron.

In 2009, the United States used 31.0 million metric tons (Mt) of iron ore, a decrease of 20.9 Mt, or 40%, compared with that of 2008, and produced 19.0 Mt of pig iron. Pig iron production decreased 44% from that of 2008 and was at the lowest level since before World War II.

Raw steel production, at 59.4 Mt, decreased 35% compared with that of 2008. U.S. steel consumption decreased to 63 Mt from 102 Mt in 2008. Imported iron ore supplements domestically produced iron ore in the production of pig iron, which is used along with imported pig iron, DRI, and scrap to produce raw steel. Integrated steel mills produce steel from iron ore; minimills produce steel from DRI and scrap. In 2009, the minimill sector of the steel industry made up 62% of the U.S. raw steel production (American Iron and Steel Institute, 2010, p. 73).

Integrated steelmakers can increase steel mill product production without increasing blast furnace production by importing pig iron and semifinished steel. This permits steelmakers to avoid costly startup of less-efficient blast furnaces held in reserve and the employment of additional skilled workers. In 2009, net U.S. exports (exports minus imports) of iron ore substitutes were 5.7 Mt, while in 2008 the United States was a net exporter of 14.8 Mt of substitutes. This increase in exports was owing to continued high levels

of scrap steel net exports combined with substantial decreases in net imports of DRI, pig iron, and semifinished steel products. During the year, along with the 33% decrease in raw steel production and a 38% drop in steel demand, iron ore consumption declined 40% from 2008 levels.

Legislation and Government Programs

In 2009, the Minnesota production tax rate to be distributed in 2010 changed for concentrates and pellets produced in 2009, increasing to \$2.364 from \$2.316 per taxable long ton. The taxable tonnage for 2009 is based on the average tonnage produced in 2007–09.

Changes affecting taconite mining and processing operations passed by the Minnesota Legislature in 2009 included production taxation items that would be based on the 2008 and 2009 production. A Taconite Environmental Protection Fund was established to receive 15.5 cents per long ton (about 15.3 cents per metric ton) from 2008 production that would have gone into the Taconite Property Tax Relief Account. Instead, these funds were set aside for use in renewable energy initiatives to be distributed in 2009 only. A production tax change for 2009 that would affect distribution of taxes in 2010 and thereafter included redistribution to 50% mining and 50% processing from 40% mining and 60% processing of the proceeds when mining and processing were carried out in two separate tax districts. Another production tax change for 2009 that would affect distribution of taxes in 2010 was a redistribution of excess tax funds to cities and towns within a school district if distribution to the school district would reduce State aid to the district (Minnesota Department of Revenue, 2009, p. 1, 6, 7, 20; 2010, p. 1, 20).

Production

The U.S. Geological Survey (USGS) develops U.S. iron ore production data through an annual “Iron Ore” survey, which is sent to iron ore mines, and those mines provided the production statistics listed in tables 1 through 5. This information is supplemented by employment data, information from consumers, and mine inspection reports. The American Iron Ore Association became a supplier-oriented organization, now known as the Iron Mining Association of Minnesota, and no longer provides data on ore shipments from loading docks on the Upper Great Lakes nor receipts at transfer docks and furnace yards nationwide. Steel plant data continues to be compiled by the American Iron and Steel Institute (AISI).

In 2009, domestic iron ore production was 26.7 Mt, about one-half of the 2008 production, which was 53.6 Mt. Michigan and Minnesota taconite mines accounted for almost all domestic iron ore production—six mines operated on the Mesabi Range

in northeastern Minnesota and two on the Marquette Range in Michigan's Upper Peninsula. Domestic iron ore supply (production minus exports) met 74% of domestic demand in 2009, 3% less than the average from 2005 through 2008.

Cliffs Natural Resources Inc. (Cleveland, OH) announced 2009 iron ore production for its North American operations. Mine production, which totaled 20 Mt, was as follows (United States, unless otherwise specified)—Empire, 2.6 Mt; Hibbing Taconite, 1.7 Mt; Northshore, 3.3 Mt; Tilden, 5.7 Mt; United Taconite, 3.9 Mt; and Wabush (Canada), 2.7 Mt. Cliffs' share of the total production from these North American operations was 17.4 Mt. Total Cliffs' North American production tonnage share for the mines it managed during the year decreased by 25% compared with that of 2008, and overall iron ore sales revenue decreased to \$1.45 billion, a decrease of 39% compared with that of 2008 (Cliffs Natural Resources Inc., 2010, p. 56, 57).

In June 2009, Cliffs acquired significant ownership of Freewest Resources Canada Inc. (Montreal, Quebec, Canada), with its three world-class chromite deposits in anticipation of diversifying downstream from its core merchant iron ore business. Cliffs planned to include construction of the open pit mine and mine-site processing facility, as well as an electric arc furnace (EAF) to further process the chromite ore into high-grade ferrochromium. The EAF facility was expected to be located on the north shore of Lake Superior after a permitting process anticipated to require approximately 3 years, with production startup in about 2015 (Cliffs Natural Resources Inc., 2009a).

Michigan.—Michigan accounted for about 31% of U.S. usable iron ore output in 2009; nearly all of Michigan's output was pellet production. The Empire Mine production was mostly flux pellets. The Tilden Mine produced magnetite and hematite flux pellets. The Empire Mine and the Tilden Mine production each showed a decrease of 2.0 Mt compared with that of 2008. Owing to a postponement of a development project, the reserve estimate for the Empire Mine was reduced by 45%, while Tilden Mine reserves remained the same net of production (Cliffs Natural Resources Inc., 2010, p. 35, 57; Skillings Mining Review, 2010c, p. 6–7).

Minnesota.—Minnesota produced 69% of the usable iron ore in the United States in 2009; nearly all of the output was pellet production. Almost all of the production from the State came from open pits on the Mesabi Iron Range, although a minor amount of the production did come from reworked tailings. Minnesota pellet production, grouped by operating company, was summarized as follows: Hibbing Taconite Company produced standard and high-compression pellets; Northshore Mining Company produced 3.3 Mt of standard pellets, including a small amount of sinter material and concentrate; United Taconite Company, LLC produced pellets and a minor amount of concentrates; ArcelorMittal Minorca Mine Inc. (Chicago, IL) produced 1.5 Mt of flux pellets, including a minor amount of pellet chips; and United States Steel Corp. (Pittsburgh, PA) had no production from its Keewatin Taconite operations and 7.7 Mt of acid and flux pellet production from its Minntac operations (ArcelorMittal, 2010, p. 51; Cliffs Natural Resources Inc., 2010, p. 57; Skillings Mining Review, 2010b, p. 8, 12–15; United States Steel Corp., 2010, F–62).

In early February, U.S. Steel announced plans to lay off 500 union employees, as well as 90 management employees at its Minntac operations (Mountain Iron, MN). In December [2008], U.S. Steel had already halted production at its Keetac operation (Keewatin, MN). Lack of new steel orders forced the steel company to reduce production from its upstream operations (Bowen, 2009), but by August, with rising steel requirements, the company announced plans to start up an additional pellet production line at the Minntac plant in Iron Mountain, MN, and to start up an additional two lines in September. U.S. Steel would then have four of the five production lines at Minntac in operation (Skillings Mining Review, 2009d), but at Keetac, the company had workers begin winterizing the plant in anticipation of extending the shutdown of operations (Skillings Mining Review, 2009b).

ArcelorMittal (Luxembourg) attributed the reduction in production from 2.8 Mt in 2008, to a shutdown of operations between May and September in 2009. Owing to market conditions, no iron ore was produced during this period (ArcelorMittal, 2010, p. 51).

Cliffs extended the shutdown of the Northshore Mining Co. facilities, which had been initiated in April through July (Skillings Mining Review, 2009e). Cliffs indicated that the joint-venture owners of the Hibbing Taconite Mine [ArcelorMittal, 62.3%; Cliffs, 23.0%; and U.S. Steel Canada Inc. (Hamilton, Ontario, Canada), 14.7%] had agreed to lengthen the shutdown at the plant, which has a rated capacity of 8.1 million metric tons per year (Mt/yr). This extended the shutdown—which started with two of three pellet lines shut down in March and then the plant shut down for 15 weeks beginning in May—through the first quarter of 2010 (Cliffs Natural Resources Inc., 2009b).

Steel Dynamics, Inc. (Fort Wayne, IN) completed construction and began commissioning on the \$260 million Mesabi Nugget project in Hoyt Lakes, MN. The main plant facility has a 180-foot-diameter gas-fired rotary-hearth furnace (RHF) that, through a chemical reduction process, was expected to yield millions of 96% to 98% iron nuggets. The feed material—iron ore concentrate, coal, and binding agents—was to be mixed and dried to form marblesized “dry balls” in ancillary facilities. These balls were then to be melted in the RHF to form the iron nuggets. At full capacity, the plant was expected to produce 500,000 metric tons per year (t/yr) of iron nuggets. Steel Dynamics expected to follow through with additional investments in an adjacent iron mine, once the required permits were received from the State of Minnesota (Skillings Mining Review, 2009c; Steel Dynamics, Inc., 2010, p. 5).

Magnetation, Inc. (Nashwauk, MN) began production of iron concentrate from its Mesabi Chief plant near Keewatin, MN. Magnetation invested \$9.6 million to bring its plant online. The plant was expected to produce low-cost iron concentrates at a rate of 300,000 t/yr from lean ore stockpiles of hematite and natural ore tailings. Plans for expansion to 750,000 t/yr of concentrate were being made to help feed the 500,000 t/yr (96% to 98% iron) Mesabi Nugget facility being constructed at nearby Hoyt Lakes, MN, by Steel Dynamics (Metal Bulletin, 2009e; Redmon, 2009).

Consumption

U.S. iron ore consumption declined by 40% to 31.0 Mt from the 2008 figure of 51.9 Mt (table 1). Pig iron production, at 19.0 Mt in 2009, was almost one-half of the 5-year average of 37.5 Mt/yr for 2004 through 2008. Raw steel production using BOF technology, which had been at the lowest production level in more than a decade in 2008, decreased by more than 40% to 22.7 Mt.

