

2010 Minerals Yearbook

MANGANESE [ADVANCE RELEASE]

MANGANESE

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In 2010, U.S. manganese apparent consumption was estimated to be 758,000 metric tons (t), a 68% increase from the revised amount of 451,000 t in 2009 (table 1). Increases in imports of manganese dioxide, manganese ferroalloys, manganese metal, and manganese ore, as well as a slight increase in high-carbon ferromanganese shipments from the U.S. Government's National Defense Stockpile (NDS), accounted for the rise in apparent consumption.

Manganese exports decreased by 21% to 37,300 t compared with those of 2009, based on the typical manganese contents of the materials as calculated in table 4. Manganese imports increased by 93% on a content basis to 758,000 t compared with those of 2009, based on U.S. Census data for manganese ore, ferromanganese, and silicomanganese, and the stochiometric ratios for manganese dioxide and manganese metal.

In 2010, the annual average domestic price of ore increased by 15% from that in 2009 (revised). The annual average international benchmark price of metallurgical-grade ore increased by 11%, based on quarterly contract prices between Australian producers and Japanese consumers in 2010. Average U.S. spot-market prices for high- and medium-carbon ferromanganese and silicomanganese increased from those in 2009 by 16%, 28%, and 27%, respectively (table 1). The average spot market price for manganese metal increased by 16% from that in 2009.

Only high-carbon ferromanganese remained in NDS physical inventory at yearend 2010. Sales of manganese materials from the NDS in 2010 reduced the Government's inventory of manganese by 9% (content basis), leaving an inventory that was 20% more than the amount of high-carbon ferromanganese reported consumed on a contained-weight basis in 2010.

World production of manganese ore in 2010 increased by 26% on a gross-weight basis and by 31% on a containedweight basis, compared with that in 2009. China was the leading producer of manganese ore (table 8). Combined world production of ferromanganese and silicomanganese increased by 16% to 15.2 million metric tons (Mt) on a gross-weight basis compared with the revised amount in 2009 (table 9). China was the leading producer of these manganese ferroalloys.

Manganese is essential to iron and steel production by virtue of its sulfur-fixing, deoxidizing, and alloying properties. Steelmaking, including its ironmaking component, accounted for most of the reported domestic manganese consumption, currently in the range of 77% to 90% of U.S. apparent consumption. Among a variety of other uses, manganese is a key component of certain widely used aluminum alloys and is used in oxide form in dry cell batteries.

Legislation and Government Programs

Air Quality, Emissions Limits.—The U.S. Environmental Protection Agency (EPA) issued final national emission standards for hazardous air pollutants (HAPs) for prepared animal feeds (except cat and dog) manufacturing in which manganese compounds are added to products. The emission standards involve various housekeeping, monitoring, and recordkeeping requirements for the storage, use, and handling of manganese materials, including the use of dust control devices at bulk loading areas and in pelletizing operations (U.S. Environmental Protection Agency, 2010c, p. 546–550).

Air Quality, Public Health Study.—The EPA conducted air sampling from August 17, 2009, through November 15, 2009, at three schools in Ohio and West Virginia to determine potential health impacts from air emissions around Eramet Marietta, Inc.'s manganese ferroalloy facility. Elevated levels of manganese were detected at each school, although they posed no immediate health threat. The EPA planned to conduct additional air monitoring in the summer of 2011 to determine whether there were long-term health concerns. Eramet Marietta indicated that it would replace the emission control device on one of their furnaces to reduce particulate matter emissions, which would result in reduced airborne manganese (U.S. Environmental Protection Agency, 2010b, f).

Toxic Substances Control Act, Significant New Use Rules (*SNUR*).—In September, the EPA issued a direct final rule that required 90-day premanufacture notices (PMNs) for several manganese materials, including cobalt-lithium-manganese-nickel oxide used as battery cathode material, styrenyl-surface-treated manganese ferrite used to manufacture polymerized pigments, and styrenyl-surface-treated manganese ferrite with acrylic ester polymer used to manufacture electronic inks. In addition to manufacturing, the PMNs also apply to importers and processors of these materials. The PMNs would allow the EPA to evaluate the intended use and, if necessary, prohibit or limit that activity before it took place. On November 18, the EPA withdrew the SNUR for cobalt-lithium-manganese-nickel oxide and proposed a new one (U.S. Environmental Protection Agency, 2010a, d, e, p. 57172, 57177).

Toxicological Profile for Manganese.—The Agency for Toxic Substances and Disease Registry of the U.S. Department of Health and Human Services retained the chronic-duration inhalation minimal risk level of 0.04 microgram of manganese per cubic meter as it continued to update the toxicological profile for manganese that was last published in 2000 (Agency for Toxic Substances and Disease Registry, 2010).

Stockpile.—The Annual Materials Plan (AMP) for fiscal year 2010 that the Defense Logistics Agency, DLA Strategic Materials (formerly Defense National Stockpile Center) issued on October 1, 2009, covered the period from October 1, 2009,

through September 30, 2010. Under this AMP, the maximum disposal authority for manganese materials was 90,718 t each for metallurgical-grade ore and high-carbon ferromanganese (Defense National Stockpile Center, 2009). The maximum disposal authority under an AMP is the maximum quantity of material that may be disposed in a given fiscal year as authorized by Congress; these may differ from the disposal authority quantities listed in table 2.

For calendar year 2010, the DLA disposed of (sold) 34,473 t of high-carbon ferromanganese. Only high-carbon ferromanganese remained in the NDS physical inventory at yearend (368,000 t, gross weight). The estimated manganese content of this material was 276,000 t, which was about 9% less than the amount contained at yearend 2009. Sales of ferromanganese were curtailed to hold a goal quantity equivalent to 1 year's AMP (U.S. Department of Defense, 2011, p. 8).

Exploration and Development

American Manganese Inc. (formerly Rocher Deboule Minerals Corp.) (White Rock, British Columbia, Canada) completed a new National Instrument (NI) 43-101 resource study estimate of its Artillery Peak manganese project (Mohave County, AZ). Indicated resources were 92.8 Mt at an average grade of 3.27% manganese (above a 0.90% manganese cutoff grade) and 80.7 Mt at an average grade of 3.55% (above a 1.30% manganese cutoff grade). Inferred resources were 107.2 Mt at an average grade of 3.76% (above a 0.90% manganese cutoff grade) and 84.1 Mt at an average grade of 4.13% (above a 1.30% manganese cutoff grade). These were substantially higher than 10.9 Mt at an average grade of 4.46%, and inferred resources were 96.9 Mt at an average grade of 4.52% assessed in 2009. A processing rate of 3,500 metric tons per day was expected to yield about 49,000 metric tons per year (t/yr) of electrolytic manganese metal based on mill feed containing 4.5% manganese and having an overall 90% rate of recovery. The metal would be produced using a patent-pending sulfurous acid-leach process followed by conventional electrolysis. No roasting or calcining of the mill feed would be required (American Manganese, Inc, 2010a, b).

Wildcat Silver Corp. (Vancouver, British Columbia, Canada) completed an updated preliminary economic assessment of its Hardshell silver-manganese-copper-zinc-lead project (now known as the Hermosa project) in Santa Cruz County, AZ. The company planned to initially mine the area via open pit, with underground operations starting 4 years after startup. Indicated manganese resources were 410,000 t at an average grade of 6.83% manganese and inferred manganese resources were 3.4 Mt at an average grade of 7.44% manganese. A processing plant would use a sulfuric acid leach process followed by copper precipitation, zinc solvent extraction-electrowinning, and manganese and silver recovery circuits. An average of 233,000 t/yr of manganese carbonate was expected to be produced for 18 years (Wildcat Silver Corp., 2010a, b).

Production

Ore and Concentrate.—The only mine production of manganese in the United States consisted of small amounts of manganiferous material having a manganese content of less than 5%. This material was produced in South Carolina for use in coloring brick.

Chemicals, Ferroalloys, and Metal.—Production statistics for these materials were withheld to avoid disclosing company proprietary data. Domestic producers of manganese ferroalloys, metal, and synthetic dioxide are listed in table 3.

Several events affected production of refined ferromanganese and silicomanganese in the United States in 2010. At its Marietta, OH, ferroalloys plant, Eramet Marietta declared force majeure for silicomanganese from March through September after its No. 18 refined ferromanganese furnace was damaged and taken offline when a buildup of pressure blew material off its top. The company switched silicomanganese production in its No. 1 furnace to high-carbon ferromanganese for refining into medium- and low-carbon ferromanganese. In June, refurbishment of the No. 12 high-carbon furnace that started in 2009 was completed. By yearend, the No. 12 furnace was again producing ferromanganese and the No. 1 furnace, silicomanganese (Metal-Pages, 2010e; Platts Metals Week, 2010). However, Felman Production Inc. was able to produce silicomanganese steadily throughout the year. On March 2, Eramet Marietta reached a 3-year labor agreement with unionized workers. It was the first new contract at the company since a 5-month lockout ended in early 2007 (Metal-Pages, 2010c).

Consumption, Uses, and Stocks

In 2010, U.S. manganese apparent consumption was estimated to be 758,000 t (table 1). Metallurgical applications account for most domestic manganese consumption, 77% to 90% of which has been for steelmaking. Reported consumption (gross weight) of ferromanganese, manganese metal, and silicomanganese increased by 21%, 10%, and 4%, respectively, from that in 2009 (table 4). Because of incomplete reporting to the U.S. Geological Survey (USGS) voluntary consumption survey, the figures in this table represent relative rather than absolute quantities.

Based on the apparent consumption of ferromanganese, manganese metal, and silicomanganese, on a gross-weight basis, manganese alloy unit consumption in steelmaking was about 7.5 kilograms per metric ton (kg/t) or about 1.91 times the reported consumption in 2010. This level was 60% more than the revised quantity of 4.7 kg/t estimated for 2009 and was predominantly a result of significant increases in ferromanganese and silicomanganese apparent consumption. The increase in the apparent consumption of these ferroalloys was attributable to significant increases in imports.

Relatively small quantities of manganese were used for alloying with nonferrous metals, chiefly in the aluminum industry as manganese-aluminum briquettes that typically contained either 75% or 85% manganese. Manganese plays an important alloying role in aluminum to increase corrosion resistance. The most important use of aluminum-manganese alloys is in the manufacture of beverage cans. Other uses include, but are not limited to, aircraft, automobiles, cookware, radiators, and roofing (Roskill Information Services Ltd., 2008, p. 195, 200).

Comparatively small amounts of manganese were used domestically in animal feed, brick coloring, dry cell batteries, fertilizers, and manganese chemicals. These were among the many nonmetallurgical applications of manganese (Roskill Information Services Ltd., 2008, p. 206–229). The source of manganese units for these applications was mainly manganese ore.

