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MANGANESE

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MANGANESE

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In 2009, U.S. manganese apparent consumption was an estimated 445,000 metric tons (t), a 47% decrease from the revised amount of 844,000 t in 2008 (table 1). Decreases in imports of manganese dioxide, manganese ferroalloys, manganese metal, and manganese ore, as well as decreases in high-carbon ferromanganese shipments from the U.S. Government's National Defense Stockpile (NDS), accounted for the decline in apparent consumption.

Manganese imports (table 6) decreased by 58% on a content basis to 395,000 t compared with those of 2008, based on U.S. Census data for manganese ore, ferromanganese, and silicomanganese, and the stochiometric ratios for manganese dioxide and manganese metal. Manganese exports (table 5) decreased by 19% to 47,600 t compared with those of 2008, based on the typical manganese contents of the materials as calculated in table 4.

In 2009, the annual average domestic price of ore decreased by 46% from that in 2008, and the average prices of manganese ferroalloys and manganese metal fell. The annual international benchmark price of metallurgical-grade ore decreased by 51%, based on monthly contract prices between Australian producers and Japanese consumers in 2009. Average U.S. spot-market prices for high- and medium-carbon ferromanganese and silicomanganese decreased from those in 2008 by 56%, 53%, and 50%, respectively. The average spot market price for manganese metal decreased by 29% from that in 2008.

Only high-carbon ferromanganese remained in NDS physical inventory at yearend 2009. Sales of manganese materials from the NDS in 2009 reduced the Government's inventory of manganese by 8% (content basis), leaving an inventory that was three times more than the amount of high-carbon ferromanganese reported consumed on a contained-weight basis in 2009.

World production of manganese ore in 2009 decreased by 12% on a gross weight basis and by 16% on a contained-weight basis, compared with that in 2008 (table 7). China was the leading producer on a gross-weight and contained-weight basis. Combined world production of ferromanganese and silicomanganese decreased by 8% to 12.5 million metric tons (Mt) on a gross weight basis compared with the revised amount in 2008 (table 8). 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 the chemical preparations industry, excluding manufacturers of indelible ink, India ink, stamp pad ink, and writing ink. The EPA used particulate matter as a surrogate limit for the target metal HAPs (metal compounds of chromium, lead, manganese, and nickel). Emission limits varied depending on whether the sources were existing or new (U.S. Environmental Protection Agency, 2009b).

Air Quality, Mandatory Reporting of Greenhouse Gas Emissions.—EPA issued a final rule that requires monitoring and reporting of greenhouse gas emissions that exceed certain thresholds from all sectors of the economy, including manganese ferroalloy manufacturers (U.S. Environmental Protection Agency, 2009a, p. 56260).

Air Quality, Public Health Study.—In July, the Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Department of Health and Human Services reported the results of its air investigation in the Marietta, OH, area. The ATSDR conducted air sampling from April 2007 to March 2008 to determine potential health impacts from air emissions around the former Union Carbide facility complex near Marietta, OH. The complex is currently occupied by Chevron-Phillips Chemical Company, Eramet Marietta Inc., Eveready Battery Co., and Solvay Advanced Polymers. The ATSDR found that manganese was the only metal that exceeded background levels and ATSDR and EPA health-based guidelines. The ATSDR identified a gap in scientific knowledge regarding the effect of chronic, low-level manganese exposures on general populations. The ATSDR recommended that additional sampling and analysis ("source fingerprinting") be conducted to determine the relative effects of potential area sources of manganese. They expected to evaluate the findings from the planned EPA-funded health study later in 2009 (Agency for Toxic Substances and Disease Registry, 2009, p. 2, 16).

Stockpile.—The Annual Materials Plan (AMP) for fiscal year 2009 that the Defense National Stockpile Center (DNSC) of the Defense Logistics Agency issued on October 3, 2008, covered the period from October 1, 2008, through September 30, 2009. Under this AMP, the maximum disposal authority for manganese materials was 226,796 t for metallurgical-grade ore and 90,718 t for high-carbon ferromanganese (Defense National Stockpile Center, 2008). 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 2009, the DNSC disposed (sold) 33,566 t of high-carbon ferromanganese. Only high-carbon ferromanganese remained in NDS physical inventory at yearend (403,000 t, gross weight). The estimated manganese content of this material was 302,000 t, which was 8% less than the amount contained at yearend 2008.