Consumption of iron ore, including agglomerates, reported to the AISI by producers of iron and steel totaled 30.3 Mt, including 26.2 Mt of pellets; 3.8 Mt of sinter, briquettes, and other products; and 0.3 Mt of natural coarse ore (table 7). Of the ore consumed, 74% was domestic production; 10%, imports from Canada; 2%, imports from other countries; and the balance was drawdowns of domestic stocks. Other iron-bearing materials charged to blast furnaces included mill scale, slag scrap, and steel furnace slag.

The three consumption numbers used in this annual review are reported in tables 1, 7, and 8. The first consumption number (31.0 Mt in 2009), in table 1, is the sum of the ore consumed by input type reported by the AISI, the ore consumed in DRI production, and the ore consumed in nonsteel uses, as reported to the USGS (American Iron and Steel Institute, 2010, p. 81). The second consumption number (30.4 Mt in 2009), in table 7, is the ore consumed in U.S. iron and steel plants by type of ore reported by the AISI. The third consumption number is an estimate of DRI and other miscellaneous uses, which include iron ore consumed in production of cement and iron ore shipped for use in manufacturing paint, ferrites, heavy media, cattle feed, refractory and weighing materials, and for use in lead smelting are listed in table 8. The latter consumption figure was the ore consumed in DRI production (of which there was none produced in 2009) and nonsteel uses (0.60 Mt in 2009). Data on iron ore consumption in nonsteel end uses (table 8) were compiled from USGS surveys and information provided by Midrex Technologies, Inc. (2010, p. 7).

Prices

At the beginning of 2009, the secretary general of the China Iron & Steel Association (CISA) reportedly indicated that China would not seek “unreasonable decreases” during 2009 iron ore contract price negotiations. China tried to negotiate for price reductions to be made retroactive to January so that Chinese mills would not be forced to pay 2008 negotiated prices. CISA indicated that it would like more flexibility to adjust prices midyear, but did not want to be hampered by an iron ore index for long-term supply contracts (Li, 2009). CISA for the first time included a representative in the Chinese delegation discussing annual iron ore price contracts. CISA reportedly wanted to strengthen coordination among Chinese steel producers and would need to agree to any benchmarks established by China’s major producers (Metal Bulletin, 2009b).

As the April 1 annual contract date passed, contract negotiations continued between the leading iron ore producers and steelmakers. BHP Billiton Ltd. (Melbourne, Australia) indicated that it would like to eliminate the 12-month contract system using either the spot market or some type of index price.

Both Vale S.A. (Rio de Janeiro, Brazil), the world’s leading producer of iron ore which had officially changed its corporate name from Companhia Vale do Rio Doce (CVRD), and Rio Tinto plc (London, United Kingdom) favored continuing with a contract price because they felt it was more stable. At the time of the negotiations, China reportedly was expected to reduce iron ore imports in 2009 by 20% compared with 2008 import levels. A price reduction of upwards of 30% was expected to be negotiated for contract year 2009–10 (Matthews, 2009a; Vale S.A., 2009a).

At the end of May, Rio Tinto settled the 2009–10 annual iron ore contract with Japanese steel firms—JFE Holdings Inc., Kobe Steel Ltd., Nippon Steel Corp., and Sumitomo Metal Industries Ltd.—and Korea’s POSCO. The agreement was for a 33% lower price for fines and a 44% lower price for lump ore, the first price reduction in 7 years. Chinese steelmakers continued to negotiate deeper discounts on both lump and fine ores. Vale continued discussions with steel firms (Thompson, 2009). Despite the impasse in iron ore price negotiations, Chinese imports of iron ore through May 2009, at 242 Mt, increased 26% compared with those of the same period in 2008. The import value of this ore was almost 28% lower when comparing these two periods (TEX Report, The, 2009c).

Following the rejection of a \$19.5 billion investment offer to increase its ownership of Rio Tinto by the Aluminum Corp. of China Ltd. (Chinalco) (Beijing, China) and the subsequent decision to develop a joint venture of Australian iron ore assets by BHP Billiton and Rio Tinto, an Australian executive of Rio Tinto was arrested by Chinese authorities on suspicion of espionage and stealing state secrets (Ritchie, 2009). The failed offer, joint venture, and arrest of Rio Tinto’s executive came amidst a failure by BHP Billiton, Rio Tinto, and Vale, to reach an annual contract price agreement with Chinese iron ore purchasers. Vale appeared to be holding back to avoid repeating the 2008 problem of settling earlier for a lower price than either BHP Billiton or Rio Tinto (Matthews, 2009b).

A move to a more market-based, rather than negotiated, contract iron ore price became evident. At the end of the July, BHP Billiton announced that it had reached agreement on 53% of its iron ore sales for the 2009 contract year. Only 23% was set based on the annual contract price, while the other 30% was priced using quarterly, spot, and index-based prices. In 2008, when spot prices collapsed, some buyers reneged on contracts, leaving annual contract prices little more than an upside limit for producers. The arrest of the Rio Tinto executive in China gave additional incentive for producers to rely to a greater degree on independently established market prices (Denning, 2009). Amidst the continued stalemate between Chinese buyers and worldwide iron ore producers, an iron ore trade association—the Iron Ore & Steel Derivatives Association (IODA)—was formed to promote the trade of iron ore and related derivatives, develop standard terms for iron ore contract transactions, and support the development and use of independent market indices. IODA was seen, by itself, as having an important role in the iron ore market as the market moved from annual contract pricing toward a spot market (Metal Bulletin, 2009d).

Fortescue Metals Group Ltd. (East Perth, Australia) agreed to a price 3% below the benchmark into the Asian markets for its

iron ore sold to Chinese steel mills. This agreement permitted Fortescue to complete a \$6 billion deal to obtain financing from Chinese sponsors for project expansion (Mining Journal, 2009b).

As negotiating posturing began for 2010 contract negotiations, CISA indicated that iron ore oversupply would worsen in the fourth quarter of 2009. China's imports for the first three quarters were 469.4 Mt of iron ore, an increase of almost 36% from those of the same period during the previous year. CISA was pressing a unified iron ore import price and a qualifications review for iron ore importers (Metal Bulletin, 2009c).

Transportation

The Lake Carriers' Association reported that the iron ore shipments on the Great Lakes fell to the lowest level in 71 years. Iron ore cargos on the Great Lakes (includes Great Lakes and St. Lawrence Seaway ports to Great Lakes destinations) totaled 28.8 Mt, the lowest level since 1938. Iron ore shipments for 2009 were 53% of the 5-year average of 2004–08. The Soo Locks on the Great Lakes closed for the season on January 15 and were reopened on March 25 in accordance with a multiagency agreement to allow inspection and maintenance of systems, structures, and key equipment (Great Lakes & Seaway Shipping News, 2009; Lake Carriers' Association, 2010a, b).

Early in 2009, the *CSL Argosy*, an 800-foot bulk carrier loaded with iron ore, ran aground in the Chesapeake Bay, just north of Annapolis, MD. The vessel, headed to Baltimore, MD, had 19,300 t of iron ore removed and was refloated before proceeding to inspection in Annapolis (American Metal Market, 2009).

Foreign Trade

In 2009, U.S. exports of iron ore exceeded imports by a slight margin, which represented only a minor percentage of domestic apparent consumption. Exports decreased by 65%, while imports decreased by 58% compared with 2008 figures. U.S. iron ore exports were 96% pellets (3.8 Mt), and 78% of the exports was shipped via the Great Lakes to Canadian steel companies, while 6% was shipped to Germany, 5% each to Belgium and France, 3% to China, 2% to Mexico, and the rest to 21 other countries. U.S. imports totaled 3.9 Mt, of which Brazil's share decreased to 5% from 28% in 2008, Canada's share increased to 81% from 64%, and Chile's share increased to 5% from 2% in 2008 (tables 1, 9–15).

World Industry Structure

Consumption.—Although global iron ore consumption is not measured directly, imports of iron ore and production of crude steel, DRI, and pig iron can be used as guides to indicate whether consumption rises or falls. DRI and pig iron production are likely to be more direct indicators of iron ore consumption than crude steel production because, to varying degrees in each country, part of steel production comes from scrap consumption in minimills. Iron ore net imports cannot be used as a straightforward indicator of a change in iron ore consumption in countries that produce iron ore unless a country's ore production remains constant. World consumption of iron ore was estimated

to have decreased slightly as indicated by slight decreases in pig iron and DRI production compared with 2008 levels. Of the nine countries that had 2% or more of world pig iron production in 2009, seven of the countries showed negative growth, including the United States, comparing 2009 production with each country's average pig iron production from 2005 through 2009. The growth rates compared with the 5-year average (2005–09) for these countries were as follows: India, 26%; China, 22%; Republic of Korea, -4%; Russia, -10%; Japan, -18%; Ukraine, -18%; Germany, -28%; Brazil, -42%; and the United States, -43%. Of the five leading producing countries of pig iron in 2009, only China (16%) and India (32%) showed an increase in production from that of 2008—decreases for the other countries were as follows: Japan, 22%; the Republic of Korea, 12%; and Russia, 10%.

Interest in mine development increased toward the end of 2009 owing to a recovery from the global economic downturn, as producers positioned themselves to take advantage of expected continuing high levels of consumption driven by Chinese economic growth. With new iron ore production capacity, world supply of iron ore was expected to be adequate through 2010.

World crude steel production fell to 1.2 billion metric tons (Gt) from 1.3 Gt in 2008. Six countries produced more than 30 Mt of crude steel each and combined accounted for almost 70% of world production in 2009. Of those countries, China produced about 68 Mt more crude steel in 2009 than in 2008 and India produced 8 Mt more. The others (Germany, Japan, Republic of Korea, and the United States) combined produced 83 Mt less crude steel in 2009 than in 2008. Annual world crude steel production, excluding China, decreased by more than 130 Mt in 2009. Between 2000 and 2009, China, Germany, India, Japan, Republic of Korea, Russia, and the United States accounted for two-thirds of combined world crude steel production. China's 2009 production was more than 70% greater than its average for the 10-year period, while that of the United States was 37% less than its average for the 10-year period (United Nations Conference on Trade and Development, 2010, p. 118–121).