In 2010, reported domestic consumption of manganese ore increased by 11% to 468,000 t, while corresponding yearend stocks decreased by 22% to 89,100 t, compared with the amounts in 2009 (table 1). Apparent consumption of manganese ore on a gross-weight basis in 2010 was about 501,000 t, which excluded any manganese ore consumed directly by ironmaking and steelmaking plants. The USGS excludes reporting by these operations to avoid disclosing company proprietary information. The discrepancy between apparent and reported consumption represented incomplete reporting to the USGS voluntary consumption survey.

Data on domestic consumption of manganese ore, exclusive of that consumed by the steel industry, are collected by means of the "Manganese Ore and Products" survey. In 2010, eight firms were canvassed that process ore or had processed ore in the past by such methods as grinding and roasting, or that consume it in the manufacture of dry cell batteries and manganese chemicals, ferroalloys, and metals. Of those eight companies, all consumed manganese ore in their processes in 2010. The collective consumption of these firms was considered to constitute all the manganese ore consumption in the United States, exclusive of that consumed by the steel industry. Full-year responses or a basis upon which to estimate the data were obtained from all of these firms for 2010.

Prices

There were significant increases in annual average manganese material prices in 2010 from those in 2009 because of improved global economic conditions.

Manganese Ore.—The USGS estimated the annual U.S. average contract price of metallurgical-grade ore containing 46% to 48% manganese was \$9.18 per metric ton unit (mtu). This was a 15% increase compared with that in 2009, which followed the 11% increase in the annual average international benchmark price for this grade of ore, as calculated from quarterly contract prices set between Japanese consumers and Australian producers (Australian Bureau of Agricultural and Resource Economics and Sciences, 2011, p. 28). The international benchmark price for the first time reflected cost, insurance, and freight rather than the historical free-on-board (f.o.b.) charges (TEX Report, The, 2010). The 2010 average spot market price for this grade of ore based on weekly averages of Chinese cost and freight (CNF) transaction prices as reported by Ryan's Notes was \$7.23 per mtu. The range in CNF spot market prices per mtu peaked in May at \$8.50 to \$8.90 and then trended downwards to finish the year at \$6.50 to \$6.80 per mtu because of increased world mine capacity and high manganese ore inventories at Chinese ports, which were reported to be more than 2.5 Mt (Metal-Pages, 2010a). The price of 1 metric ton of ore (gross weight) is obtained by multiplying the mtu price by

the percentage manganese content of the ore; for example, by 48 when the manganese content is 48%. The ore market consisted of a number of submarkets because of differences in ore-quality requirements by end use—ferroalloy production, blast furnace ironmaking, and manufacture of manganese chemicals.

Manganese Ferroalloys and Metal.—Prices for manganese ferroalloys tend to vary in response to changes in demand by the steel and ferrous foundry industries, while those of manganese metal predominantly follow changes in demand by the aluminum industry. Manganese ferroalloy prices are also influenced by changes in the product mix of the world's suppliers because different manganese ferroalloys are largely interchangeable with each other.

Annual average import prices for manganese ferroalloys are given by Platts Metals Week. These prices are based on free market spot prices per unit of measurement, f.o.b. Chicago, IL, or Pittsburgh, PA, warehouse. Annual average import prices were \$1,403.41 per gross (long) ton for high-carbon ferromanganese, 129.09 cents per pound for medium-carbon ferromanganese, and 64.27 cents per pound for silicomanganese. These prices were 16%, 28%, and 27% higher, respectively, than those of 2009. The annual average price for manganese metal is based on weekly averages of North American transaction prices published by Ryan's Notes for bulk shipments of manganese metal, f.o.b. Chicago, IL, or Pittsburgh, PA, warehouse. The annual average North American transaction price for manganese metal was 162.60 cents per pound, which was a 16% increase compared with that of 2009.

According to Platts Metals Week, the price range for high-carbon ferromanganese containing 78% manganese, per gross ton, began the year at \$1,310 to \$1,350 and ended the year at \$1,300 to \$1,350, for a slight net decrease. The price range, per pound of manganese, for medium-carbon ferromanganese with a manganese content of 80% to 85% and a nominal carbon content of 1.5% began the year at 105 to 109 cents and ended the year at 117 to 119 cents, for a net increase of 10%. The price range, per pound of alloy, for imported silicomanganese with 2% carbon started the year at 58 to 62 cents and ended 2010 at 59 to 62 cents, for a slight net increase. The net price increases for medium-carbon ferromanganese and silicomanganese were caused by supply concerns when U.S. producer Eramet Marietta declared a force majeure on manganese alloys production in March and early April.

According to Ryan's Notes North American transaction prices, the 2010 yearend price range of bulk manganese metal shipments was 182.5 to 187.5 cents per pound, a net increase of 27% from the price of 142 to 150 cents per pound at the beginning of the year. This net price increase was attributable to rising costs of Chinese manganese metal exports.

Foreign Trade

In the absence of domestic mine production and recycling for manganese, U.S. net import reliance, as a percentage of apparent consumption, was 100% for manganese, the same as it has been for the past 25 years. The ensuing comparisons of foreign trade data were made on the basis of gross weight.

In 2010, U.S. exports of manganese dioxide and manganese metal increased, while exports of ferromanganese, manganese

ore, and silicomanganese decreased compared with exports of these materials for 2009 (table 5). The biggest year-to-year change in exports was that of silicomanganese, which were 50% lower than those in 2009. Mexico accounted for 54% of U.S. silicomanganese exports, followed by Canada with 23%.

In 2010, U.S. imports of ferromanganese, manganese dioxide, manganese metal, manganese ore, and silicomanganese increased compared with those of 2009, while imports of potassium permanganate decreased (table 6). The most significant year-to-year change was for imports of manganese ore, which were 43% more than those of 2009. Increases in this import category were especially notable for China, with an increase of 95,400 t, up from zero in 2009; and for Gabon and Australia, with year-on-year increases of 60,100 t (32%) and 50,800 t (142%), respectively.

Antidumping Duty Administrative Reviews.—Final antidumping duty rates assessed in 2010 on imports of manganese materials to the United States are summarized in table 7.

U.S. World Trade Organization (WTO) Chinese Raw Material Export Dispute Settlement Proceedings.—On March 29, panel representatives were appointed to the WTO Dispute Settlement Body (DSB) that was formed in response to requests from the United States, the European Union, and Mexico, regarding curbs placed by China in 2009 on exports of various materials, including a tax of 20% on ferromanganese, manganese metal, and silicomanganese exports and a 15% tax on manganese ore exports. The DSB panel was expected to finalize its determination in April 2011, although as of June 30, 2011, it had not done so (Office of the United States Trade Representative, 2009; American Metal Market, 2010; World Trade Organization Dispute Settlement Body, 2010).

World Industry Structure

World manganese ore production was estimated by the USGS to be 14.2 Mt (contained manganese) in 2010, up 31% from the revised amount in 2009. Most (95%) manganese ore was produced in 10 countries. On a manganese-content basis, the leading producer countries of manganese ore were Australia (21%), South Africa (20%), China (18%), Gabon (10%), and India (7%) (table 8). World manganese ferroalloy production was estimated by the USGS to be 15.2 Mt (gross weight) in 2010, an increase of 16% compared with the revised amount in 2009. On a gross weight basis, the leading producer countries of manganese ferroalloys were China (55%), India (9%), Ukraine (8%), South Africa (5%), Norway (4%), and Japan (3%) (table 9).

CRU International Ltd. estimated that world consumption of manganese ferroalloys increased by 25% to 15.1 Mt in 2010 compared with that of 2009. Of that amount, 9.3 Mt was silicomanganese, 4.4 Mt was high-carbon ferromanganese, and 1.4 Mt was refined (medium- and low-carbon) ferromanganese. World consumption was slightly more than CRU's estimate of world manganese ferroalloys production in 2010 (15 Mt). The International Manganese Institute (IMnI) estimated world manganese ore production to be 14.1 Mt (contained manganese), which was an increase of 33% from the IMnI estimate of 11.1 Mt in 2009 (CRU Bulk Ferroalloys Monitor, 2011; Mark Camaj, market analyst, International Manganese Institute, unpub. data, May 26, 2011).

World Review

New manganese materials projects scheduled for completion around the world from 2010 through 2014 are listed in table 10. In 2010 alone, an additional 2.3 million metric tons per year (Mt/yr) of manganese ore and 262,000 t/yr of manganese ferroalloys capacity were planned. Additional manganese mine capacity was in South Africa (1.25 Mt/yr), Namibia (480,000 t/yr), Australia (440,000 t/yr), Burkina Faso (50,000 t/yr), and Zambia (48,000 t/yr). New manganese ferroalloys capacity was in China (120,000 t/yr) of silicomanganese), South Africa (75,000 t/yr of high-carbon ferromanganese), and India (67,000 t/yr of ferromanganese and silicomanganese).

Brazil.—Vale S.A. was the leading manganese ore and ferroalloy producer in Brazil. Vale produced 1.8 Mt of manganese ore in 2010, an increase of 11% from that of 2009. The Azul Mine in the Carajás region produced 1.6 Mt of ore. Vale's manganese ferroalloys plants, with the exception of the Urucum plant, produced 207,000 t, more than double that in 2009 (Vale S.A., 2011, p. 4).

China.—Chinese imports of manganese ore were at an alltime high of 11.6 Mt (gross weight) in 2010, up 21% from those of 2009 (TEX Report, The, 2011a). This was about 27% of the USGS estimated total world production (gross weight) in 2010. The leading sources of Chinese manganese ore imports were Australia (3.16 Mt), South Africa (3.11 Mt), Gabon (1.30 Mt), Brazil (1.25 Mt), and Burma (0.75 Mt). Most of the imported manganese ore likely was blended with lower-grade domestic manganese ore for the production of manganese ferroalloys and metal.

China was the leading producer of manganese ferroalloys in the world, but it still relied on imports of ferromanganese and silicomanganese. The country exported 15% more ferromanganese in 2010 (54,000 t) than it did in 2009, but it exported significantly less silicomanganese (72,000 t, -37%) (TEX Report, The, 2011b).