The U.S. Department of Defense (DOD) was directed by Congress to review its current policy for disposal of NDS material. A DOD working group concluded that DNSC's current disposal policy required revision and that the NDS should be reconfigured into a Strategic Material Security Program to encompass a full range of responsibilities required to develop an integrated and comprehensive approach to strategic materials management. The working group supported DNSC's recommendation to temporarily suspend or limit the sale of 13 materials that had no viable substitutes and on which the United States was wholly or substantially import dependent or at a significant risk of supply disruption. Sales of ferromanganese were curtailed to hold a goal quantity equivalent to 1 year's AMP (U.S. Department of Defense, 2010, p. 1–2).

Exploration and Development

Rocher Deboule Minerals Corp., White Rock, British Columbia, Canada (now American Manganese Inc.) completed a NI 43–101 Resource Study Estimate and a NI 43–101 Preliminary Economic Assessment of its Artillery Peak manganese project, Mohave County, AZ. Indicated resources were 10.9 Mt at an average grade of 4.46% manganese and inferred resources were 96.9 Mt at an average grade of 4.52%. According to the preliminary economic assessment, the area can be mined by conventional open pit methods at a rate of 3,500 metric tons per day for 17 years. About 50,000 tons per year (t/yr) of electrolytic manganese metal would be produced using a patent-pending sulfurous acid-leach process followed by conventional electrolysis (Rocher Deboule Minerals Corp., 2009).

Production

Ore and Concentrate.—The only mine production of manganese in the United States consisted of small amounts of manganiferous material having a natural 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 concealed to avoid disclosing company proprietary data. Domestic producers of manganese ferroalloys, metal, and synthetic dioxide are listed in table 3.

The global financial problems that began during the third quarter of 2008 affected the largest domestic producers of manganese materials to a varying extent in 2009. At its Marietta, OH, ferroalloys plant, Eramet Marietta Inc. curtailed operation of its No. 1 silicomanganese furnace from March through May and curtailed operation of the No. 12 high-carbon ferromanganese furnace throughout the year. As a result, the company laid off 110 workers (Metal-Pages, 2009e; Eramet SA, 2010, p. 11). However, Felman Production Inc. was able to produce silicomanganese steadily throughout the year in its three electric arc furnaces, with a production level at about 9,100 metric tons per month (t/mo) (Metal-Pages, 2009i).

To supplement its high-carbon ferromanganese supply, Eramet Marietta purchased some of the 27,200 t of ferromanganese sold by the DNSC in October (Defense National Stockpile Center, 2009). In November, Eramet Marietta secured an electric power arrangement through 2018 with the Columbus Southern Power division of American Electric Power-Ohio. As part of the arrangement, Eramet Marietta agreed to maintain on average a minimum of 200 employees per year, and to make a $40 million capital investment in plant operations. The first $20 million investment would be made by yearend 2011 and the other $20 million by yearend 2014 (Metal-Pages, 2009f).

Tronox Incorporated voluntarily filed Chapter 11 bankruptcy for its U.S.-based operations, including its electrolytic manganese dioxide (EMD) facility in Henderson, NV. The decision to file was made to address environmental and litigation legacy liabilities that were incurred when the company was spun off from Kerr-McGee Corporation in 2006. The company planned to continue operations without interruption (Tronox Incorporated, 2009).

Bateman Mineral Recovery started full operations of its Riders ferromanganese-slag recovery plant in late May 2009 in Johnstown, PA. The Riders plant was designed to recover 500 t/mo of high-carbon ferromanganese from 25,000 t/mo of stockpiled blast-furnace slag produced by ArcelorMittal's (formerly Bethlehem Steel Corp.) Johnstown steel operations. The recovered ferromanganese was to be sold to the steel industry and the crushed slag to the aggregate market, possibly for use in acid mine water treatment (Bateman Mineral Recovery, 2008; Louis Eybers, general manager, Jigging Technologies LLC, unpub. data, March 25, 2010).