Production.—World iron ore production of 2.2 Gt, gross weight, increased slightly from 2008 production levels. Annual world production has exceeded 1 Gt, gross weight, each year since it first reached that level in 1995, and has exceeded 2 Gt since 2007. Australia's and Brazil's combined share of world production by gross weight from 2005 through 2009 averaged 32%. In 2009, iron ore was produced in 42 countries, with production exceeding 1 Mt, gross weight, in 28 of those countries. World DRI production decreased to 64.4 Mt, which was 5% less than that of 2008 (Midrex Technologies, Inc., 2010).

Trade.—World iron ore imports of 941 Mt rose by 4% compared with 2008 levels. Following large year-on-year increases in imports for the past 7 years (21% in 2002, 33% in 2003, 40% in 2004, 32% in 2005, 19% in 2006, 17% in 2007, and 16% in 2008), China posted another sharp rise to 628 Mt in 2009 from 440 Mt in 2008—a gain of more than 40%. Since 2000, four countries have accounted for more than two-thirds of world iron ore imports. Germany's share of imports in that period decreased to 3% from 10%, Japan's share decreased to

11% from 26%, and the Republic of Korea's share decreased to 4% from 8%. China's share more than tripled during this 10-year period to 67% from 14%. Australia's and Brazil's combined share of world iron ore exports remained the same at 67% in 2009 compared with their revised share in 2008. Five countries represented more than 86% of world iron ore exports. In decreasing order of market share, Australia held 38%; Brazil, 28%; India, 12%; South Africa, 5%; and Canada, 3% (United Nations Conference on Trade and Development, 2010, p. 100–103).

In China, the State Administration of Taxation in the Ministry of Finance announced the rate of value-added tax for imported iron ore would be raised from 13% to 17%. This increase became effective beginning January 1, 2009 (TEX Report, The, 2009d). According to The TEX Report (2010), China, the world's leading importer of iron ore, imported 599 Mt of nonagglomerated iron ore and 30 Mt of agglomerated ore in 2009. The leading exporters of nonagglomerated ore to China were Australia (43%), Brazil (23%), India (18%), and South Africa (6%), with the remainder shared among more than 30 countries. The leading exporters of agglomerated ore to China were Brazil (25%), Canada (17%), Ukraine (12%), Russia (11%), and Kazakhstan (11%), with the remainder shared among more than 23 countries.

Mergers and Acquisitions.—In October, Cliffs exercised its right of first refusal and announced it would purchase Wabush Mines, with mine, rail, concentrating, pelletizing, and port operations in Newfoundland and Labrador, and Quebec Provinces, Canada. Cliffs planned to purchase Wabush Mines from the two other joint-venture partners—ArcelorMittal Dofasco (Hamilton, Ontario, Canada) (a subsidiary of ArcelorMittal) and U.S. Steel Canada (Hamilton, Ontario, Canada) (a subsidiary of U.S. Steel). The \$88 million purchase would increase Cliffs' ownership in the operations to 100% from 26.8%. Wabush Mines has a production capacity of 5.6 Mt/yr and reportedly about 70 Mt of iron ore reserves (Cliffs Natural Resources Inc., 2009c).

In January, Vale announced a purchase and sale agreement with Rio Tinto to acquire 100% of the Corumbá open pit iron ore operations in the State of Mato Grosso do Sul, Brazil. The price for the iron ore assets was \$750 million and included associated logistics assets—port and barges. The Corumbá Mine had a production capacity of 2.5 Mt/yr and reportedly had proven and probable reserves at yearend 2007 of 583 Mt with a 62.7% iron ore content. By mid-September, Vale completed the purchase of the iron ore mine, including associated transport operations on the Paraguay River. Vale announced tentative plans to increase production capacity at Corumbá to 15 Mt/yr at a cost of greater than \$2 billion (Vale S.A., 2009b, c).

Chinalco, a Chinese state-owned enterprise, proposed a \$19.5 billion investment in Rio Tinto. Approximately \$7.2 billion of the investment would be in convertible bonds, which when exercised would give Chinalco 18% ownership of Rio Tinto (Wilson and others, 2009). Australia's Foreign Investment Review Board (FIRB) faced an inquiry by state representatives into the bid by Chinalco, as well as a bid by another Chinese state-run enterprise (Hunan Valin Iron and Steel Group Co. Ltd.) for 16.5% interest in Fortescue Metals. FIRB regulates foreign

ownership in Australian companies and restricts control of natural resources by foreign entities (Wilshaw, 2009).

In June, a nonbinding agreement was signed between Rio Tinto and BHP Billiton to form a joint venture covering production for both companies' Western Australian iron ore assets. The 50–50 ownership was expected to enhance each company's profitability through combination of adjacent mines into a single operating unit, more efficient utilization of rail and port facilities, improvement in blending and product quality, optimization of future facilities growth and project development, and combination of staff functions within a single entity. This merger follows a breakdown of the proposed deal between Chinalco and Rio Tinto, in which the Chinese state-owned company would have obtained partial ownership of Rio Tinto (BHP Billiton Ltd., 2009b, p. 1; Brindal, 2009).

BHP Billiton and Rio Tinto later decided not to proceed with the formation of a joint-venture iron ore marketing entity and instead market production from their planned joint venture separately. The companies continued plans to merge production and development units to take advantage of significant operational synergies (BHP Billiton Ltd., 2009a). The decision to keep separate marketing entities may aid regulators in appraising the merger. CISA's unification of all Chinese iron ore purchasing in one organization may be seen, especially in light of the two major iron ore producing companies' withdrawal from a unified sales strategy, as a strong move away from balanced trade negotiations toward a market in which the purchaser (China) has greater control (Metal Bulletin, 2009f).

In April, China's National Development and Reform Commission approved the purchase of 260 million shares of Australia's Fortescue Metals by Hunan Valin for \$A644.8 million (US\$445 million). The share purchase agreement, giving Valin 17.3% of Fortescue capital ownership, was signed on February 25 and subsequently approved by the Australian Federal Treasurer. Hunan Valin planned to assist Fortescue in obtaining additional debt financing. It was estimated that an additional \$3 to \$4 billion would be required to raise production capacity to 90 Mt/yr from 50 Mt/yr at Fortescue's iron ore mines. Fortescue is the third largest producer of iron ore in Australia reportedly with 1.6 Gt of iron ore reserves in Western Australia's Pilbara Region (Fortescue Metals Group Ltd., 2009).

In an effort to acquire additional equity interest in Australian iron ore resources, Chinese investors sought and received approval from Australia's FIRB for Anshan Iron & Steel Group to increase its equity ownership of Gindalbie Metals Ltd. to 36.28% from 12.6%. Gindalbie was developing the Karara iron ore project in Western Australia, with plans for port development at Oakajee and a joint-venture pellet plant in China (TEX Report, The, 2009b; Wall Street Journal, The, 2009). FIRB also approved a \$246 million deal between Centrex Metals Ltd. (Adelaide, Australia) and Wuhan Iron & Steel Co. (WISCO). Chinese Government-owned WISCO was then able to take a 60% stake in iron ore rights to five Centrex tenements on the Eyre Peninsula in South Australia. WISCO planned to invest an additional \$169 million in staged payments linked to achieving JORC-inferred resources of up to 2 Gt (Mining Journal, 2009e). Centrex also received approval from FIRB for a joint venture with Baotou Steel Group, a Chinese state-owned

entity headquartered in Inner Mongolia. The 50–50 magnetite joint venture planned to develop tenements on the Eyre Peninsula, with potential for production of between 3 Mt/yr and 5 Mt/yr (Metal Bulletin, 2009a).

World Review

Afghanistan.—The Ministry of Mines of Afghanistan requested expressions of interest for the Hajigak iron deposit. The deposit was estimated to contain about 1.8 Gt of iron ore resources at a grade of 62% iron content within 16 ore bodies along a strike length of 32 kilometers (km). The deposit is located about 130 km west of Kabul. Successful applicants were to be notified by the Ministry of Mines on or before May 20, 2009, and would receive a bid package for the Hajigak deposit (Mining Journal, 2009c). The bidding was later reopened in early 2010 in order to improve transparency issues related to the first bidding process (Rupert and Najafzida, 2010).

Australia.—BHP Billiton announced full-year production figures for 2009. BHP Billiton's share of salable quantities of iron ore (wet) were as follows (Australia, unless otherwise specified)—Area C Joint Venture (JV) (85% owned), 37.0 Mt; Goldsworthy JV (85% owned), 1.7 Mt; Mt. Newman JV and Jimblebar (85% owned), 30.4 Mt; Samarco (Brazil) (50% owned), 8.9 Mt; and Yandi JV (85% owned), 39.9 Mt. BHP Billiton's share of total world mine production was 117.8 Mt in 2009, a slight increase from that of 2008 (BHP Billiton Ltd., 2010a, p. 4).

BHP Billiton completed its Rapid Growth Project 4 with the opening of the Newman Mining Hub—the company's center for mining, crushing, and screening in the Eastern Pilbara region of Western Australia. The \$1.85 billion project was designed to raise BHP Billiton's production capacity in the Pilbara by 26 Mt/yr to 155 Mt/yr, part of an overall expansion plan to raise iron ore production to 300 Mt/yr by 2015. Rapid Growth Project 5, a \$4.80 billion project with engineering 85% complete and construction 25% complete by yearend 2009, was expected to add 50 Mt/yr to system capacity by the second half of 2011 (Skillings Mining Review, 2009a; BHP Billiton Ltd., 2010b).

Rio Tinto announced full-year production figures for 2009. Rio Tinto's share of salable quantities of iron ore plus pellets were as follows (Australia, unless otherwise specified)—Channar (60% owned), 6.6 Mt; Corumbá (Brazil), 1.5 Mt; Eastern Range, 9.3 Mt; Hamersley, 106.8 Mt; Hope Downs (50% owned), 10.3 Mt; Iron Ore Company of Canada (IOC) (58.7% owned), 8.1 Mt; and Robe River (53% owned), 28.8 Mt. Rio Tinto's share of total world mine production was 171.5 Mt, a 12% increase from that of 2008 (Rio Tinto plc, 2010, p. 166).