China, the leading producer of electrolytic manganese metal (EMM) in the world with about 188 companies, produced 1.38 Mt of EMM in 2010, an increase of 7% from that in 2009. The country exported about 220,000 t of EMM in 2010, an increase of 42% from that in 2009. China's EMM capacity in 2010 was estimated to be 2.2 Mt/yr, or 98% of the world total. The country's EMM capacity utilization rate in 2010 was about 62% (TEX Report, The, 2011c; Xie, 2011, p. 9). In 2010, the Chinese Ministry of Industry and Information Technology began evaluating the elimination of EMM plants with production lines of less than 5,000 t/yr capacity and plants that were noncompliant with environmental requirements. As a result, the country's EMM production capacity would be reduced by 2012 to between 1.5 Mt/yr and 1.7 Mt/yr by 2012 (JF Zhang Associates Inc., 2011, p. 67).

In 2010, China was also the leading producer of EMD in the world, with total output of 202,000 t. This equated to 77% of the country's annual production capacity held by 14 producers, which was 260,000 t. China's share of the active world EMD production capacity in 2010 was about 62%, followed by the United States with 15%. Other countries with EMD capacity include Colombia, Greece, India, Japan, South Africa, and

Spain. China's EMD exports increased to 48,000 t in 2010 from 38,700 t in 2009 (Li, 2011, p. 27).

CITIC Dameng Holdings Ltd. (2010, p. 102, 104) summarized the Government's requirements for new EMM and manganese alloy producers in China in its initial public offering prospectus. The minimum capacity for each new EMM production line was 10,000 t/yr. The minimum production capacities for new ferromanganese blast furnaces and silicomanganese electric arc furnaces (EAFs) were 70,000 t/yr (300 cubic meters) and 40,000 t/yr [25,000-kilovoltampere (kVA)], respectively, except for silicomanganese EAFs in midwest China, which must have at least 20,000 t/yr (12,500 kVA) production capacity. CITIC also noted that the Government has compiled lists of outdated existing ferroalloy production facilities that would be shut down "in the near-term" to meet its industrial policies. If fully carried out, these policies were expected to affect 755 ferroalloy producers and eliminate about 4 Mt/yr of outdated ferroalloy production capacity, including 1.3 Mt/yr of silicomanganese capacity.

Starting July 15, the Central Government revoked the 5% value-added-tax rebate on exports of wrought manganese products categorized under the Harmonized Tariff Schedule (HTS) code 8111.00.6000. The Government maintained the 20% export duty on ferromanganese, unwrought manganese metal (except manganese briquettes), and silicomanganese exports. It also kept the duty on manganese ore exports at 15% (Metal-Pages, 2009, 2010b; Swire, 2009).

France.—Eramet SA reported a 26% reduction in worldwide manganese alloy output in 2010 to 779,000 t compared with that in 2009. The company owned manganese alloy plants in China, France, Norway, and the United States (Eramet SA, 2011, p. 34). Vale's Rio Doce Manganese Europe tripled manganese alloy production at its Dunkerque plant to 138,000 t in 2010 from that in 2009 (Vale S.A., 2011, p. 4).

Gabon.—Eramet reached an agreement with the Government of Gabon that would increase the Government's share of the Compagnie Miniere de l'Ogoouse (Comilog) S.A. mine by 10% to 35.4% (Eramet SA, 2011, p. 32).

Macedonia.—In April, Skopski Leguri DOOEL restarted one furnace at its manganese ferroalloys plant in Skopje after a 5-month stoppage. The company would produce either ferromanganese or silicomanganese depending on customer requirements (Metal-Pages, 2010d).

Norway.—Eramet relined the Nos. 1 and 10 manganese ferroalloy furnaces at Kvinesdal and Porsgrunn, respectively, with refractory during the year (Eramet SA, 2011, p. 11). Manganese ferroalloy production at Vale's Mo I Rana plant was 106,000 t, a 34% increase from that of 2009 (Vale, S.A., 2011, p. 4).

South Africa.—In May, Samancor Manganese sold its 51% equity stake in Manganese Metal Company (Pty.) Ltd. (MMC) to Agattu Trading 195 (Pty.) Ltd. Also in May, U.S.-based Valmont Industries, Inc. acquired a 56% share in Delta EMD Ltd., which owned the remaining 49% of MMC. Delta EMD's ownership in MMC was transferred to Valmont (BHP Billiton Ltd., 2010, p. 46; Valmont Industries, Inc., 2012).

South African manganese producers were facing rail and port infrastructure constraints as substantial additions of manganese ore production capacity were planned through 2014 (table 10). Transnet SOC Ltd., South Africa's state-run port and rail utility began evaluating options for expanding manganese rail line and shipping port capacities. Transnet was responsible for transporting manganese ores from mines located in the Kalahari Basin in the Northern Cape region by bulk rail to the Port Elizabeth and Durban. In 2010, the manganese ore terminal capacity at Port Elizabeth was 5.5 Mt/yr and at Durban, 1 Mt/yr. Transnet's rail capacity to Durban matched that of the port, but rail capacity to Port Elizabeth was only 4.2 Mt/yr. As an interim solution, Transnet planned to increase its Port Elizabeth rail line capacity to 5.5 Mt/yr by July 2012, while continuing to evaluate whether to locate a new 12-Mt/yr manganese facility at Port Ngqura or Port Saldanha by 2016–17. The manganese terminal at Port Elizabeth would then be vacated (Herbert, 2011, p. 12, 18, 29-30).

Ukraine.—Ukraine's total output of manganese concentrate increased by 71% in 2010 to 1.59 Mt, compared with that of 2009. Manganese ferroalloy production also increased in 2010 by 120% for ferromanganese, 27% for silicomanganese, and 4% for electrothermic manganese metal. Nikopol Ferroalloy Plant's produced 704,600 t of silicomanganese and 210,600 t of ferromanganese, up 21% and 170%, respectively. OAO Zaporozhsky Ferro-Alloy Works produced 152,100 t of silicomanganese, 69,500 t of ferromanganese, and 15,700 t of electrothermic manganese metal, up 32%, 32%, and 4%, respectively, from those in 2009. Silicomanganese production at the Stakhanov Ferroalloy Plant increased to 83,700 t, which was a 91% increase from that in 2009 (Interfax Russia & CIS Metals and Mining Weekly, 2011).

Outlook

The trend of domestic and global consumption for manganese is expected to follow closely that of steel production, for which the annual growth rate in the United States has been typically in the range of 1% to 2%. Although growth rates for some nonmetallurgical components of manganese consumption, especially batteries, may be higher than for steel production, this situation should have only a minor effect on overall manganese demand.

Details of the outlook for the steel industry are discussed in the Outlook section of the Iron and Steel chapter of the 2010 USGS Minerals Yearbook, volume I, Metals and Minerals. According to the World Steel Association (2011), raw steel production, compared with that in 2009, increased by 38.5% to 80.6 Mt in the United States and by 15% worldwide to slightly more than 1.4 billion metric tons (Gt). Raw steel production in China, the leading world producer of raw steel, increased by 9.3% to about 627 Mt. MEPS (International) Ltd. (2011) forecast that world raw steel production would increase by 5% to 1.49 Gt in 2011 from that in 2010, and by 4.4% in 2012.

Manganese metal is used primarily by the aluminum industry followed by the steel industry. The outlook for the aluminum industry is discussed in the Outlook section of the Aluminum chapter of the 2010 USGS Minerals Yearbook, volume I, Metals and Minerals.

EMD is used by the primary and secondary battery industries. As a rough indicator of future EMD consumption, U.S. demand for primary and secondary batteries was projected to increase by 4.8% annually through 2015 to \$16.7 billion. Secondary battery sales were forecast to rise faster than those of primary batteries, owing mainly to growth in lead-acid batteries in which EMD is not used, although non-lead-acid secondary batteries were expected to grow faster in percentage terms spurred by increasing usage of high-drain electronic products and increased production of hybrid and electric vehicle batteries such as lithium-ion in which EMD may be used. Sales of secondary batteries were expected to increase at an annual rate of 5.7% through 2015. The value of global primary and secondary battery consumption was forecast to increase by 4.8% annually through 2014 to \$109 billion, with U.S consumption expanding below the average global rate (Freedonia Group, Inc., The, 2010, 2011).

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TABLE 1 SALIENT MANGANESE STATISTICS¹

(Thousand metric tons, gross weight, unless otherwise specified)

| | | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|-----------------------------|---------------------|----------|---------------------|---------------------|----------|
| United States: | | | | | | |
| Manganese ore (20% or more Mn): | | | | | | |
| Exports | | 2 | 29 | 48 | 15 | 14 |
| Imports for consumption | | 572 | 602 | 571 | 269 | 489 |
| Consumption ² | | 365 | 351 | 464 | 422 | 468 |
| Stocks, December 31, consumers ² | | 153 | 190 | 255 | 115 | 89 |
| Ferromanganese: | | | | | | |
| Exports | | 22 | 29 | 23 | 24 | 19 |
| Imports for consumption | | 358 | 315 | 448 | 153 | 326 |
| Consumption | | 297 | 272 | 304 | 242 | 292 |
| Stocks, December 31, consumers and prod | ucers | 31 | 31 | 27 | 31 | 30 |
| Consumption, apparent, manganese content ³ | | 1,060 | 979 | 844 | 451 ^r | 758 |
| Price, average: | | | | | | |
| Ferromanganese, high-carbon ⁴ | dollars per gross ton | 867.51 | 1,420.00 | 2,740.00 | 1,210.00 | 1,400.00 |
| Ferromanganese, medium-carbon ⁴ | cents per pound | 66.83 | 104.98 | 213.13 | 100.52 | 129.09 |
| Manganese metal ⁵ | do. | 75.52 | 199.39 | 197.64 | 140.13 | 162.60 |
| Manganese ore price, c.i.f. ⁶ | dollars per metric ton unit | 3.22 | 3.10 | 12.15 | 7.95 ^r | 9.18 |
| Silicomanganese ⁴ | cents per pound | 39.57 | 76.72 | 100.87 | 50.72 | 64.27 |
| World, production of manganese ore | | 33,100 ^r | 35,100 | 38,300 ^r | 33,800 ^r | 42,700 |
| wond, production of maligaliese ofe | | 55,100 | 55,100 | 56,500 | 55 | ,800 |

^rRevised. do. Ditto.

¹Data are rounded to no more than three significant digits.

²Exclusive of iron and steel plants.

³Based on estimates of average content for all significant components except imports, for which content is reported.

⁴Platts Metals Week, dealer import prices based on monthly averages.

⁵Ryan's Notes North American transaction prices based on weekly averages.

⁶Cost, insurance, and freight, U.S. ports.