Consumption, Uses, and Stocks

Data relating to manganese end use and other information have shown that metallurgical applications account for most domestic manganese consumption, 85% to 90% of which has been for steelmaking. In 2009, reported U.S. ore consumption indicated that unit consumption of manganese in ironmaking, which could not be published to avoid disclosing company proprietary data, was about the same as that of 2008 and remained a relatively minor component of overall manganese use in steelmaking. Reported consumption (gross weight) of manganese metal, ferromanganese, and silicomanganese decreased by 36%, 20%, and 17%, respectively, from that in 2008 (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.

The combination of the indicated consumption pattern with estimates of apparent consumption, on a gross weight basis, suggested that manganese alloy unit consumption in steelmaking was about 4.7 kilograms per metric ton (kg/t) or about 1.14 times that calculated on the basis of reported consumption in

2009. This level was 38% less than the revised quantity of 7.5 kg/t estimated for 2008 and was a result of a significant decrease in ferromanganese and silicomanganese apparent consumption. The decrease in the apparent consumption of these two ferroalloys was attributable to significant decreases in ferromanganese and silicomanganese 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 soft drink 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 2009, reported domestic consumption of manganese ore decreased by 9% to 422,000 t, while corresponding yearend stocks decreased by 55% to 115,000 t compared with the revised amounts in 2008 (table 1). Apparent consumption of manganese ore on a gross-weight basis in 2009 was about 408,000 t, which excluded any manganese ore consumed directly by ironmaking and steelmaking plants. The USGS must exclude 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 2009, nine 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 nine companies, all consumed manganese ore in their processes in 2009. 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 2009.

Prices

There were significant decreases in annual average manganese material prices in 2009 from those in 2008 because of continued effects of the economic downturn that began during the third quarter of 2008.

Manganese Ore.—The USGS estimated the annual U.S. average contract price of metallurgical-grade ore containing 48% manganese was $6.61 per metric ton unit (mtu). This was a 46% decrease compared with that in 2008, which followed the 51% decrease in the annual average international benchmark price for this grade of ore, as calculated from monthly contract prices set between Japanese consumers and Australian producers (Australian Bureau of Agricultural and Resource Economics and Sciences, unpub. data, January through December, 2009). Prices were above or below this value, depending on ore quality, time of year, and nature of transaction. The year-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 $5.61 per mtu. The range in CNF spot market prices per mtu peaked in January at $8.00 to $8.50, fell to a low of $4.00 to $4.25 in mid-year, then rose to finish the year at $6.85 to $7.10 per mtu because of improved market conditions. The price of a 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 $1,208.16 per gross ton for high-carbon ferromanganese, 100.52 cents per pound for medium-carbon ferromanganese, and 50.72 cents per pound for silicomanganese. These prices were 56%, 53%, and 50% lower, respectively, than those of 2008 when they reached an alltime high. 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 140.13 cents per pound, which was a 20% decrease compared with that of 2008. The year-average price for manganese metal was 22% more than the last listed U.S. price for domestically produced electrolytic manganese metal of $1.15 per pound at the beginning of 1996.

According to Platts Metals Week, the price range for high-carbon ferromanganese containing 78% manganese, per gross ton, began the year at $1,375 to $1,400 and ended the year at $1,310 to $1,350, for a net decrease of 4%. 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 120 to 140 cents and ended the year at 100 to 105 cents, for a net decrease of 21%. The price range, per pound of alloy, for imported silicomanganese with 2% carbon started the year at 44 to 49 cents and ended 2009 at 58 to 62 cents, for a net increase of 29%. This net price increase was caused by low levels of inventory and slight improvement in domestic steel production at yearend.

According to Ryan's Notes North American transaction prices, the 2009 yearend price range of bulk manganese metal shipments was 142 to 150 cents per pound, a net increase of 4% from the price of 135 to 145 cents per pound at the beginning of the year. This net price increase was attributable to rising aluminum production in the fourth quarter of 2009.

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 24 years. The ensuing comparisons of foreign trade data were made on the basis of gross weight.

In 2009, U.S. exports of ferromanganese and silicomanganese increased, while exports of manganese dioxide, manganese metal, and manganese ore decreased compared with exports of these materials for 2008 (table 5). The biggest year-to-year changes in exports was that of manganese ore, which were 68% lower than those in 2008. Canada accounted for 91% of manganese ore exports, followed by Germany with 4%.