Rio Tinto announced that its HIs melt pig iron plant (Kwinana, Western Australia) would be placed on care and maintenance for 1 year at the end of March. The Kwinana plant, with design capacity of 800,000 t/yr, used proprietary, direct-smelting technology to produce pig iron from high-phosphorus iron ore fines and noncoking coal. Rio Tinto (60%), United States' Nucor Corp. (25%), Japan's Mitsubishi Corp. (10%), and China's Shougang Corp. (5%) jointly own the plant (TEX Report, The, 2009a).

Atlas Iron Ltd. (West Perth) secured additional berthing facilities at Port Hedland to bring its production capacity to 6

Mt/yr. The Utah Point facilities were under construction and were expected to begin exports of Atlas iron ore in April 2010. Atlas began mining iron ore from its 100%-owned Pardoo Mine in 2008, and shipped its first direct shipping ore (DSO) in December 2008 (Atlas Iron Ltd., 2009).

Fortescue Metals decided to fund an expansion of its Pilbara operations after a deal with Chinese investors failed. The proposed \$6 billion funding requirement would be used to double iron ore output to 90 Mt/yr. Original funding with Chinese investors had been tied to an agreement by Fortescue to sell 20 Mt of iron ore to Chinese steel mills at a 35% reduction on the previous year's prices (Welch, 2009).

Brazil.—In 2009, Vale reported iron ore production was 238 Mt (includes Vale's Samarco, which was a joint venture until becoming fully owned by Vale in September)—a 21% decrease compared with that of 2008. Vale's share of salable quantities of iron ore was as follows, in decreasing order of tonnage—Southeastern System, 89.5 Mt; Carajás, 84.6 Mt; Southern System, 55.2 Mt; and Samarco, 8.6 Mt. Vale pellet production in 2009 was 23.9 Mt—a 47% decrease compared with that of 2008. The breakdown of salable quantities of iron ore pellets was as follows, in decreasing order of pellet production—Samarco, 8.0 Mt; Nibrasco, 5.8 Mt; Tubarão I and II, 3.9 Mt; Vargem Grande, 2.2 Mt; Kobrasco, 1.7 Mt; Itabasco, 1.5 Mt; Hispanobras, 0.6 Mt; Fábrica, 0.2 Mt; and São Luís, 3,000 t. Of this pellet production, 14.0 Mt was blast furnace pellets and 9.8 Mt was direct reduction pellets. A large part of pellet production in 2009 was shut down owing to reduced global demand and a desire to avoid excessive inventory buildup. The Vargem Grande pellet plant continued to ramp up production and construction continued on two new plants: Tubarão VIII (16.5 Mt/yr pellet production capacity) and another plant in Oman (9.8 Mt/yr direct reduction pellet production capacity) (Vale S.A., 2010, p. 2, 3).

MMX Mineração e Metálicos S.A. (Rio de Janeiro) announced that resources at its Serra Azul Mine had increased five-fold to 515 Mt, with measured and indicated resources totaling 381 Mt (MMX Mineração e Metálicos S.A., 2009).

Canada.—IOC [owned jointly by Labrador Iron Ore Royalty Income Fund (15.1%), Mitsubishi Corporation (26.18%), and Rio Tinto (58.72%)] produced 5.7 Mt of iron ore concentrates and 8.1 Mt of iron ore pellets. ArcelorMittal Mines Canada (formerly Québec Cartier Mining Company) produced 13.1 Mt of iron ore concentrates and pellets. Wabush Mines Ltd. [owned jointly by ArcelorMittal (28.6%), Cliffs (26.8%), and U.S. Steel Canada (44.6%)] produced 2.7 Mt of iron ore pellets (ArcelorMittal, 2010, p. 53; Cliffs Natural Resources Inc., 2010, p. 57; Skillings Mining Review, 2010b, p. 10–11).

Consolidated Thompson Iron Mines Ltd. (Toronto, Canada) signed a letter of agreement with China's WISCO for the investment of \$240 million in return for 19.9% of the shares of Consolidated Thompson. WISCO would also receive a 25% interest in the company incorporated to operate the future Bloom Lake iron ore mine in Quebec. Bloom Lake planned to produce 8 Mt/yr of iron ore, with expansion potential to 16 Mt/yr. Initial startup, although planned for late 2009, was postponed to 2010 (Consolidated Thompson Iron Mines Ltd., 2009).

Labrador Iron Mines (LIM) Holdings Ltd. (Toronto, Ontario) acquired an additional 50 Mt of DSO in the Province of Quebec. The deal was comprised of five separate transactions, in which Schefferville Mines Inc. (a fully owned subsidiary of LIM) obtained rights to several properties in different stages of exploration and development. The DSO properties are located near the company's planned western Labrador operations, which were scheduled to begin production in mid-2010 (Gordon, 2009).

China.—In June, it was reported that China discovered a massive iron ore deposit with 3 Gt of iron ore reported reserves in the northeastern province of Liaoning. The Dataigou deposit has an ore grade of between 25% and 62% iron and was located between 1.2 and 2.0 km below the surface.

China continued to report new project developments in advance of the upcoming 2010 iron ore price negotiations. It was reported that an iron ore deposit with 1 Gt of reserves was discovered in Luannan, Tangshan City, Hebei Province, in the northern part of the country. The Macheng deposit was reported to contain an average grade of 35% iron and was located between 100 and 600 meters below the surface. The Hebei Government reported that the deposit would be developed by Hebei Iron & Steel Group, the country's second leading steel producer (Skillings Mining Review, 2010a).

Congo (Brazzaville).—Xstrata plc (Zug, Switzerland) planned to invest \$50 million to explore the Zanaga iron ore deposit. Zanaga is considered a world-class deposit and, if the results of the prefeasibility study were sufficiently encouraging, Xstrata planned to purchase the property and begin operations as soon as possible (Reuters, 2009).

Liberia.—Members of the country's parliament raised concerns related to the \$2.6 billion agreement approving the development of the Bong iron ore deposit by China Union Holdings Ltd. (Shenzhen, China). Final approval was being withheld until issues relating to the basis for some tax exemptions were clarified (Mining Journal, 2009a). ArcelorMittal reported a planned \$1.5 billion iron ore mine startup would be delayed owing to the downturn of the global economy and its effect on the steel market. ArcelorMittal still planned to make its first iron ore shipment from the Nimba Mine in the third quarter of 2011, and construction and development work would start during 2010 (Biesheuvel, 2010).

African Aura Mining Inc. (Vancouver, British Columbia, Canada) reported inferred mineral resource of 1.08 Gt containing an average of 38% of iron ore at the Company's Putu joint venture with Severstal. The Putu iron ore project is 38.5% owned by African Aura. A prefeasibility study was expected to be completed (African Aura Mining Inc., 2010, p. 1, 3, 6).

Peru.—Shougang Group (China), the parent company of Shougang Hierro Peru S.A., announced plans to invest \$1 billion to double iron ore production capacity at its Peruvian iron ore operations by 2010. The iron ore production capacity was to be raised to 10 Mt/yr (Skillings Mining Review, 2009f).

Russia.—In mid-January, Mikhailovsky Mining & Processing (MGOK), owned by Metalloinvest Holding Co. (Moscow, Russia), resumed iron ore pellet production, which it had shut down to perform processing plant maintenance during a decline in iron ore market demand. MGOK had shipped stockpiled

pellets while production was idled at the Lebedinsky and Mikhailovsky Mines since November 2008 (Interfax Ltd.—Russia & CIS—Metals & Mining Weekly, 2009).

OJSC Magnitogorsk Iron & Steel Works (Magnitogorsk, Russia) announced the startup of iron ore production at the Sosnovsky Mine in the Chelyabinsk Region. Reserves at the Sosnovsky deposit were estimated to be 70 Mt with a full production rate of between 2.0 Mt/yr and 2.5 Mt/yr, with 1 Mt/yr of sinter produced by dry magnetic separation. Mining rates of 370 Mt/yr and 500 Mt/yr were anticipated for 2009 and 2010, respectively (OJSC Magnitogorsk Iron & Steel Works, 2009).

Saudi Arabia.—London Mining Plc (London, United Kingdom) reported 157 Mt of ore resources with an average grade of 41.1% iron at the Wadi Sawawin prospect. The feasibility study suggested a run-of-mine production rate of 11.6 Mt/yr with an ability to produce 5.5 Mt/yr of direct-reduction iron pellets. The initial capital costs were estimated to be \$1.8 billion. London Mining would develop the project with Saudi Arabia's National Mining Co. (Mining Journal, 2009d).

South Africa.—Kumba Iron Ore Ltd. (Centurion), the fourth leading supplier of iron ore for the seaborne trade, continued work on the Kolomela Mine, formerly known as the Sishen South Mine. The new mine, located 70 km southwest of the existing Sishen Mine, was expected to begin producing in 2012, with an annual production capacity of 9 Mt (Creamer, 2009).

Sweden.—At Luossavaara-Kiirunavaara Aktiebolag (LKAB) (Luleå) iron ore pellet production decreased to 14.7 Mt from 19.9 Mt in 2008. Pellet production was most of the total production, although 3.0 Mt of fines and minor special products were produced, a decrease in production of this material from 3.9 Mt in 2008. Decreased production resulted from all six pellet plants being closed intermittently during the first half of the year owing to declining market conditions. LKAB announced Kiruna's proven ore reserves to be 598 Mt at 48.6% iron content, and probable ore reserves of an additional 76 Mt at 46.4% iron content. The company reported Malmberget's proven ore reserves to be 298 Mt at 43.8% iron content, and probable ore reserves of 52 Mt at 37.8% iron content (Luossavaara-Kiirunavaara Aktiebolag, 2010, p. 5, 19).