TABLE 2 U.S. GOVERNMENT DISPOSAL AUTHORITIES AND INVENTORIES FOR MANGANESE MATERIALS AS OF YEAREND $2010^{\rm l}$

(Metric tons, gross weight)

| | | | Phys | sical inventory | e | |
|--------------------------------|-----------|-----------|--------------|-----------------|----------|---------|
| | | | Uncommitted | | Sold, | |
| | Disposal | Stockpile | Nonstockpile | | pending | Grand |
| Material | authority | grade | grade | Total | shipment | total |
| Metallurgical ore ² | (8,910) | | (8,910) | (8,910) | XX | (8,910) |
| High-carbon ferromanganese | 398,000 | 368,000 | | 368,000 | 29,700 | 398,000 |

^eEstimated. XX Not applicable. -- Zero.

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

²Negative inventory, as reported by the Defense Logistics Agency, DLA Strategic Materials.

Source: Defense Logistics Agency, DLA Strategic Materials.

 TABLE 3

 DOMESTIC PRODUCERS OF MANGANESE PRODUCTS IN 2010

| | | | Products | | |
|--|----------------------|------|----------|---------|-------------------|
| Company | Plant location | FeMn | SiMn | MnO_2 | Type of process |
| Energizer Holdings, Inc., Eveready Battery Co. | Marietta, OH | | | Х | Electrolytic. |
| Erachem Comilog, Inc. | Baltimore, MD | | | Х | Chemical. |
| Do. | New Johnsonville, TN | | | Х | Electrolytic. |
| Eramet Marietta, Inc. | Marietta, OH | Х | Х | | Electric furnace. |
| Felman Productions Inc. | Letart, WV | | Х | | Do. |
| Tronox Inc. | Henderson, NV | | | Х | Electrolytic. |

Do. Ditto.

¹FeMn, ferromanganese; SiMn, silicomanganese; MnO₂, synthetic manganese dioxide.

TABLE 4

U.S. CONSUMPTION, BY END USE, AND INDUSTRY STOCKS OF MANGANESE FERROALLOYS AND METAL IN $2010^1\,$

(Metric tons, gross weight)

| | Fe | erromanganese | | | |
|--|-------------|---------------|---------|---------------------|-----------|
| | | Medium and | | | Manganese |
| End use | High carbon | low carbon | Total | Silicomanganese | metal |
| Steel: | | | | | |
| Carbon | 111,000 | 107,000 | 218,000 | 56,300 | 1,560 |
| High-strength, low-alloy | 18,800 | 10,600 | 29,300 | 5,850 | |
| Stainless and heat-resisting | 6,630 | 2,160 | 8,790 | 14,200 | 968 |
| Full alloy | 13,900 | 14,000 | 27,800 | 16,700 | 1 |
| Unspecified ² | 670 | 380 | 1,050 | 904 | 1,650 |
| Total | 151,000 | 134,000 | 285,000 | 93,900 | 4,170 |
| Cast irons | 6,640 | 331 | 6,970 | 460 | 5 |
| Superalloys | W | W | W | | 316 |
| Alloys (excluding alloy steels) | 454 | 251 | 705 | 2,920 | 11,400 |
| Miscellaneous and unspecified | W | W | W | W | W |
| Grand total | 158,000 | 134,000 | 292,000 | 97,300 ³ | 15,800 |
| Total manganese content ⁴ | 123,000 | 108,000 | 231,000 | 64,200 | 15,800 |
| Stocks, December 31, 2010, consumers and producers | 7,590 | 9,820 | 30,000 | 28,000 | 608 |

W Withheld to avoid disclosing company proprietary data; included with "Alloys (excluding alloy steels)." -- Zero.

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

²Includes electrical and tool steel.

³Internal evaluation indicates that silicomanganese consumption is considerably understated.

⁴Estimated based on typical percentages of manganese content.

TABLE 5

U.S. EXPORTS OF MANGANESE ORE, FERROALLOYS, METAL AND MANGANESE DIOXIDE, BY COUNTRY¹

| | 200 |)9 | 2010 | | |
|---|--------------------|---------------------|---------------|---------------------|--|
| | Quantity, | Value, | Quantity, | Value, | |
| | gross weight | f.a.s. ² | gross weight | f.a.s. ² | |
| Country | (metric tons) | (thousands) | (metric tons) | (thousands) | |
| Ore and concentrates with 20% or more manganese: ³ | · · · · | | × / | | |
| Canada | 13,900 | \$923 | 3,160 | \$366 | |
| China | | | 8,790 | 2,190 | |
| Germany | - 668 | 1,750 | 75 | 278 | |
| Korea, Republic of | 527 | 893 | 306 | 395 | |
| Other (20 countries) | - 184 | 256 | 1,620 | 2,760 | |
| Total | 15,300 | 3,830 | 13,900 | 5,990 | |
| Ferromanganese, all grades: ⁴ | | , | , | , | |
| Brazil | - 480 | 626 | 2,170 | 3,750 | |
| Canada | 10,900 | 11,600 | 5,550 | 8,130 | |
| Chile | 540 | 488 | 1,570 | 2,720 | |
| Japan | 1,000 | 1,400 | | | |
| Malaysia | 1,080 | 1,160 | 8 | 22 | |
| Mexico | 6,890 | 8,220 | 9,610 | 12,700 | |
| Netherlands | 2,260 | 2,620 | | | |
| Other (16 countries) | 969 | 1,770 | 210 | 472 | |
| Total | 24,200 | 27,900 | 19,100 | 27,800 | |
| Silicomanganese: ⁴ | _ | | | | |
| Canada | 5,410 | 5,580 | 2,150 | 4,590 | |
| Italy | 2,540 | 2,010 | | | |
| Mexico | 7,050 | 6,510 | 5,030 | 6,760 | |
| Netherlands | 1,490 | 1,340 | | | |
| Other (12 countries) | 2,290 | 2,040 | 2,180 | 1,720 | |
| Total | 18,800 | 17,500 | 9,360 | 13,100 | |
| Metal, including alloys and waste and scrap: ³ | _ | | | | |
| China | | 2,200 ^r | 690 | 1,640 | |
| Hong Kong | 820 | 2,340 | 849 | 3,530 | |
| India | 205 | 452 | 626 | 1,450 | |
| Japan | 462 | 1,010 | 311 | 683 | |
| Other (23 countries) | 772 | 2,090 | 1,190 | 3,020 | |
| Total | 3,150 ^r | 8,090 r | 3,660 | 10,300 | |
| Manganese dioxide: ⁴ | | | , | | |
| Belgium | 1,930 | 4,870 | 1,790 | 4,220 | |
| Canada | 4,090 | 3,900 | 4,090 | 4,220 | |
| Other (48 countries) | 2,400 | 4,650 | 3,100 | 6,220 | |
| Total | 8,420 | 13,400 | 8,990 | 14,700 | |

^rRevised. -- Zero.

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

²Free alongside ship.

³Countries listed imported more than 300 metric tons from the United States based on a 2-year average.

⁴Countries listed imported more than 500 metric tons from the United States based on a 2-year average.

Source: U.S. Census Bureau.

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY¹

| | | 2009 | | <u> </u> | 2010 | |
|---|---------------------|---------------|---------------------|---------------|---------------|-------------|
| | | ntity | Value, | | ntity | Value, |
| | Gross weight | Mn content | customs | Gross weight | Mn content | customs |
| Country | (metric tons) | (metric tons) | (thousands) | (metric tons) | (metric tons) | (thousands) |
| Ore and concentrates with 20% or more manganese: ² | | | | | | |
| All grades: | | | | | | |
| Australia | 35,700 | 15,400 | \$12,300 | 86,400 | 65,200 | \$24,900 |
| Belgium | 1,180 | 609 | 136 | | | - |
| Brazil | 2,960 | 1,540 | 930 | 6,780 | 3,440 | 2,52 |
| China | 4,170 | 2,150 | 618 | 707 | 481 | 63 |
| Gabon | 186,000 | 96,500 | 65,000 | 246,000 | 125,000 | 70,70 |
| Georgia | | | | 12,400 | 8,610 | 13,00 |
| Ghana | 37,500 | 37,100 | 3,400 | 36,600 | 10,300 | 5,08 |
| Mexico | 1,490 | 671 | 304 | 2,920 | 1,050 | 68 |
| Morocco | 16 | 9 | 12 | 1,540 | 791 | 21 |
| South Africa | | | | 95,400 | 40,100 | 15,50 |
| Total | 269,000 | 154,000 | 82,600 | 489,000 | 255,000 | 133,00 |
| More than 20% but less than 47% manganese: ² | | | | | | |
| Australia | 25,600 | 10,500 | 10,200 | | | |
| Gabon | | | | 16,800 | 7,480 | 2,32 |
| Ghana | | | | 36,600 | 10,300 | 5,08 |
| Mexico | 1,490 | 671 | 304 | 2,920 | 1,050 | 68 |
| South Africa | 1,190 | | | 77,400 | 30,300 | 9,49 |
| Total | 27,100 | 11,100 | 10,500 | 134,000 | 49,100 | 17,60 |
| | 27,100 | 11,100 | 10,500 | 134,000 | 49,100 | 17,00 |
| 47% or more manganese: ² | 10 100 | 4.070 | 2.070 | 86 400 | 65 200 | 24.00 |
| Australia | 10,100 | 4,970 | 2,070 | 86,400 | 65,200 | 24,90 |
| Belgium | 1,180 | 609 | 136 | | | - |
| Brazil | 2,960 | 1,540 | 930 | 6,780 | 3,440 | 2,52 |
| China | 4,170 | 2,150 | 618 | 707 | 481 | 63 |
| Gabon | 186,000 | 96,500 | 65,000 | 229,000 | 117,000 | 68,30 |
| Georgia | | | | 12,400 | 8,610 | 13,00 |
| Ghana | 37,500 | 37,100 | 3,400 | | | - |
| Morocco | 16 | 9 | 12 | 1,540 | 791 | 21 |
| South Africa | | | | 18,000 | 9,850 | 6,01 |
| Total | 242,000 | 143,000 | 72,100 | 355,000 | 206,000 | 116,00 |
| Ferromanganese: | | | | | | |
| All grades: ³ | | | | | | |
| Australia | 11,000 | 8,460 | 11,600 | 4,040 | 3,140 | 4,20 |
| China | 10,100 | 9,160 | 24,600 | 32,900 | 28,000 | 75,50 |
| France | | | | 15,700 | 11,200 | 19,00 |
| Korea, Republic of | 8,790 | 7,120 | 15,700 | 16,900 | 13,500 | 35,70 |
| Mexico | 7,750 | 6,110 | 13,300 | 21,500 | 17,200 | 44,00 |
| Norway | 10,100 | 8,250 | 16,300 | 35,000 | 28,000 | 56,60 |
| South Africa | 90,200 | 69,900 | 118,000 | 152,000 | 118,000 | 199,00 |
| Ukraine | 4,290 | 3,360 | 3,670 | 40,300 | 31,600 | 47,10 |
| Other (14 countries) | 10,800 ^r | 8,340 ' | 11,600 ^r | 8,310 | 6,350 | 11,90 |
| Total | 153,000 | 121,000 | 215,000 | 326,000 | 257,000 | 493,00 |
| 1% or less carbon: | | , | , | , | , | , |
| China | 8,580 | 7,940 | 21,900 | 21,700 | 19,000 | 55,10 |
| Korea, Republic of | 3,460 | 2,810 | 5,370 | | | |
| Mexico | 4,340 | 3,450 | 8,090 | 10,200 | 8,200 | 21,10 |
| Norway | 2,660 | 2,160 | 4,720 | 3,810 | 3,090 | 7,83 |
| South Africa | 1,020 | 827 | 2,560 | 23 | 21 | 7,83 |
| Other (4 countries) | 1,020 | 21 | 2,360 | 23 3,800 | 3,140 | 8,74 |
| | | | | | | |
| Total | 20,100 | 17,200 | 42,700 | 39,500 | 33,500 | 92,80 |
| More than 1% to 2% or less carbon: | 740 | <i>c</i> 00 | 1 (10 | 11 100 | 0.000 | 20.20 |
| China | 740 | 600 | 1,610 | 11,100 | 8,890 | 20,30 |