In 2009, U.S. imports of potassium permanganate increased compared with those of 2008, while imports of ferromanganese, manganese dioxide, manganese metal, manganese ore, and silicomanganese fell (table 6). The most significant year-to-year change was for imports of manganese ore; these were 53% less than those of 2008. Decreases in this import category were especially notable for Gabon, with a decrease of about 170,000 t (48%), Australia, with a decrease of 66,900 t (65%), and Brazil, with a decrease of 65,300 t (96%) year-on-year.

Imports of spiegeleisen (pig iron containing about 20% manganese) from South Africa decreased to less than 1 t in 2009 from 1 t in 2008, on a gross weight basis. The 2009 customs value for spiegeleisen imports was $300,653 (U.S. Census Bureau, unpub. data, December 2009).

Antidumping Duty Administrative Reviews.—No final antidumping duty rates were assessed in 2009 on imports of manganese materials to the United States.

U.S.-World Trade Organization (WTO) Chinese Raw Material Export Dispute Settlement Proceedings.—On June 23, the United States requested consultations with China and the WTO Dispute Settlement Body (DSB) about curbs placed by China on exports of various materials, including manganese metal and ore. In July, Canada, the European Union, Mexico, and Turkey requested to join the consultations. On November 4, the Office of the United States Trade Representative requested that the DSB establish a dispute settlement panel to review the U.S. claims. (The European Union and Mexico also requested the establishment of a dispute settlement panel.) The DSB established a single panel on December 21 and appointed panel representatives on March 29, 2010. The panel was expected to finalize the proceedings in April 2011 (Office of the United States Trade Representative, 2009; World Trade Organization Dispute Settlement Body, 2010).

World Industry Structure

World manganese ore production was estimated by the USGS at 10.8 Mt (contained manganese) in 2009, down 16% from the revised amount in 2008. Most (97%) of manganese ore was produced in 10 countries. On a manganese-content basis, the leading producer countries of manganese ore were, in decreasing order, China (22%), Australia (20%), South Africa (18%), India (9%), and Gabon (8%) (table 7). World manganese ferroalloy production in 2009 was 12.5 Mt (gross weight), an 8% decrease from that of 2008. On a gross weight basis, the leading producer countries of manganese ferroalloys were, in decreasing order, China (64%), India (12%), Ukraine (7%), Japan (3%), Norway (3%), and South Africa (3%) (table 8).

The International Manganese Institute (IMnI) estimated that world apparent consumption of manganese ferroalloys decreased by 12% to 12.0 Mt in 2009 compared with that of 2008. Of that amount, 7.2 Mt was silicomanganese, 4.0 Mt was high-carbon ferromanganese, and 0.8 Mt was refined (medium- and low-carbon) ferromanganese. IMnI estimated that world production of manganese ferroalloys was 11.6 Mt, slightly less than world consumption. World manganese ore production was 11.1 Mt (contained manganese), which was a decrease of about 22% from the revised IMnI estimate of 14.3 Mt in 2008 (Ideas 1st Information Services Pvt. Ltd., 2010, p. 19; Mark Camaj, market analyst, International Manganese Institute, unpub. data, June 13, 2010).

New manganese materials projects scheduled for completion around the world from 2009 through 2013 are listed in table 9.

World Review

European Union.—Antidumping duties on silicomanganese imported from China (8.2%) and Kazakhstan (6.5%) that had been previously suspended by the Commission of the European Communities in 2007 and 2008 automatically went into effect on September 7 (Metal-Pages, 2009g).

Australia.—OM Holdings Limited (Singapore) constructed a secondary processing plant (SPP) to crush and reprocess reject material from the heavy-media drum plant at the Bootu Creek Manganese Mine. The SPP operations would first handle reject material currently stockpiled (about 1.5 Mt) with a tie-in to the existing heavy-media drum plant to follow. SPP material would serve as feedstock to sinter plant operations; the company expected the SPP to initially generate an additional 150,000 t/yr of 35% manganese fines
(OM Holdings Limited, 2009a, 2010).