Venezuela.—The Venezuelan Government unilaterally assumed exclusive control of the Materiales Siderúrgicos SA (Matesi) 1.5-Mt/yr hot briquetted iron (HBI) plant, formerly owned by Tenaris SA (Luxembourg). Three other privately owned hot briquetted iron producers were in negotiations for the nationalization of their holdings. Later in the year, following nationalization of several HBI plants, extremely low levels of HBI production were reported. Technical problems, labor issues, and output cuts caused by low prices and decreasing demand for product all contributed to these lower production levels (Weik, 2009a, b).

Outlook

It appeared that U.S. production in 2010 would increase almost to 2008 levels, and indications were that recovery from the strong economic downturn would continue into 2011 with steel and iron ore production returning to tonnages seen in the previous decade. Most U.S. iron ore production is sold

directly to the domestic steel industry, although a large amount of domestic ore is shipped to Canada and small amounts are generally exported to other countries. Neither the domestic dependence nor the pattern of exports to Canada is expected to change in the near future, although changes in ownership of some steel plants have led to minor changes in the countries from which iron ore is imported.

Trends in the steel industry are provided in the “Outlook” section in the Iron and Steel chapter of the 2009 USGS Minerals Yearbook, volume I, Metals and Minerals. The development of projects, using new and existing direct reduction technology being developed in northern Minnesota, was expected to encourage growth of the U.S. iron ore industry within the next few years, as developments such as Steel Dynamics’ Mesabi Nugget project comes to full production and Essar Steel’s Minnesota Iron project is built.

The increase in Chinese iron ore imports in 2009 was a major indicator for growth in the global iron ore industry. Overall world trade in iron ore increased and international imports of iron ore and production of iron ore and pig iron—key indicators of iron ore consumption—pointed toward continued dependence by the global iron ore industry on increasing Chinese iron ore consumption. China was becoming increasingly involved in overseas projects in Australia and on the African continent through equity participation, which may well affect the balance of supply and demand for iron ore in the midterm. Downward price pressures would be anticipated as China acquires additional sources of supply, which may help to offset reduced supply from India, where it is expected that the domestic steel industry will take a larger share of iron ore production.

Following the economic downturn, which continued through most of 2009, the annual benchmark system of pricing lost its predominance in annual global iron ore sales. It is expected that more frequent benchmarking and indices developed based on spot sales will become a much stronger factor in the determination of future pricing. The possibility of developing a commodity exchange for the sale of iron ore still remains many years in the future. The new pricing system, for the short term, appears to give an advantage to the few major iron ore producers with respect to the many steel companies needing to make purchases.

Development of new iron ore mines in the next few years can be expected to add production capacity faster than the growth of demand, if those projects already considered strongly probable of coming onstream in the next few years actually do. Although supply is expected to remain tight in relation to demand, some easing of the supply deficit of iron ore needed to satisfy the iron ore requirements of China and India’s growing steel industries can be expected. This would possibly lead to a leveling off of price growth in 2010 through 2013.

New developments and growth of DRI technology would allow the iron ore industry to become a major supplier to an expanding DRI sector, as well as to existing customers—the integrated steel plants. Coastal U.S. steel producers already rely on imported DRI to supply a quality raw-material input to help meet steel alloy purity specifications, which cannot be obtained solely using traditional scrap. However, even in the event of strong global DRI growth during the next decade, DRI would be

able to replace only a small portion of the world’s blast furnace production. Although no new “greenfield” pig iron facilities have been built in the United States in the past 30 years, and owing in part to the continued slow growth in the DRI market, the blast furnace, with its need for an assured supply of iron ore, is expected to remain the mainstay of the iron and steel industry in the immediate future.

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TABLE 1
SALIENT IRON ORE STATISTICS¹

(Thousand metric tons and thousand dollars unless otherwise specified)

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|-----------|--------------------|--------------------|------------------------|------------------------|
| United States, iron ore, usable, less than 5% manganese: ² | | | | | |
| Production | 54,300 | 52,700 | 52,500 | 53,600 | 26,700 |
| Shipments: | | | | | |
| Quantity | 53,200 | 52,700 | 50,900 | 53,600 ^f | 27,600 |
| Value | 2,370,000 | 2,840,000 | 3,040,000 | 3,770,000 | 2,560,000 |
| Average value at mines dollars per metric ton | 44.50 | 53.88 | 59.64 | 70.43 | 92.76 |
| Exports: | | | | | |
| Quantity | 11,800 | 8,270 | 9,310 | 11,100 | 3,920 |
| Value | 584,000 | 636,000 | 718,000 | 1,240,000 | 356,000 |
| Imports for consumption: | | | | | |
| Quantity | 13,000 | 11,500 | 9,400 | 9,250 | 3,870 |
| Value | 532,000 | 611,000 | 543,000 | 918,000 | 376,000 |
| Consumption, iron ore and agglomerates | 60,100 | 58,200 | 54,700 | 51,900 | 31,000 |
| Stocks, December 31: | | | | | |
| At mines, plants and loading docks ³ | 2,040 | 1,650 ⁴ | 2,090 ⁴ | 4,070 ⁴ | 5,060 ⁴ |
| At receiving docks ⁵ | (6) | (6) | (6) | (6) | (6) |
| At consuming plants | (6) | (6) | (6) | (6) | (6) |
| Total ⁷ | (6) | (6) | (6) | (6) | (6) |
| Additional stocks, December 31: | | | | | |
| Crude ore at mines and plants | 915 | 1,140 ⁴ | 749 ⁴ | 947 ⁴ | 580 ⁴ |
| Unagglomerated concentrates for pelletizing plants | 1,870 | 1,260 | 1,550 | 1,320 | 896 |
| World, production ⁸ | 1,550,000 | 1,840,000 | 2,040,000 | 2,210,000 ^f | 2,240,000 ^e |

^eEstimated. ^fRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Direct-shipping ore, concentrates, agglomerates, and byproduct ore.

³Excludes byproduct ore.

⁴Crude ore stocks and unagglomerated concentrates for pelletizing plants removed. Marketable stocks only.

⁵Transfer and (or) receiving docks of lower Great Lake ports.

⁶American Iron and Steel Institute no longer collects this data as of 2004.

⁷Sum of stocks at mines, consuming plants, and U.S. docks.

⁸Gross weight.

TABLE 2
EMPLOYMENT AT IRON ORE MINES AND BENEFICIATING PLANTS, QUANTITY AND TENOR OF ORE PRODUCED, AND AVERAGE
OUTPUT PER WORKER HOUR IN THE UNITED STATES IN 2009, BY DISTRICT AND STATE¹

| District and State | Average number of employees | Worker hours (thousands) | Production | | | | Average quantity per worker hour (metric tons) | | |
|---------------------------|-----------------------------------|-----------------------------|--|---|--|---|---|------------|-------------------|
| | | | Crude ore (thousand metric tons) | Usable ore (thousand metric tons) | Iron contained in usable ore (thousand metric tons) | Iron content natural (percent) | Crude ore | Usable ore | Iron contained |
| | | | | | | | | | |
| Lake Superior: | | | | | | | | | |
| Michigan ² | 1,170 | 2,430 | 21,800 | 8,300 | 5,000 | 60.3 | 8.96 | 3.41 | 2.06 |
| Minnesota | 2,300 | 4,430 | 59,000 | 18,400 | 11,500 | 62.8 | 13.32 | 4.15 | 2.61 |
| Total or average | 3,470 | 6,860 | 80,800 | 26,700 | 16,500 | 62.0 | 11.78 | 3.89 | 2.41 |
| Other States ³ | 56 | 116 | 14 | 14 | 8 | 54.0 | 0.12 | 0.12 | 0.07 |
| Grand total or average | 3,530 | 6,980 | 80,800 | 26,700 | 16,500 | 62.0 | 11.58 | 3.83 | 2.37 |

¹Data are rounded to no more than three significant digits, except "Average per worker hour, crude ore" may not add to totals shown.

²Does not include professional or clerical workers at mines, pelletizing plants, maintenance shops, or research lab workers.

³Includes California and South Dakota.

TABLE 3
CRUDE IRON ORE MINED IN THE UNITED STATES IN 2009, BY DISTRICT,
STATE, AND MINING METHOD^{1,2}

| District and State | Number of mines | Open pit (thousand metric tons) | Underground (thousand metric tons) | Total (thousand metric tons) |
|--------------------|--------------------|---------------------------------------|--|------------------------------------|
| Lake Superior: | | | | |
| Michigan | 2 | 21,800 | -- | 21,800 |
| Minnesota | 6 | 59,000 | -- | 59,000 |
| Total | 8 | 80,800 | -- | 80,800 |
| Other States | 4 | 14 | -- | 14 |
| Grand total | 12 | 80,800 | -- | 80,800 |

-- Zero.

¹Includes some byproduct ore. Excludes ore containing 5% or more manganese.

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 4
USABLE IRON ORE PRODUCED IN THE UNITED STATES IN 2009, BY DISTRICT,
STATE, AND TYPE OF PRODUCT^{1,2}

(Thousand metric tons)

| District and State | Direct | | | Other | | Total |
|---------------------------|--------------|--------------|--------|---------------------------|--|--------|
| | shipping ore | Concentrates | Sinter | agglomerates ³ | | |
| Lake Superior: | | | | | | |
| Michigan | 2 | -- | -- | 8,300 | | 8,300 |
| Minnesota | -- | 271 | 65 | 18,000 | | 18,400 |
| Total | 2 | 271 | 65 | 26,300 | | 26,700 |
| Other States ⁴ | -- | 14 | -- | -- | | 14 |
| Grand total | 2 | 285 | 65 | 26,300 | | 26,700 |

-- Zero.

¹Excludes ore containing 5% or more manganese.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Data may include pellet chips, screenings, and sinter.

⁴Includes California and South Dakota.