TABLE 6—Continued

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY¹

| | | 2009 | | 2010 | | |
|--|---------------|---------------|--------------|---------------|-----------------|-------------|
| | Qua | ntity | Value, | Quantity | | Value, |
| | Gross weight | Mn content | customs | Gross weight | Mn content | customs |
| Country | (metric tons) | (metric tons) | (thousands) | (metric tons) | (metric tons) | (thousands) |
| More than 1% to 2% or less carbon—Continued: | | | | | | |
| Korea, Republic of | 4,630 | 3,770 | \$9,460 | 12,400 | 9,920 | \$27,100 |
| Mexico | 1,520 | 1,210 | 3,080 | 11,300 | 8,970 | 22,900 |
| Norway | 7,410 | 6,030 | 11,400 | 18,500 | 14,900 | 34,600 |
| South Africa | 12,300 | 9,740 | 26,800 | 31,200 | 24,700 | 55,000 |
| Other (6 countries) | 39 | 31 | 198 | 1,270 | 1,010 | 2,650 |
| Total | 26,600 | 21,400 | 52,600 | 85,900 | 68,400 | 163,000 |
| More than 2% but not more than 4% carbon: | - | | | | | |
| China | | | | 60 | 32 | 114 |
| Norway | 16 | 13 | 25 | | | |
| South Africa | 216 | 179 | 500 | 180 | 166 | 464 |
| Other (2 countries) | 405 | 304 | 460 | 51 | 40 | 51 |
| Total | 637 | 496 | 986 | 291 | 238 | 629 |
| More than 4% carbon: | | | | | | |
| Australia | 11,000 | 8,460 | 11,600 | 4,040 | 3,140 | 4,200 |
| China | 816 | 614 | 1,140 | | | 1,200 |
| France | | | | 15,700 | 11,200 | 19.000 |
| Korea, Republic of | 701 | 546 | 870 | 1,500 | 1,130 | 1,800 |
| Mexico | 1,900 | 1,450 | 2,130 | 1,500 | 6 | 1,000 |
| | 57 | 46 | 2,130 | 12,700 | 9,980 | 14,200 |
| Norway South Africa | 76,700 | | 92 88,600 | 12,700 | 9,980 93,100 | 14,200 |
| | - | 59,100 | | | | |
| Ukraine | 4,290 | 3,360 | 3,670 | 40,300 | 31,600 | 47,100 |
| Other (9 countries) | 10,400 r | - | · · · · · | , | 4,580 | 7,260 |
| Total | 106,000 | 81,600 | 119,000 | 201,000 | 155,000 | 237,000 |
| Silicomanganese: ³ | - | | | | | |
| Australia | 18,400 | 12,200 | 17,200 | 31,200 | 20,700 | 32,700 |
| Georgia | 20,300 | 13,500 | 15,600 | 79,200 | 54,300 | 98,100 |
| Korea, Republic of | 7,090 | 4,620 | 6,380 | | | |
| Mexico | 1,600 | 1,050 | 1,660 | 12,500 | 8,180 | 14,700 |
| Norway | 15,200 | 9,460 | 22,300 | 38,300 | 23,900 | 61,600 |
| Saudi Arabia | 8,760 | 3,510 | 7,540 | 2,540 | 1,670 | 2,990 |
| South Africa | 55,400 | 36,800 | 60,500 | 122,000 | 81,500 | 145,000 |
| Other (9 countries) | 3,600 | 2,320 | 4,040 | 10,700 | 6,710 | 17,700 |
| Total | 130,000 | 83,500 | 135,000 | 297,000 | 197,000 | 373,000 |
| Metal: ² | | | | | | |
| Unwrought: ⁴ | - | | | | | |
| China | 15,500 | XX | 38,100 | 25,900 | XX | 64.400 |
| Germany | 555 | XX | 1,660 | 852 | XX | 2,650 |
| South Africa | 4,980 | XX | 14,100 | 5,450 | XX | 18,300 |
| Other (10 countries) | 459 | XX | 1,150 | 2,450 | XX | 6,490 |
| Total | 21,500 | XX | 55,000 | 34,600 | XX | 91,800 |
| Other manganese, wrought: | 21,500 | 7171 | 55,000 | 54,000 | 7474 | 91,000 |
| Mexico | 299 | XX | 1,530 | 477 | XX | 2,630 |
| Other (9 countries) | 315 | XX | 918 | 477 140 | XX | 2,030 |
| Total | | | | | | |
| | 614 | XX | 2,450 | 617 | XX | 3,110 |
| Waste and scrap: | - | *7** | 000 | | 3737 | 200 |
| Canada | 701 | XX | 239 | 698 | XX | 300 |
| Other (5 countries) | 185 | XX | 131 | 88 | XX | 138 |
| Total See footnotes at and of table | 886 | XX | 370 | 786 | XX | 438 |

TABLE 6-Continued

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY¹

| | | 2009 | | | 2010 | |
|--------------------------------------|---------------|---------------|-------------|---------------|---------------|-------------|
| | Qua | ntity | Value, | Quantity | | Value, |
| | Gross weight | Mn content | customs | Gross weight | Mn content | customs |
| Country | (metric tons) | (metric tons) | (thousands) | (metric tons) | (metric tons) | (thousands) |
| Manganese dioxide: ² | | | | | | |
| Japan | 4,570 | XX | \$11,400 | 7,220 | XX | \$16,000 |
| South Africa | 12,200 | XX | 29,200 | 13,100 | XX | 36,400 |
| Other (14 countries) | 733 | XX | 1,310 | 1,620 | XX | 2,720 |
| Total | 17,500 | XX | 42,000 | 21,900 | XX | 55,100 |
| Potassium permanganate: ² | | | | | | |
| Czech Republic | 565 | XX | 1,870 | 385 | XX | 1,150 |
| India | 560 | XX | 1,870 | 690 | XX | 2,140 |
| Other (2 countries) | 18 | XX | 62 | 14 | XX | 51 |
| Total | 1,140 | XX | 3,800 | 1,090 | XX | 3,330 |

^rRevised. XX Not applicable. -- Zero.

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

²Countries listed exported more than 300 metric tons (gross weight) to the United States based on the 2-year average.

³Countries listed exported more than 5,000 metric tons (gross weight) of total manganese alloys to the United States based on the 2-year average.

⁴Imports of unwrought metal include flake, powder, and other.

Source: U.S. Census Bureau, data adjusted by the U.S. Geological Survey.

TABLE 7 MANGANESE MATERIALS: FINAL ANTIDUMPING DUTY RATES ASSESSED IN 2010, BY DATE¹

| | | Country | Period of | |
|-----------|------------------------|-----------|----------------------------|------------------------|
| Date | Imported material | of origin | investigation | Producer and duty rate |
| August 26 | Potassium permanganate | China | 5-year review ² | All imports (128.94%). |

¹Antindumping duties are assessed by the U.S. International Trade Commission (ITC).

²Conducted on existing antidumping duty order by the International Trade Administration of the U.S. Department of Commerce.

Source: Federal Register.

TABLE 8 MANGANESE ORE: WORLD PRODUCTION, BY COUNTRY^{1, 2}

(Thousand metric tons)

| | Mn content, | | | | | |
|---------------------------|----------------------------|---------------------|------------------|---------------------|---------------------|--------------------|
| Country ³ | percentage ^{e, 4} | 2006 | 2007 | 2008 | 2009 | 2010 |
| Australia: ⁵ | | | | | | |
| Gross weight | | 4,556 | 5,289 | 4,812 | 4,451 | 6,465 |
| Mn content ^e | 37–53 | 2,192 6 | 2,540 | 2,320 | 2,140 | 3,100 |
| Brazil: ⁷ | | | | | | |
| Gross weight | | 3,390 | 1,570 | 3,160 | 2,350 ^r | 2,400 ^p |
| Mn content | 33–51 | 1,120 | 520 | 1,040 | 778 ^r | 780 ^p |
| China: ^{e, 8, 9} | | | | | | |
| Gross weight | | 8,000 | 10,000 | 11,000 | 12,000 | 13,000 |
| Mn content | 20-30 | 1,600 | 2,000 | 2,200 | 2,400 | 2,600 |
| Gabon: ¹⁰ | | | | | | |
| Gross weight | | 3,000 | 3,300 | 3,250 | 1,992 ^r | 3,201 |
| Mn content | 45–53 | 1,393 | 1,532 | 1,441 | 881 | 1,416 |
| Ghana: | | | | | | |
| Gross weight | | 1,659 | 1,173 | 1,261 | 1,007 | 1,000 e |
| Mn content ^e | 32–34 | 580 | 410 | 440 | 351 | 350 |
| India: ¹¹ | | | | | | |
| Gross weight | | 2,084 | 2,300 e | 2,400 | 2,500 | 2,600 |
| Mn content | 10–54 | 844 | 900 ^e | 960 | 980 | 1,000 |
| Kazakhstan, crude ore: | | | | | | |
| Gross weight | | 2,531 | 2,482 | 2,485 | 2,457 ^r | 3,042 |
| Mn content ^e | 20-30 | 550 | 600 | 600 | 520 ^r | 640 |
| Mexico: ¹² | | | | | | |
| Gross weight | | 346 | 423 | 472 ^e | 330 ^{r, e} | 485 ^e |
| Mn content | 36–37 | 124 | 152 | 170 | 119 ^r | 175 |
| South Africa:10 | | | | | | |
| Gross weight | | 5,213 | 5,996 | 6,807 | 4,576 | 7,172 |
| Mn content | 30-48+ | 2,300 | 2,600 | 2,900 | 1,900 ^e | 2,900 |
| Ukraine: | | | | | | |
| Gross weight | | 1,606 | 1,720 | 1,447 | 932 | 1,589 |
| Mn content ^e | 30–35 | 546 | 580 | 492 r | 316 ^r | 540 |
| Other: ^{e, 13} | | | | | | |
| Gross weight | _ | 752 ^r | 865 ^r | 1,220 r | 1,180 ^r | 1,720 |
| Mn content | XX | 228 r | 275 ^r | 434 r | 411 ^r | 672 |
| Total: | | | | | | |
| Gross weight | | 33,100 ^r | 35,100 | 38,300 ^r | 33,800 ^r | 42,700 |
| Mn content | XX | 11,500 | 12,100 | 13,000 r | 10,800 | 14,200 |
| | | | | | | |

^eEstimated. ^pPreliminary. ^rRevised. XX Not applicable.

¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown. ²Table includes data available through January 2, 2012. Data pertain to concentrates or comparable shipping product, except that in a few instances the best data available appear to be for crude ore, possibly after some upgrading. ³In addition to the countries listed, Cuba, Panama, and Philippines may have produced manganese ore and (or) manganiferous ore, but available information is inadequate to make reliable estimates of output levels.

⁴May be average content of each year's production rather than for content of typical products.

⁵Metallurgical ore.

⁶Reported figure.

⁷Production of beneficiated ore as reported in Mineral Summary, Brasilia, Brazil. Average content 43% Mn. Contains imports from China and South Africa.

⁸Includes manganiferous ore.

TABLE 8—Continued

MANGANESE ORE: WORLD PRODUCTION, BY COUNTRY^{1, 2}

⁹The International Manganese Institute estimated Chinese manganese ore production, in gross weight and Mn content, respectively, to be in metric tons, as follows: 2006—11,000,000 and 2,200,000; 2007—14,000,000 and 2,800,000; 2008—19,000,000 and 3,400,000; 2009—15,000,000 and 2,700,000; and 2010—17,000,000 and 3,100,000.

¹⁰Calculated metal content includes allowance for assumed moisture content. Includes ore and sinter.

¹¹Reported on a fiscal year-basis. Much of India's production grades below 35% Mn; content averaged 38.3% Mn for fiscal years 2006–07 through 2010–11.

¹²Mostly oxide nodules; may include smaller quantities of direct-shipping carbonate and oxide ores for metallurgical and battery operations.

¹³Category represents the combined totals of Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burma, Chile, Colombia, Cote d'Ivoire, Egypt, Georgia, Hungary, Indonesia, Iran, Italy (from wastes), Morocco, Namibia, Romania, Russia (crude ore), Sudan, Thailand, Turkey, and Zambia.

TABLE 9

FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY $^{\rm 1,\,2}$

(Metric tons, gross weight)

| Country | 2006 | 2007 | 2008 | 2009 ^e | 2010 ^e |
|--|----------------------|----------------------|----------------------|---------------------------|-------------------------|
| Argentina, electric furnace, silicomanganese | 9,268 | 8,917 | 9,172 | 6,644 ³ | 6,000 |
| Australia, electric furnace: ^e | | | | | |
| Ferromanganese | 125,000 | 115,000 | 147,000 | 87,000 | 136,000 |
| Silicomanganese | 120,000 | 110,000 | 125,000 | 74,000 | 131,000 |
| Total | 245,000 | 225,000 | 272,000 | 161,000 | 267,000 |
| Brazil, electric furnace: | | | | | |
| Ferromanganese | 280,770 | 205,000 r | 190,000 ^r | 75,000 r | 103,000 ^{p, 2} |
| Silicomanganese ^e | 292,230 ³ | 214,000 | 198,000 | 79,000 ^r | 107,000 |
| Total | 573,000 | 419,000 ^r | 388,000 ^r | 154,000 ^r | 210,000 3 |
| China: ^e | | | | | |
| Blast furnace, ferromanganese | 600,000 | 600,000 | 600,000 | 350,000 ^r | 350,000 |
| Electric furnace: | _ | | | | |
| Ferromanganese | 1,400,000 | 1,930,000 | 2,100,000 | 2,070,000 r | 2,300,000 |
| Silicomanganese | 3,600,000 | 4,340,000 | 5,000,000 | 5,430,000 r | 5,700,000 |
| Total | 5,000,000 | 6,270,000 | 7,100,000 | 7,500,000 r | 8,000,000 |
| Total, blast and electric furnaces | 5,600,000 | 6,870,000 | 7,700,000 | 7,850,000 r | 8,350,000 |
| Egypt, electric furnace, ferromanganese ^e | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| France, electric furnace: ^e | | 20,000 | 20,000 | 20,000 | 20,000 |
| Ferromanganese | 137,000 | 144,000 | 46,600 | 46,000 | 138,000 |
| Silicomanganese ⁴ | 63,300 | 65,400 | 60,200 | 54,100 | 54,000 |
| Total | 200,000 | 209,000 | 107,000 | 100,000 | 192,000 |
| Georgia, electric furnace: ^e | 200,000 | 209,000 | 107,000 | 100,000 | 172,000 |
| Ferromanganese | 5,130 ³ | 5,000 | 5,000 | NA ^{r, 3} | NA ³ |
| Silicomanganese | 116,945 ³ | 120,000 | 120,000 | 112,016 ^{r, 3} | 203,464 ³ |
| Total | 122,075 3 | 125,000 | 125,000 | 112,010 r, 3 | 203,464 ³ |
| | 122,073 | 125,000 | 125,000 | 112,010 | 203,404 |
| India, electric furnace: ⁵ | | 201 210 | 204 577 | 200 465 3 | 200.000 |
| Ferromanganese | 296,726 | 391,210 | 384,577 | 389,465 ³ | 390,000 |
| Silicomanganese | 782,962 | 911,402 | 891,458 | 1,099,838 3 | 1,000,000 |
| Total | 1,079,688 | 1,302,612 | 1,276,035 | 1,489,303 3 | 1,390,000 |
| Indonesia, electric furnace: ^e | | | | | |
| Ferromanganese | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| Silicomanganese | 5,000 | 6,000 | 7,000 | 7,000 | 8,000 |
| Total | 17,000 | 18,000 | 19,000 | 19,000 ^{r, 3} | 20,000 |
| Iran, electric furnace, ferromanganese | ^r | r | ^r | 1, 5 | 3 |
| Italy, electric furnace: ^e | | | | | |
| Ferromanganese | 4,500 | 4,800 | 8,500 | 5,500 | 17,000 |
| Silicomanganese | 33,500 | 37,000 | 25,500 | 17,000 | 23,000 |
| Total | 38,000 | 41,800 | 34,000 | 22,500 | 40,000 |
| Japan, electric furnace: | 406.162 | 420 151 | 421 101 | 261 275 3 | 152 265 3 |
| Ferromanganese | 406,162 | 420,151 | 431,181 | $361,375^{-3}$ | 453,265 ³ |
| Silicomanganese | 59,424 | 52,901 | 58,884 | 49,205 3 | 49,865 ³ |
| Total | 465,586 | 473,052 | 490,065 | 410,580 ³ | 503,130 ³ |
| Kazakhstan, electric furnace: | | - | _ | _ | |
| Ferromanganese ^e | r | r | r | ^r | |
| Silicomanganese | 218,323 r | 188,445 | 179,939 | 200,374 ^{r, 3} | 215,000 3 |
| Total | 218,323 r | 188,445 ^r | 179,939 ^r | 200,374 ^{r, 3} | 215,000 3 |

TABLE 9—Continued

FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY $^{\rm 1,\,2}$

(Metric tons, gross weight)

| Country | 2006 | 2007 | 2008 | 2009 ^e | 2010 ^e |
|--|-----------|----------------------|------------------------|-------------------------|----------------------|
| Korea, Republic of, electric furnace: | | | | | |
| Ferromanganese | 169,202 | 209,321 | 251,125 | 250,000 r | 250,000 |
| Silicomanganese | 94,119 | 105,607 | 76,184 | 80,000 r | 80,000 |
| Total | 263,321 | 314,928 | 327,309 | 330,000 ^r | 330,000 |
| Macedonia, electric furnace: | | | | | |
| Ferromanganese | | | 12,623 | 3 | 3 |
| Silicomanganese | | 70,472 | 54,931 | 3 | 3 |
| Total | | 70,472 | 67,554 | 3 | 3 |
| Mexico, electric furnace: ⁶ | | | - | | |
| Ferromanganese | 62,485 | 74,578 | 97,366 | 42,492 3 | 42,000 |
| Silicomanganese | 97,457 | 109,286 | 114,320 | 85,065 ³ | 85,000 |
| Total | 159,942 | 183,864 | 211,686 | 127,557 ³ | 127,000 |
| Norway, electric furnace: ^e | | | | | |
| Ferromanganese | 245,000 | 245,000 | 309,000 | 205,000 | 297,000 |
| Silicomanganese | 230,000 | 225,000 | 252,000 | 200,000 | 249,000 |
| Total | 475,000 | 470,000 | 561,000 | 405,000 | 546,000 |
| Poland: | | | | | |
| Blast furnace, ferromanganese | 4,100 | 2,100 | 8,500 r | 1,700 ^r | 2,000 |
| Electric furnace, silicomanganese | 3,310 | 15,600 | 25,100 r | 14,000 r | 15,000 |
| Total | 7,410 | 17,700 | 33,600 r | 15,700 ^r | 17,000 |
| Romania, electric furnace: | | | | | |
| Ferromanganese | 3,329 | | | | |
| Silicomanganese | 53,085 | 26,868 | 10,000 | | 20,000 3 |
| Total | 56,414 | 26,868 | 10,000 | | 20,000 3 |
| Russia: ^e | | | | | |
| Blast furnace, ferromanganese | 130,000 | 120,000 | 110,000 | 88,000 ^{r, 3} | 171,600 ³ |
| Electric furnace, silicomanganese | 40,000 | 40,000 | 40,000 | 98,700 ^{r, 3} | 147,900 ³ |
| Total | 170,000 | 160,000 | 150,000 | 186,700 ^{r, 3} | 319,500 ³ |
| Slovakia, electric furnace: | | | | | |
| Ferromanganese | 59,391 | 74,065 | 61,194 | 21,000 r | 25,000 |
| Silicomanganese | 59,128 | 71,587 | 59,940 | 32,000 ^r | 35,000 |
| Total | 118,519 | 145,652 | 121,134 | 53,000 ^r | 60,000 |
| South Africa, electric furnace: | | | | | |
| Ferromanganese | 656,235 | 698,654 | 503,000 | 260,000 | 530,000 ³ |
| Silicomanganese ^e | 247,000 | 302,000 | 233,000 | 110,000 | 230,000 |
| Total | 903,235 | 1,000,654 | 736,000 | 370,000 | 760,000 3 |
| Spain, electric furnace: ^e | | | | | |
| Ferromanganese | 148,000 r | 155,000 ^r | 163,000 ^r | 68,000 ^r | 152,000 |
| Silicomanganese | 145,000 r | 153,000 r | 160,000 ^r | 67,000 ^r | 150,000 |
| Total | 293,000 r | 308,000 r | 323,000 r | 135,000 r | 302,000 |
| Ukraine: | | , | , | , | , |
| Blast furnace, ferromanganese | 30,000 | 26,700 | 16,000 | | 3 |
| Electric furnace: | 7 | | y | | |
| Ferromanganese | 373,000 | 368,000 | 362,400 r | 129,400 ³ | 280,100 ³ |
| Silicomanganese | 1,168,000 | 1,281,000 | 894,900 ^r | 741,900 ³ | 940,400 ³ |
| Total | 1,541,000 | 1,649,000 | 1,257,300 ^r | 871,300 ⁻³ | 1,220,500 3 |
| Total, blast and electric furnaces | 1,571,000 | 1,675,700 | 1,273,300 r | 871,300 ³ | 1,220,500 3 |
| United States, electric furnace, ferromanganese ⁷ | W | 1,075,700 W | 1,275,500 W | W ³ | W ³ |