Brazil.—Vale S.A. (formerly Companhia Vale do Rio Doce) was the leading manganese ore and ferroalloy producer in Brazil. Vale produced 1.7 Mt of manganese ore in 2009, a decrease of 30% from that of 2008. The Azul Mine in the Carajás region produced 1.4 Mt of ore. Vale's manganese ferroalloys plants, with the exception of the Urucum plant, resumed operation at the beginning of 2009 after being shut down in December 2008. Vale's manganese alloy production in Brazil was 99,000 t, a 66% decrease from that in 2008 (Ryan's Notes, 2009b; Vale S.A., 2010, p. 4).

China.—Chinese imports of manganese ore were at an alltime high of 9.62 Mt (gross weight) in 2009, up 27% from that of 2008 (TEX Report, The, 2010a). This was about 29% of the USGS estimated total world production (gross weight) in 2009. Most of the imported manganese ore was likely used to blend

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 still relied on imports of ferromanganese and silicomanganese. The country's manganese ferroalloy exports were significantly less in 2009 than in 2008—47,062 t (-87%) of ferromanganese and 115,175 t (-84%) of silicomanganese (TEX Report, The, 2010b).

China, the leading producer of electrolytic manganese metal (EMM) in the world with about 190 companies, produced 1.29 Mt of EMM in 2009, an increase of 14% from the revised amount of 1.13 Mt in 2008. The country exported about 155,000 t of EMM in 2009, a decrease of 50% from that in 2008. Before the global economic downturn in late 2008, China exported between 250,000 t/yr and 300,000 t/yr of EMM. Only two countries, China and South Africa, have the capacity to produce EMM. China's EMM capacity in 2009 was estimated to be about 2.11 million metric tons per year, or 96% of the world total (2.20 Mt) (Metal-Pages, 2009c; Tan, 2010).

In 2009, China was also the leading producer of EMD in the world, with total output of 181,520 t. This equated to 79% of the country's annual production capacity, which was 230,000 t. China's share of the active world EMD production capacity in 2009 was about 60%, followed by the United States with 16%. China's EMD exports fell slightly to 38,720 t from that of 2008, owing mainly to antidumping duties assessed by Japan and the United States (Li, 2010, p. 2, 5–7).

Several Central Government policies affected manganese materials during the year. The Government maintained the 20% export duty on ferromanganese, unwrought manganese metal, and silicomanganese exports. They also kept the duty on manganese ore exports at 15%. However, they raised the value-added tax on manganese ore imports to 17% from 13% (Metal-Pages, 2009d; TEX Report, The, 2009).

France.—Eramet reported a 13% reduction in worldwide manganese alloy output in 2009 to 617,000 compared with that in 2008. The company owned manganese alloy plants in China, France, Norway, and the United States (Eramet SA, 2010, p. 33). Vale's Rio Doce Manganese Europe reduced manganese alloy production at its Dunkerque plant by 18% to 45,000 t in 2009 from that in 2008 (Vale S.A., 2010, p. 4).

Japan.—Nippon Mining & Metals Co., Ltd. started a demonstration-scale recycling plant for used lithium-ion batteries to extract value-bearing metals such as cobalt, lithium, manganese, and nickel. The plant, located on the premises of Nikko Tsuruga Recycle Co., Ltd. in Fukui, was expected to recover about 6 t/mo of manganese. Full-scale commercial operation of the plant, which would be the first of its kind, was planned for 2011 (Nippon Mining & Metals Co., Ltd., 2009).

Mexico.—Minera Autlán, S.A.B. de C.V., the sole Mexican manganese ferroalloys manufacturer, reported a 40% decrease in manganese ferroalloys production in 2009 compared with that in 2008 (table 8). However, as global market conditions improved during the second half of 2009, the company restarted two of its plants—Teziutlan in June and Gomez Palacio in September—after having shut them down at yearend 2008. Additionally, the company operated its Tamós ferroalloys plant below full capacity (estimated to be about 150,000 t/yr) (Minera Autlán, S.A.B. de C.V., 2010, p. 12).

Norway.—Manganese ferroalloy production at Vale's Mo I Rana plant was 79,000 t, a 29% decrease from that of 2008. The decrease in production was attributable to the maintenance of one of two furnaces starting in November (Vale, S.A., 2010, p. 4). Eramet increased its ownership stake to 100% from 56% in Eralloys, a company combining the former silicomanganese producer Tinfos AS. Tinfos produced silicomanganese at its Kvinesdal plant, which has an 180,000-t/yr production capacity (Eramet, SA, 2010, p. 33).