TABLE 5
SHIPMENTS OF USABLE IRON ORE FROM MINES IN THE UNITED STATES IN 2009^{1,2}

| District and State | Gross weight of ore shipped (thousand metric tons) | | | | | Average iron content, natural (percent) | Value (thousands) |
|-----------------------------|---|--------------|--------|--------------------|--------------------|---|----------------------|
| | Direct | Other | | | Total | | |
| | shipping ore | Concentrates | Sinter | agglomerates | | | |
| Lake Superior: | | | | | | | |
| Michigan | 2 | -- | -- | 8,870 ³ | 8,870 ³ | 60.3 | W |
| Minnesota | -- | 271 | 77 | 18,400 | 18,700 | 62.8 | W |
| Total reportable or average | 2 | 271 | 77 | 27,200 | 27,600 | 62.0 | \$2,560,000 |
| Other States ⁴ | -- | 14 | -- | -- | 14 | 54.0 | 921 |
| Grand total or average | 2 | 285 | 77 | 27,200 | 27,600 | 62.0 | 2,560,000 |

W Withheld to avoid disclosing company proprietary data; included in "Total reportable or average." -- Zero.

¹Includes byproduct ore. Excludes ore containing 5% or more manganese.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Source reported to Securities and Exchange Commission.

⁴Includes California and South Dakota.

TABLE 6
IRON ORE-PRODUCING MINES IN THE UNITED STATES IN 2009

| State and mine | County | Operator | Source of iron ore |
|--------------------------|----------------|---------------------------------|----------------------------------|
| California: | | | |
| Baxter Mine | San Bernardino | Hahm International Inc. | Quarried ore. |
| Dredge 21 | Yuba | Cal Sierra Development Inc. | Dredged sands. |
| Silverlake Mine | San Bernardino | Hahm International Inc. | Quarried ore. |
| Michigan: | | | |
| Empire | Marquette | Cliffs Natural Resources Inc. | Magnetite taconite ore. |
| Tilden | do. | do. | Hematite-magnetite taconite ore. |
| Minnesota: | | | |
| Hibbing Taconite | Saint Louis | do. | Magnetite taconite ore. |
| Keewatin Taconite | do. | United States Steel Corporation | Do. |
| Mesabi Chief Plant | do. | Magnetation, Inc. | Hematite tailings. |
| Minntac | do. | United States Steel Corporation | Magnetite taconite ore. |
| Minorca | do. | ArcelorMittal | Do. |
| Northshore | do. | Cliffs Natural Resources Inc. | Do. |
| United Taconite | do. | do. | Do. |
| South Dakota, CF & I Pit | Lawrence | Pete Lien & Sons Inc. | Quarried ore. |
| Do., do. Ditto. | | | |

TABLE 7
CONSUMPTION OF IRON ORE AT U.S. IRON
AND STEEL PLANTS, BY TYPE OF PRODUCT¹

(Thousand metric tons)

| Type of product | 2008 | 2009 |
|-----------------------|--------|--------|
| Blast furnaces: | | |
| Direct-shipping ore | -- | -- |
| Pellets | 43,800 | 26,200 |
| Sinter ² | 6,380 | 3,720 |
| Total | 50,200 | 29,900 |
| Steelmaking furnaces: | | |
| Direct-shipping ore | 465 | 327 |
| Sinter ² | 118 | 91 |
| Total | 583 | 417 |
| Grand total | 50,700 | 30,400 |

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes briquettes, nodules, and other.

Source: American Iron and Steel Institute.

TABLE 8
U.S. CONSUMPTION OF IRON ORE FOR
DIRECT-REDUCED IRON AND NONSTEEL END USES^{1,2}

(Thousand metric tons)

| Year | Direct-reduced | | Total |
|------|--------------------------------------|-----------------------------------|-------|
| | iron for steelmaking ³ | Nonsteel end uses ⁴ | |
| 2005 | 330 | 928 | 1,260 |
| 2006 | 360 | 867 | 1,230 |
| 2007 | 375 | 699 | 1,070 |
| 2008 | 390 | 734 | 1,120 |
| 2009 | -- | 603 | 603 |

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates. Excludes ore containing 5% or more manganese.

³U.S. Geological Survey estimates based on production reports compiled by Midrex Corp.

⁴An estimate, which includes iron ore consumed in production of cement and iron ore shipped for use in manufacturing paint, ferrites, heavy media, cattle feed, refractory and weighing materials, and for use in lead smelting.

TABLE 9
U.S. EXPORTS OF IRON ORE, BY COUNTRY OF DESTINATION^{1,2}

(Thousand metric tons and thousand dollars)

| Country | 2008 | | 2009 | |
|--------------------|---------------------|------------------------|----------|----------|
| | Quantity | Value | Quantity | Value |
| Algeria | 80 | \$7,690 | -- | -- |
| Belgium | 218 | 20,900 | 194 | \$18,600 |
| Canada | 9,030 ^r | 1,020,000 | 3,060 | 276,000 |
| China | 91 | 7,210 | 99 | 5,800 |
| Colombia | 12 | 946 | 20 | 1,210 |
| Czech Republic | 83 | 7,930 | -- | -- |
| France | 210 | 20,100 | 179 | 17,200 |
| Germany | 156 | 14,900 | 234 | 22,400 |
| Malaysia | 25 | 499 | 1 | 60 |
| Mexico | 328 | 43,200 | 70 | 8,730 |
| Poland | 103 | 9,890 | -- | -- |
| Romania | 129 | 12,400 | -- | -- |
| Serbia | 51 | 7,850 | -- | -- |
| Slovakia | 505 | 61,700 | -- | -- |
| South Africa | -- | -- | 53 | 5,050 |
| Spain | 103 | 9,770 | -- | -- |
| Sweden | 4 | 291 | 6 | 427 |
| Other ³ | 13 | 1,620 ^r | 6 | 442 |
| Total | 11,100 ^r | 1,240,000 ^r | 3,920 | 356,000 |

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates.

³Includes all countries with less than 5,000 metric tons of exports from the United States in 2008 and 2009. This represents 13 countries in 2008 and 16 countries in 2009.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF IRON ORE, BY TYPE OF PRODUCT^{1,2}

| Type of product | 2008 | | | 2009 | | |
|--------------------|---------------------------------------|------------------------|---|---------------------------------------|----------------------|---|
| | Quantity (thousand metric tons) | Value (thousands) | Unit value ^{3,4} (dollars per metric ton) | Quantity (thousand metric tons) | Value (thousands) | Unit value ^{3,4} (dollars per metric ton) |
| Concentrates | 142 | \$13,000 | 91.24 | 123 | \$7,850 | 63.84 |
| Coarse ores | 45 | 1,160 | 25.63 | 4 | 182 | 45.50 |
| Fine ores | 136 ^r | 12,500 ^r | 91.71 ^r | 25 | 1,560 | 62.52 |
| Pellets | 10,800 | 1,220,000 | 112.64 | 3,760 | 346,000 | 92.10 |
| Briquettes | (5) | 4 | 79.15 | 3 | 259 | 86.33 |
| Other agglomerates | 19 | 1,100 | 13.37 | (5) | 22 | 80.00 |
| Roasted pyrites | 1 | 102 | 90.66 | 1 | 71 | 71.00 |
| Total | 11,100 ^r | 1,240,000 ^r | 111.67 ^r | 3,920 | 356,000 | 90.97 |

^rRevised.

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes agglomerates.

³Unit values shown are calculated from unrounded data.

⁴Weighted average calculated from unrounded data by dividing total value by total tonnage.

⁵Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS OF IRON ORE, BY COUNTRY AND TYPE OF PRODUCT^{1,2}

| Country and type of product | 2008 | | | 2009 | | |
|--------------------------------|---------------------------------------|----------------------|---|---------------------------------------|----------------------|---|
| | Quantity (thousand metric tons) | Value (thousands) | Unit value ^{3,4} (dollars per metric ton) | Quantity (thousand metric tons) | Value (thousands) | Unit value ^{3,4} (dollars per metric ton) |
| Country: | | | | | | |
| Bosnia and Herzegovina | 23 | \$1,570 | 68.43 | -- | -- | -- |
| Brazil | 2,620 | 216,000 | 82.45 | 188 | \$13,100 | 69.65 |
| Canada | 5,900 | 645,000 | 109.35 | 3,140 | 323,000 | 102.70 |
| Chile | 215 | 16,800 | 78.25 | 203 | 16,100 | 79.14 |
| China | 14 | 266 | 19.00 | (5) | 2 | 33.33 |
| Finland | 6 | 233 | 38.83 | 6 | 367 | 61.17 |
| Mexico | 52 | 4,290 | 82.56 | 55 | 4,610 | 83.73 |
| Peru | 59 | 3,100 | 52.59 | 34 | 1,670 | 49.03 |
| Russia | 127 | 16,000 | 126.06 | 136 | 8,240 | 60.60 |
| South Africa | -- | -- | -- | 43 | 2,980 | 69.23 |
| Sweden | 88 | 4,540 | 51.59 | 31 | 3,190 | 102.74 |
| Switzerland | 70 | 5,410 | 77.29 | -- | -- | -- |
| United Kingdom | -- | -- | -- | 8 | 1,630 | 203.75 |
| Venezuela | 68 | 4,210 | 61.85 | 21 | 825 | 39.29 |
| Other ⁶ | 4 | 185 | 98.92 | 8 | 224 | 39.75 |
| Total | 9,250 | 918,000 | 99.26 | 3,870 | 376,000 | 96.97 |
| Type of product: | | | | | | |
| Concentrates | 1,250 | 92,200 | 73.79 | 283 | 22,300 | 78.95 |
| Coarse ores | 48 | 1,970 | 41.10 | 16 | 2,330 | 145.50 |
| Fine ores | 1,980 | 149,000 | 75.59 | 466 | 34,900 | 74.91 |
| Pellets | 5,960 | 674,000 | 113.03 | 3,100 | 315,000 | 101.90 |
| Briquettes | 1 | 97 | 97.00 | 4 | 159 | 39.75 |
| Other agglomerates | -- | -- | -- | 3 | 104 | 34.67 |
| Roasted pyrites | 12 | 537 | 44.75 | 6 | 367 | 61.17 |
| Total | 9,250 | 918,000 | 99.26 | 3,870 | 376,000 | 96.97 |

-- Zero.

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes agglomerates.

³Unit values shown are calculated from unrounded data.