TABLE 9—Continued FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY $^{1,\,2}$

(Metric tons, gross weight)

| Country | 2006 | 2007 | 2008 | 2009 ^e | 2010 ^e |
|--|------------------------|--------------|-------------------------|-------------------|-------------------|
| Venezuela, electric furnace: ^e | | | | | |
| Ferromanganese | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| Silicomanganese | 35,000 | 35,000 | 35,000 | 35,000 | 35,000 |
| Total | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| Grand total | 12,700,000 r | 14,300,000 r | 14,500,000 ^r | 13,100,000 | 15,200,000 |
| Of which: | | | | | |
| Blast furnace, ferromanganese | 764,000 | 749,000 | 735,000 ^r | 440,000 r | 524,000 |
| Electric furnace, excluding United States: | | | | | |
| Ferromanganese | 4,430,000 r | 5,100,000 r | 5,130,000 r | 4,070,000 r | 5,170,000 |
| Silicomanganese ⁸ | 7,470,000 ^r | 8,490,000 r | 8,630,000 r | 8,590,000 r | 9,480,000 |
| Total | 11,900,000 r | 13,600,000 r | 13,800,000 r | 12,700,000 r | 14,700,000 |

^eEstimated. ^pPreliminary. ^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data; not included in "Grand total." -- Zero. ¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through January 31, 2012.

³Reported figure.

⁴Includes silicospiegeleisen, if any.

⁵Reported on a fiscal year basis, which is from April 1 to March 31.

⁶Salable products from Cía Minera Autlán S.A. de C.V.

⁷U.S. output of ferromanganese includes silicomanganese.

⁸Includes silicospiegeleisen, if any, for France.

TABLE 10

MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2014^{1, 2, 3}

(Metric tons, gross weight, unless otherwise specified)

| Projected year of first | Country | | | Incremental annual production | Total annual production | |
|----------------------------|-----------------------------------|--|------------------------------|-------------------------------------|--------------------------------|------------------------------------|
| production | (state/province) | Project and company | Project type | capacity | capacity | Manganese product |
| 2010 | Australia (East Pilbara) | Nicholas Downs (formerly Balfour Downs) Manganese Mine Mineral Resources Ltd. (50%) and Hancock Prospecting Pty. Ltd. (50%) | mine expansion | NA | 350,000 | Mn ore. |
| 2010 | Australia (Western) | Peak Hill District Manganese Mine Mineral Resources Ltd. | do. | 85,000 | 220,000 | Do. |
| 2010 | Burkina Faso (Tuy) | Kiere Manganese Mine Burkina Manganese S.A. | new mine | NA | 50,000 | Do. |
| 2010 | China (Chongzuo, Guangxi) | China International Trust and Investment Corporation (CITIC) Dameng Tiandong Plant China International Trust and Investment Corporation (CITIC) Dameng Tiandong New Materials Co., Ltd. | new EMM plant | NA | 30,000 | EMM. |
| 2010 | China (Henan) | Wuhai Mengjin Smelting Wuhai Mengjin Smelting Co. Ltd. | ferroalloys plant expansion | 120,000 | 170,000 | SiMn. |
| 2010 | India (Haldia, West Bengal) | Rohit Ferro Tech Haldia Plant Rohit Ferro Tech Ltd. | do. | NA | 67,000 ^r | FeMn, SiMn. |
| 2010 ^e | Namibia (Okahandja) | Otjosondu Manganese Mine Purity Manganese (pty) Ltd. | mine expansion | 480,000 | 600,000 | Mn ore. |
| 2010 | South Africa (Mpumalanga) | Machadodorp Ferroalloys Plant ⁵ Assmang Ltd. | ferroalloys plant conversion | NA | 75,000 | HC FeMn. |
| 2010 | South Africa (Northern Cape) | Kalahari Manganese Mine United Manganese of Kalahari | mine expansion | 1,250,000 ^r | 1,500,000 ^r | Mn ore. |
| 2010 | Zambia (Central and Mansa) | Kabasa, Kabulu, Kansambo Mines ⁶ Genesis Procurement Company and Luapul Base Metals Ltd. | do. a | NA | 48,000 | Do. |
| 2011 | Australia (Northern) | Bootu Creek Manganese Mine OM Holdings Ltd. | do. | 150,000 | 1,000,000 | Do. |
| 2011 | Australia (Western) | Peak Hill District Manganese Mine Mineral Resources Limited | do. | 60,000 | 280,000 | Do. |
| 2011 | China (Chongzuo, Guangxi) | Eramet New Guilin Ferroalloys Plant Eramet S.A. | new ferroalloys plant | NA | 105,000 ^r 60,000 | HC FeMn, SiMn. MC FeMn, LC FeMn |
| 2011 | Do. | Pingle (formerly Guangxi) EMM Plant Guangxi Zhaohong Manganese Industry Co., Ltd. | new EMM plant | NA | 24,000 | EMM. |
| 2011 | Cote d'Ivoire (Grand-Lahou) | Lauzoua Mine Compagnie Minière du Littoral (CML) | new mine | NA | 300,000 ^r | Mn ore. |
| 2011 ^r | Gabon (Moyen- Ogooué) | M'Bembélé Manganese Mine Compagnie Industrielle et Commerciale des Mines de Huazhou (CICMH) | do. | NA | 1,150,000 ^r | Do. |
| 2011 | India (Sundargarh, Orissa) | Patmunda Manganese Mine ⁷ Orissa Manganese and Minerals Pvt. Ltd. | mine expansion | 210,000 | 360,000 | Do. |
| 2011 | Do. | Siljora Kalimati Manganese & Iron Ore Mine Rungta Mines Ltd. | do. | 129,000 ^e | 189,000 ^e | Do. |

TABLE 10—Continued

MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2014^{1, 2, 3}

(Metric tons, gross weight, unless otherwise specified)

| Projected year of first | Country | | | Incremental annual production | Total annual production | |
|----------------------------|--|--|---|-------------------------------------|-------------------------------|------------------------------------|
| production | (state/province) | Project and company | Project type | capacity | capacity | Manganese product ⁴ |
| 2011 | India | 10 mines MOIL Ltd. ⁸ | do. | 360,000 ^r | 1,200,000 ^r | Do. |
| 2011 | Korea, Republic of (Gangwon) | Donghae Ferroalloys Plant Dongbu Metal Co., Ltd. | ferroalloys plant expansion | 270,000 | 500,000 | HC FeMn, MC FeMn LC FeMn, SiMn. |
| 2011 | Korea, Republic of (South Jeolla) | Gwangyang FeMn Plant POS-HiMetal | new ferroalloys plant | NA | 75,000 | MC FeMn, LC FeMn |
| 2011 | Mexico (Hidalgo) | Tajo Naopa Manganese Mine Minera Autlán Sociedad Anónima Bursátil de Capital Variable (SAB de CV) | new mine | NA | 300,000 ^e | Mn ore. |
| 2011 | Russia (Mezhdure- chensk, Kemerovo) | Usink Manganese Mine Filial Zakrytogo Aktsionernogo Obshchestiva (ZAO) CHEK-SU.VK V | do. | NA | 300,000 ^e | Do. |
| 2011 | South Africa (Northern Cape) | Kalahari Manganese Mine United Manganese of Kalahari | mine expansion | 600,000 | 2,100,000 | Do. |
| 2011 ^e | South Africa (North West) | Kudumane Manganese Mine Asia Minerals Ltd. (AML) | new mine | NA | 500,000 ^e | Do. |
| 2012 | Australia (East Pilbara) | Nicholas Downs (formerly Balfour Downs) Manganese Mine Mineral Resources Ltd. (50%) and Hancock Prospecting Pty. Ltd. (50%) | mine expansion | 370,000 | 720,000 | Do. |
| 2012 ^e | Cote d'Ivoire (Grand-Lahou) | Lauzoua Mine Compagnie Minière du Littoral (CML) | do. | 200,000 | 500,000 | Do. |
| 2012 | China (Hunan) | Kingray Changsha EMM Plant Kingray New Materials Science & Technology Co., Ltd. | EMM plant expansion | 30,000 | 40,000 | EMM. |
| 2012 ^e | China (Jilin) | Sinosteel Jilin Ferroalloys Plant Sinosteel Jilin Ferroalloy Co., Ltd. | new ferroalloys plant | NA | 100,000 | MC FeMn, LC FeMn |
| 2012 | Gabon (Haut-Ogooué) | Moanda Mine Compagnie Miniere de l'Ogooue (Comilog) S.A. | mine expansion | 300,000 | 4,000,000 | Mn ore. |
| 2012 ^r | India (Burdwan, West Bengal) | Maithan Alloys Limited | new ferroalloys plant | NA | 120,000 | Mn alloys. |
| 2012 | India (Andhra Pradesh) | Sarda Vizag Ferroalloys Plant Sarda Energy & Minerals Ltd. | do. | NA | 100,000 | FeMn, SiMn. |
| 2012 | Mali (Gao) | Ansongo Manganese Mine Mali Manganese S.A. | new mine | NA | 280,000 | Mn ore. |
| 2012 | Russia (Siberia) | Siberian Mining and Metallurgical Company (SGMK) Manganese Mine ⁹ Siberian Mining and Metallurgical Company (SGMK) | do. | NA | 600,000 | Do. |
| 2012 | South Africa (Mpumalanga) | Machadodorp Ferroalloys Plant ⁵ Assmang Ltd. | ferroalloys plant conversion | 100,000 | 175,000 | HC FeMn. |
| 2012 | South Africa (Northern Cape) | Kalagadi Manganese Mine ¹⁰ Kalagadi Manganese (50%) and ArcelorMittal (50%) | new mine-beneficiation- sinter complex | NA | 3,000,000 | Mn ore. |
| 2012 | Do. | Kalahari Manganese Mine United Manganese of Kalahari | mine expansion | 600,000 | 2,700,000 | Do. |