⁴Weighted average calculated from unrounded data by dividing total value by total tonnage.

⁵Less than ½ unit.

⁶Includes four countries with less than 5,000 metric tons of imports to the United States in both 2008 and 2009.

Source: U.S. Census Bureau.

TABLE 12
U.S. IMPORTS OF IRON ORE IN 2009, BY COUNTRY AND TYPE OF PRODUCT^{1,2}

(Thousand metric tons)

| Country of origin | Concentrates | Coarse ores | Fine ores | Pellets | Briquettes and other | | Total |
|--------------------|--------------|----------------|--------------|---------|-------------------------|--------------------|-------|
| | | | | | agglomerates | Roasted pyrites | |
| Brazil | -- | -- | 150 | 38 | -- | -- | 188 |
| Canada | -- | -- | 245 | 2,900 | -- | -- | 3,140 |
| Chile | 198 | -- | 5 | -- | -- | -- | 203 |
| Finland | -- | -- | -- | -- | -- | 6 | 6 |
| Mexico | 52 | -- | -- | -- | 3 | -- | 55 |
| Peru | -- | -- | 29 | 5 | -- | -- | 34 |
| Russia | -- | -- | -- | 136 | -- | -- | 136 |
| South Africa | 33 | 8 | 2 | -- | -- | -- | 43 |
| Sweden | -- | -- | 31 | -- | -- | -- | 31 |
| United Kingdom | -- | 8 | -- | -- | -- | -- | 8 |
| Venezuela | -- | -- | -- | 21 | -- | -- | 21 |
| Other ³ | -- | (4) | 4 | -- | 4 | -- | 8 |
| Total | 283 | 16 | 466 | 3,100 | 7 | 6 | 3,870 |

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates.

³Includes all countries with less than 5,000 metric tons of imports to the United States. This represents three countries.

⁴Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 13
AVERAGE UNIT VALUE FOR SELECTED IMPORTS OF IRON ORE IN 2009¹

| Type of product | Country of origin | Average unit value ² (dollars per metric ton, gross weight) |
|-----------------|-------------------|--|
| Concentrates | Chile | 79.53 |
| Do. | Mexico | 86.33 |
| Do. | South Africa | 64.28 |
| Fine ores | Brazil | 63.96 |
| Do. | Canada | 82.29 |
| Do. | Peru | 47.97 |
| Do. | Sweden | 102.12 |
| Pellets | Brazil | 93.23 |
| Do. | Canada | 104.44 |
| Do. | Russia | 60.68 |

Do. Ditto.

¹Includes agglomerates.

²Weighted averages of individual customs values.

Source: U.S. Census Bureau.

TABLE 14
U.S. IMPORTS OF IRON ORE, BY CUSTOMS DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

| Customs district | 2008 | | 2009 | |
|-----------------------|----------|-----------|----------|----------|
| | Quantity | Value | Quantity | Value |
| Baltimore, MD | 3,590 | \$338,000 | 781 | \$67,400 |
| Buffalo, NY | 1 | 43 | -- | -- |
| Charleston, SC | 28 | 647 | 6 | 151 |
| Chicago, IL | 1,160 | 81,600 | 637 | 45,000 |
| Cleveland, OH | 3,160 | 384,000 | 1,860 | 213,000 |
| Detroit, MI | (3) | 4 | -- | -- |
| Houston-Galveston, TX | 51 | 5,870 | 38 | 3,510 |
| Los Angeles, CA | -- | -- | (3) | 1 |
| Minneapolis, MN | 103 | 9,660 | -- | -- |
| Mobile, AL | 74 | 4,570 | 28 | 2,270 |
| New Orleans, LA | 1,020 | 91,400 | 465 | 41,400 |
| New York, NY | 1 | 28 | -- | -- |
| Nogales, AZ | -- | -- | 3 | 175 |
| Norfolk, VA | 10 | 649 | -- | -- |
| Ogdensburg, NY | 12 | 223 | 18 | 325 |
| Philadelphia, PA | 6 | 249 | 6 | 367 |
| Port Arthur, TX | -- | -- | 8 | 1,630 |
| Seattle, WA | -- | -- | 28 | 513 |
| Tampa, FL | 24 | 1,490 | -- | -- |
| Total | 9,250 | 918,000 | 3,870 | 376,000 |

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 15
U.S. IMPORTS OF PELLETS, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

| Country | 2008 | | 2009 | |
|------------------------|----------|---------|----------|---------|
| | Quantity | Value | Quantity | Value |
| Bosnia and Herzegovina | 23 | \$1,570 | -- | -- |
| Brazil | 616 | 65,600 | 38 | \$3,510 |
| Canada | 5,240 | 602,000 | 2,900 | 303,000 |
| Peru | 18 | 736 | 5 | 283 |
| Russia | -- | -- | 136 | 8,240 |
| Venezuela | 68 | 4,210 | 21 | 825 |
| Total | 5,960 | 674,000 | 3,100 | 315,000 |

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 16
SELECTED PRICES FOR IRON ORE IN THE JAPANESE MARKET¹

(Cents per dry long ton unit of iron unless otherwise specified)

| Country and producer | Ore types | April 1-March 31 | |
|---|--------------|---------------------|---------------------|
| | | Fiscal year 2008 | Fiscal year 2009 |
| Australia: | | | |
| Hamersley Iron Proprietary Limited and Mount Newman Mining Company Proprietary Limited ² | Lump ore | 201.69 | 112.00 |
| Do. ² | Fines | 144.66 | 97.00 |
| Robe River Iron Associates ² | do. | 115.30 | 77.31 |
| BHP Billiton (Yandi) ² | do. | 144.66 | 97.00 |
| Fortescue Metals Group | do. | NA | 94.00 |
| Brazil: | | | |
| Companhia Nipo-Brasileira de Pelotizacao (Nibrasco) ² | Pellets | 213.59 | 110.43 |
| Vale S.A. (Carajás) ² | Fines | 125.17 | 89.87 |
| Vale S.A. (Itabira) ² | do. | 118.98 | 85.43 |
| Minerações Brasileiras Reunidas Societe Anonyme | Lump ore | 181.78 | 100.94 |
| Do. | Fines | NA | NA |
| Samarco Mineracão Societe Anonyme | Pellets | 213.59 ³ | 110.43 ³ |
| Canada, Iron Ore Company of Canada (Carol Lake) | Concentrates | 117.27 | 84.20 |
| Chile: | | | |
| Minera del Pacifico Societe Anonyme (Huasco) | Pellets | 104.99 | NA |
| Minera del Pacifico Societe Anonyme (El Romeral) | Fines | 93.65 | 67.24 |
| India: | | | |
| Minerals and Metals Trading Corporation (Bailadila) | Lump ore | 198.68 | 110.33 |
| Do. | Fines | 141.12 | 94.62 |
| Peru, Shougang Hierro Peru S.A.A. | Pellet feed | 92.47 | 66.39 |
| South Africa: | | | |
| Kumba Resources Limited (Iscor) | Lump ore | 165.89 | 92.12 |
| Assmang Limited | do. | 163.92 | 91.02 |
| Do. | Fines | 108.05 | 72.45 |
| Venezuela, Corporación Venezolana de Guayana ² | Pellet feed | 94.28 | 67.69 |

Do., do. Ditto. NA Not available.

¹Free on board shipping port basis.

²Cents per dry metric ton unit.

³Blast furnace grade pellets.

Sources: Trust Fund Project on Iron Ore Information, Iron Ore Statistics—October 2010. The TEX Report, Iron Ore Manual 2009.

TABLE 17
IRON ORE: WORLD PRODUCTION, BY COUNTRY^{1,2}
(Thousand metric tons)

| Country ⁵ | Gross weight ³ | | | | | Metal content ⁴ | | | | |
|---------------------------|---------------------------|---------------------|---------------------|----------------------|------------------------|----------------------------|----------------------|----------------------|----------------------|------------------------|
| | 2005 | 2006 | 2007 | 2008 | 2009 ⁶ | 2005 | 2006 | 2007 | 2008 | 2009 ⁶ |
| Algeria | 1,579 | 2,340 | 1,982 | 2,077 | 2,000 | 800 ^e | 1,180 | 1,000 ^e | 1,050 | 1,040 |
| Australia | 262,000 | 275,000 | 299,000 | 342,000 | 394,000 | 163,000 | 171,000 ^r | 194,000 ^r | 209,000 | 228,000 |
| Austria | 2,048 | 2,093 ^r | 2,153 | 2,033 ^r | 1,500 | 665 ^r | 669 ^r | 689 ^r | 650 ^r | 480 |
| Azerbaijan | 7 | 11 | 18 ^r | 28 ^r | -- ⁶ | 4 ^e | 6 ^e | 9 ^e | 14 ^{r,e} | -- |
| Bosnia and Herzegovina | 3,177 | 3,440 | 2,944 | 2,667 ^r | 2,600 | 1,500 | 1,450 | 1,240 | 1,200 ^{r,e} | 1,100 |
| Brazil | 281,462 | 317,800 | 354,674 | 351,246 ^r | 300,000 ^{p,1} | 186,891 | 211,020 | 235,504 ^r | 233,200 ^r | 199,200 ^{p,6} |
| Canada ⁷ | 30,387 | 33,543 | 32,744 | 31,273 | 31,700 | 19,333 | 21,341 | 20,800 | 19,700 ^e | 19,700 |
| Chile | 7,862 | 8,628 | 8,818 | 9,316 | 8,242 ⁶ | 4,707 | 5,235 | 5,379 | 5,670 | 5,006 ⁶ |
| China ^{e,8} | 420,000 | 601,000 | 707,000 | 824,000 | 880,000 | 138,000 | 198,000 | 233,000 | 270,000 | 280,000 |
| Colombia | 608 | 644 | 624 | 475 ^r | 500 | 325 | 351 | 350 | 200 ^r | 200 |
| Egypt ^e | 1,590 | 1,600 | 2,185 ⁶ | 1,811 ⁶ | 1,800 | 800 | 800 | 1,100 | 910 | 900 |
| Germany ⁹ | 362 | 412 | 422 | 455 ^r | 350 | 38 | 44 | 44 | 48 ^{r,e} | 37 |
| Greece ^{e,10} | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 575 | 575 | 575 | 575 | 570 |
| Guatemala | 11 | 7 | 31 ^r | (11) ^r | 5 ⁶ | 7 ^{r,e} | 5 ^{r,e} | 20 ^{r,e} | (11) ^{r,e} | 4 |
| India ^e | 152,000 | 181,000 | 202,000 | 220,000 | 245,000 | 97,500 | 117,000 | 129,000 | 142,000 | 157,000 |
| Indonesia | 32 | 88 | 61 | 65 ^e | 63 | 18 | 50 | 35 | 37 ^e | 36 |
| Iran ^{e,12} | 19,000 | 26,244 ⁶ | 31,538 ⁶ | 32,000 | 33,000 | 9,000 | 13,000 | 15,000 | 15,000 | 16,000 |
| Kazakhstan | 19,471 | 22,263 | 23,834 | 22,700 ^e | 22,290 ⁶ | 11,100 | 12,700 | 13,600 | 13,000 ^e | 12,800 |
| Kenya ^e | (11) ⁶ | (11) | (11) | (11) | (11) | (11) ⁶ | (11) | (11) | (11) | (11) |
| Korea, North ^e | 5,000 | 5,040 | 5,130 | 5,136 ^{r,6} | 5,000 | 1,400 | 1,400 | 1,400 | 1,488 ^{r,6} | 1,400 |
| Korea, Republic of | 213 | 227 | 291 | 366 ^r | 360 ⁶ | 119 | 155 | 163 | 205 ^r | 200 |
| Macedonia ^e | 10 | 10 | -- | -- ⁶ | -- | 6 | 6 | -- | -- ⁶ | -- |
| Malaysia | 950 | 667 | 802 | 982 ^r | 950 | 541 ^e | 380 ^e | 457 ^e | 560 ^{r,e} | 532 |
| Mauritania | 11,133 | 10,658 | 11,817 | 11,200 ^r | 10,400 ⁶ | 7,240 ^r | 7,250 ^r | 7,700 ^r | 7,280 ^r | 6,760 |
| Mexico ¹³ | 11,687 | 10,983 | 10,916 | 11,688 | 11,600 | 7,012 | 6,590 | 6,550 | 7,013 | 7,000 |
| Mongolia | 168 | 180 | 265 | 1,387 | 1,000 | 109 | 116 | 170 | 888 | 600 |
| Morocco ^e | 10 | 10 | 10 | 10 | 10 | 5 | 5 | 5 | 5 | 5 |
| New Zealand ¹⁴ | 2,270 | 2,146 | 1,723 | 2,020 ^r | 2,000 | 1,260 ^e | 1,220 ^e | 982 ^e | 1,200 ^{r,e} | 1,200 |
| Nigeria ^e | 60 | 88 ⁶ | 58 ⁶ | 62 ⁶ | 50 | 22 | 32 | 21 | 23 | 16 |
| Norway | 620 | 620 | 620 | 668 ^r | 711 ⁶ | 420 | 420 | 400 ^e | 430 ^e | 460 |
| Pakistan ¹⁵ | 50 | 130 | 207 | 250 | 270 | 25 | 65 | 104 | 125 ^e | 135 |
| Peru | 6,810 | 7,138 ^r | 7,614 ^r | 7,823 ^r | 6,698 ⁶ | 4,638 ^r | 4,862 ^r | 5,186 ^r | 5,244 ^r | 4,490 ⁶ |
| Portugal ^{e,16} | 14 | 14 | 14 | 14 ^r | 14 | 10 | 10 | 10 | 10 ^r | 10 |
| Romania | 265 | 123 | 45 | -- ^r | -- | 69 | 40 | 11 | -- ^r | -- |

See footnotes at end of table.

TABLE 17—Continued
IRON ORE: WORLD PRODUCTION, BY COUNTRY^{1,2}
(Thousand metric tons)

| Country ⁵ | Gross weight ³ | | | | | Metal content ⁴ | | | | |
|----------------------------|---------------------------|-----------|---------------------|------------------------|---------------------|----------------------------|---------------------|---------------------|-----------------------|---------------------|
| | 2005 | 2006 | 2007 | 2008 | 2009 ^e | 2005 | 2006 | 2007 | 2008 | 2009 ^e |
| Russia | 96,764 | 102,000 | 105,000 | 99,900 | 92,000 ⁶ | 56,100 ^e | 59,100 ^e | 60,800 ^e | 57,800 ^e | 53,200 |
| Slovakia | 534 | 583 | 570 | 392 | 390 | 182 | 198 | 194 | 133 | 130 |
| South Africa ¹⁷ | 39,542 | 41,326 | 42,083 ^r | 48,983 | 55,313 ⁶ | 25,000 ^e | 26,100 ^e | 26,600 ^e | 31,000 ^e | 35,600 |
| Sweden ^e | 23,300 | 23,300 | 24,700 | 23,800 ⁶ | 17,700 | 15,300 | 15,000 | 16,000 | 14,280 ^{r,6} | 11,500 |
| Thailand | 231 | 264 | 1,555 | 1,710 ^r | 1,700 | 116 | 132 | 779 ^r | 855 ^r | 855 |
| Tunisia | 206 | 214 | 180 ^r | 108 ^r | 110 | 108 ^e | 112 ^e | 94 | 56 ^r | 57 |
| Turkey | 4,598 | 3,785 | 4,849 | 4,700 ^e | 4,000 | 2,450 | 2,000 ^e | 2,600 | 2,500 ^e | 2,100 |
| Ukraine | 68,570 | 74,000 | 77,900 | 72,700 ^e | 66,476 ⁶ | 37,700 ^e | 40,700 ^e | 42,800 ^e | 40,000 ^{r,e} | 36,500 |
| United Kingdom | (11) | (11) | (11) ^e | (11) | -- | (11) | (11) | (11) ^e | (11) | -- |
| United States | 54,329 | 52,749 | 52,489 | 53,560 | 26,696 ⁶ | 34,202 | 33,274 | 33,068 | 33,769 | 16,550 ⁶ |
| Venezuela ^e | 21,200 | 22,100 | 20,700 | 20,650 ⁶ | 14,900 | 14,000 | 14,500 | 13,600 | 13,600 | 9,800 |
| Vietnam | 1,009 | 1,020 | 1,060 ^e | 1,000 ^e | 1,000 | 505 | 510 | 530 ^e | 530 ^e | 530 |
| Zimbabwe | 377 | 104 | 100 ^e | 50 ^e | -- | 200 ^e | 52 ^e | 50 ^e | 25 ^e | -- |
| Total | 1,550,000 | 1,840,000 | 2,040,000 | 2,210,000 ^r | 2,240,000 | 843,000 | 969,000 | 1,070,000 | 1,130,000 | 1,110,000 |

⁵Estimated. ⁶Preliminary. ^rRevised. -- Zero.

¹Estimated data and world totals are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through July 22, 2010.

³Insofar as availability of sources permit, gross weight in this table represent the nonduplicative sum of marketable direct-shipping iron ores and iron ore concentrates; iron agglomerates produced from imported iron ores have been excluded under the assumption that the ore from which such materials are produced has been credited as marketable ore in the country where it was mined.

⁴Data represent actual reported weight of contained metal or are calculated from reported metal content. Estimated figures are based on latest available iron content reported, except for the following countries for which grades are U.S. Geological Survey estimates: Azerbaijan, Kazakhstan, North Korea, and Ukraine.

⁵In addition to the countries listed, Cuba may also produce iron ore, but definitive information on output levels, if any, is not available.

⁶Reported figure.

⁷Series represented gross weight and metal content of usable iron ore (including byproduct ore) actually produced, natural weight.

⁸China's gross weight iron ore production figures are significantly higher than that of other countries, because China reports crude ore production only with an average iron content of 33%, whereas other countries report production of usable ore.

⁹Iron ore is used domestically as an additive in cement and other construction materials but is of too low a grade to use in the steel industry.

¹⁰Nickeliferous iron ore.

¹¹Less than 1/2 unit.

¹²Data are for year beginning March 21 of that stated.

¹³Gross weight calculated from reported iron content based on grade of 60% iron.

¹⁴Concentrates from titaniferous magnetite beach sands.

¹⁵Pakistan iron ore is based on a July-to-July fiscal year and 50% of production is used from each reported year.

¹⁶Includes manganese iron ore.

¹⁷Includes magnetite ore as follows, in thousand metric tons: 2005—2,957; 2006—3,830; 2007—3,781; 2008—3,987; and 2009—4,725.

TABLE 18
 IRON ORE: WORLD PELLETTIZING CAPACITY,
 BY CONTINENT AND COUNTRY IN 2009¹

| | Rated capacity, gross weight (million metric tons) |
|-----------------------------|--|
| North America: | |
| Canada | 27.5 |
| Mexico | 15.0 ^e |
| United States | 56.6 |
| Total | 99.1 |
| South America: | |
| Brazil | 56.0 ^e |
| Chile | 5.3 ^r |
| Peru | 3.5 |
| Venezuela | 11.8 ^e |
| Total | 76.6 |
| Europe and Central Eurasia: | |
| Kazakhstan | 8.4 ^e |
| Netherlands | 4.4 ^e |
| Russia | 31.4 ^e |
| Slovakia | 0.4 |
| Sweden | 21.0 |
| Turkey | 1.5 |
| Ukraine | 33.5 ^e |
| Total | 100.6 |
| Asia: | |
| Bahrain | 4.0 |
| China | 45.0 ^e |
| India | 26.7 ^r |
| Iran | 12.3 ^e |
| Japan | 3.0 |
| Total | 91.0 |
| Oceania, Australia | 4.3 |
| Grand total | 371.6 |

^eEstimated. ^rRevised.

¹Data may not add to totals shown because of independent rounding.

Sources: International Iron and Steel Institute; United Nations Commission on Trade and Development, Trust Fund on Iron Ore Information; U.S. Geological Survey.