TABLE 10-Continued

MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2014^{1, 2, 3}

(Metric tons, gross weight, unless otherwise specified)

| Projected year of first | Country | | | Incremental annual production | Total annual production | |
|----------------------------|--|---|-----------------------------|-------------------------------------|-------------------------------|---------------------------|
| production | (state/province) | Project and company | Project type | capacity | capacity | Manganese product |
| 2012 | South Africa | Tshipi Kalahari Manganese Mine | new mine | NA | 200,000 | Mn ore. |
| | (Northern Cape) | Jupiter Mines Ltd. (49.9%) and Ntsimbintle Mining (Pty) Ltd. (50.1%) | | | , | |
| 2012 | Do. | Wessels Mine BHP Billiton Ltd. (44.4%), Anglo American Corp. (29.6%), Ntsimbintle (9%), and others (17%) | mine expansion | 500,000 | 1,500,000 | Do. |
| 2012 | Zambia | Taurian Manganese Ltd. Mines ¹¹ | new mine | NA | 240,000 | Do. |
| | (Luapula) | Dharni Sampda Private Ltd. Group | | | | |
| | | (formerly Taurian Resources Private Ltd.) | | | | |
| 2013 | Australia (Northern Territory, Western Australia) | Groote Eylandt Mining Company Pty. Ltd. BHP Billiton Ltd. (60%) and Anglo | | 600,000 | 4,800,000 | Do. |
| 2013 ^e | China (Chongzuo, Guangxi) | Pingle (formerly Guangxi) EMM Plant Guangxi Zhaohong Manganese Industry Co., Ltd. | EMM plant expansion | 36,000 | 60,000 | EMM. |
| 2013 ^e | China (Jilin) | Sinosteel Jilin Ferroalloys Plant Sinosteel Jilin Ferroalloy Co., Ltd. | ferroalloys plant expansion | 600,000 ^e | 1,000,000 | FeMn. |
| 2013 | Gabon | Moanda Metallurgical Complex | new EMM and ferroalloys | NA | 65,000 | SiMn. |
| | (Haut-Ogooué) | Compagnie Miniere de l'Ogooue (Comilog) S.A. | plants | NA | 20,000 | EMM. |
| 2013 ^r | India (Bhandara, Maharashtra) | Chandrapur Plant ¹² Maharashtra Elektrosmelt Ltd. | ferroalloys plant expansion | 90,000 ^e | 190,000 ^e | FeMn, SiMn. |
| 2013 | Kazakhstan (Aktobe) | Aktobe Ferroalloys Plant Eurasian Natural Resources Corp. plc | new ferroalloys plant | NA | 400,000 | HC FeMn. |
| 2013 | Kazakhstan (Almaty) | Tekeli EMM Plant Electro Manganese and ThyssenKrupp AG | new EMM plant | NA | 30,000 | EMM. |
| 2013 | Malaysia | Tanjung Langsat Project | new ferroalloys and | NA | 300,000 | Mn ore. |
| | (Johor Bahru) | OM Materials (Johor) Sdn Bhd | sintering plants | NA | 66,000 | HC FeMn. |
| 2013 | Malaysia (Sarawak) | Samalaju Ferroalloys Plant ¹³ Asia Minerals Ltd (AML) | new ferroalloys plant | NA | 132,000 | MC FeMn, LC FeMn SiMn. |
| 2013 | Mali (Gao) | Ansongo Manganese Mine Mali Manganese S.A. | mine expansion | 270,000 | 550,000 | Mn ore. |
| 2013 ^r | South Africa (Eastern Cape) | Kalagadi Coega Ferroalloys Plant Kalagadi Manganese (50%) and ArcelorMittal (50%) | do. | NA | 320,000 | HC FeMn. |
| 2013 | South Africa (Northern Cape) | Tshipi Kalahari Manganese Mine Jupiter Mines Ltd. (49.9%) and Ntsimbintle Mining (Pty) Ltd. (50.1%) | do. | 2,200,000 | 2,400,000 | Mn ore. |
| 2013 | South Africa (North West) | Kudumane Manganese Mine Asia Minerals Ltd. (AML) | do. | 1,000,000 | 1,500,000 | Do. |
| 2013 | Zambia (Central and Luapula) | Various mines ¹⁴ Asia Minerals Ltd. (AML) | new mine | NA | 250,000 | Do. |

TABLE 10-Continued

MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2014^{1, 2, 3}

(Metric tons, gross weight, unless otherwise specified)

| Projected year of first | Country | | | Incremental annual production | Total annual production | |
|----------------------------|--------------------|--|-----------------------------|-------------------------------------|-------------------------------|--------------------------------|
| production | (state/province) | Project and company | Project type | capacity | capacity | Manganese product ⁴ |
| 2014 ^r | Cameroon | Nkamouna Cobalt-Nickel-Manganese | new mine | NA | 62,800 ^r | Mn ore. |
| | (Haut Nyong, East) | Project | | | | |
| | | Geovic Mining Corporation | | | | |
| 2014 | India | Balaghat and Dongri Buzurg Mines | mine expansions | 400,000 ^e | 1,600,000 ^e | Do. |
| | (Balaghat, | MOIL Ltd. ⁸ | | | | |
| | Madhya Pradesh; | | | | | |
| | Bhandara, | | | | | |
| | Maharashtra) | | | | | |
| 2014 | India | Bhilai Ferro-Alloys Plant | new ferroalloys plant | NA | 75,000 | SiMn. |
| | (Chhattisgarh) | MOIL Ltd.8 (50%) and Steel Authority of | | NA | 31,000 | FeMn. |
| | | India Ltd. (SAIL) (50%) | | | | |
| 2014 ^r | India | Bobbili Ferro-Alloys Plant | do. | NA | 37,500 | SiMn. |
| | (Visakhapat- | MOIL Ltd.8 (50%) and Rashtriya Ispat | | NA | 20,000 | FeMn. |
| | nam, Andhra | Nigam Ltd. (50%) | | | | |
| | Pradesh) | | | | | |
| 2014 | Malaysia | Samalaju Ferroalloys Plant ¹³ | ferroalloys plant expansion | 108,000 | 240,000 | MC FeMn, LC FeMn |
| | (Sarawak) | Asia Minerals Ltd (AML) | | | | SiMn. |
| 2014 | Do. | Sarawak Ferroalloys Plant ¹⁵ | new ferroalloys plant | NA | 300,000 | SiMn. |
| | | OM Materials (S) Pte Ltd. (80%) and | | | | |
| | | Cahya Mata Sarawak Berhard (20%) | | | | |
| 2014 ^r | Mali | Ansongo Manganese Mine | mine expansion | 50,000 | 600,000 | Mn ore. |
| | (Gao) | Mali Manganese S.A. | | | | |
| 2014 | Zambia | Taurian Manganese Ltd. Mines | do. | 480,000 | 720,000 | Do. |
| | (Luapula) | Dharni Sampda Private Ltd. Group | | | | |
| | Pavisad Do do Ditt | (formerly Taurian Resources Private Ltd. |) | | | |

^eEstimated. ^rRevised. Do., do. Ditto. NA Not available.

¹Estimated data are rounded to no more than three significant digits.

²Projects in feasibility or later stages of development in 2010–11. Actual startup dates may be postponed, owing to economic or other factors. Additional projects might produce manganese materials by 2014, but not enough information was available to include them.

³Includes projects having the following minimum tonnage capacities: 45,000 metric tons per year of manganese alloys or manganese ore;

and 10,000 metric tons per year of electrolytic manganese dioxide or electrolytic manganese metal.

⁴EMD Electrolytic manganese dioxide. EMM Electrolytic manganese metal. FeMn Ferromanganese. HC FeMn High-carbon ferromanganese.

LC FeMn Low-carbon ferromanganese. MC FeMn Medium-carbon ferromanganese. Mn Manganese. SiMn Silicomanganese.

⁵A total of three ferrochromium furnaces at the Machadodorp Ferroalloys Plant will be converted to high-carbon ferromanganese production by 2012.

⁶These Zambian mines are located in Kabasa (Central Province) and Kabulu and Kansambo (Laupula Province).

⁷Includes five additional manganese mines situated in the region of Sundargarth, Orissa.

⁸Formerly Manganese Ore (India) Ltd. (MOIL). MOIL Ltd. operates 10 mines, 6 of which are located in the Nagpur and Bhandara Districts of Maharashtra and 4 in the Balaghat District of Madhya Pradesh. The company has not specified which mines would be affected by the planned capacity expansion.

⁹The Siberian Mining and Metallurgical Company (SGMK) Manganese Mine will have the capacity to produce 120,000 metric tons per year of manganese concentrates from the total ore mined.

¹⁰The Kalagadi Manganese sinter plant will have a capacity of 2.4 million metric tons per year.

¹¹Taurian Manganese Ltd. Zambian mines are located in Kabwe and Kapiri Mphoshi (Central Province) and Mansa (Luapula Province).

¹²Steel Authority of India Limited (SAIL) became the new owner of the Chandrapur Ferroalloys Plant when it acquired Maharashtra Elektrosmelt Ltd. on on July 12, 2011.

¹³The Samalaju ferroalloys plant will also have the capacity to produce ferrosilicon.

¹⁴Asia Minerals Ltd. (AML) has Zambian mining and prospecting licenses in the Central Province (Kabwe, Kapiri, Mkushi, Mphoshi, and Serenje) and the Luapula Province (Mansa).

TABLE 10—Continued MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2014^{1, 2, 3}

¹⁵The Sarawak ferroalloys plant will also have a capacity of 300,000 metric tons per year to produce ferrosilicon.

Sources: Company annual reports, presentations, and press releases; unpublished personal communications; and trade publications.