South Africa.—The global economic slowdown greatly affected production of manganese materials in 2009. South Africa's position as the world's leading producer of manganese ore (content-basis) in 2008 dropped to third in 2009. The country became the sixth-leading producer of manganese ferroalloys (gross-weight basis) in 2009, down from third in 2008.

Samancor Manganese reduced production at its Metalloys manganese ferroalloy plant in FY 2009 (July 1, 2008, through June 30, 2009). The plant produced 301,000 t of manganese alloys during that period or about 53% of its total annual production capacity (BHP Billiton Ltd., 2009, p. 59, 61). In March, Mogale Alloys Limited curtailed two silicomanganese furnaces capable of producing about 4,000 t/mo (Ryan's Notes, 2009a). In April, Assmang Ltd. shut down its No. 5 high-carbon ferromanganese furnace (55,000-t/yr production capacity) at its Cato Ridge Works plant in KwaZulu Natal. High-carbon ferromanganese furnaces Nos. 3 and 4 that were shut down at yearend 2008 remained closed, owing to market conditions, as was the refined ferromanganese alloys convertor at the company's Cato Ridge Alloys plant. As a result, Cato Ridge operated at about 65% of its total capacity (225,000 t/yr) throughout most of the year (Assore Limited, 2009; Metal-Pages, 2009a, b).

There were ownership changes in several South African manganese companies. In May, Ruukki Group Plc (Finland) acquired 84.9% of Mogale. The minority stake in Mogale would be owned by South African Black Economic Empowerment (BEE) partners. During the year, Mogale produced ferrochromium, silicomanganese, and stainless steel; the production capacity for this mix of materials was 110,000 t/yr (GlobeNewswire, Inc., 2009; Ruukki Group Plc, 2010, p. 11). In July, Samancor Manganese sold 26% of the Hotazel manganese mines—Mamatwan and Wessels Mines—to BEE partners (BHP Billiton Ltd., 2009, p. 58). In November, OM Holdings Limited (Singapore) acquired 26% in Ntsimbintle Mining (Proprietary) Limited, which owns 50.1% of the Tshipi Kalahari Manganese Project (OM Holdings Limited, 2009b).

Spain.—Grupo FerroAtlántica, S.L. cut production at all its Spanish manganese ferroalloy operations by 70%. The company's Spanish production capacity was 183,000 t/yr for ferromanganese and 218,000 t/yr for silicomanganese (Metal-Pages, 2009h; Grupo FerroAtlántica, S.L., 2010).

Ukraine.—Ukraine's total output of manganese concentrate decreased by 36% in 2009 to 932,000 t, compared with that of 2008. Manganese ferroalloy production also decreased in 2009 by 64% for ferromanganese and 23% for silicomanganese. However, ferroalloy companies ramped up production in the second and third quarters of 2009, as economic market

conditions improved. OAO Zaporozhsky Ferro-Alloy Works restarted five ferroalloy furnaces in June, raising the number of working furnaces to 20 of 31. Nikopol Ferroalloy Plant restarted two silicomanganese furnaces in July after a shutdown of 8 months (Platts Metals Week, 2009a, b).

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 has been typically in the range of 1% to 2% in the United States. 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 2009 USGS Minerals Yearbook, volume I, Metals and Minerals. According to the World Steel Association (2009), raw steel production, compared with that in 2008, decreased by 36.4% to 58.1 Mt in the United States while decreasing 8% worldwide to 1,220 Mt. However, raw steel production in China, the leading world producer of raw steel, increased by 13.5% to about 568 Mt. MEPS (International) Ltd. (2010) forecast world raw steel production would increase to 1.4 billion metric tons in 2010 from that in 2009, with a 21% increase in North American raw steel production to 100.5 Mt.

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 2009 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. sales of primary and secondary batteries was projected to increase by 2% annually through 2012 to $16.4 billion. Primary battery sales were forecast to rise faster than those of secondary batteries, owing in part to the growing need for replacement primary batteries in portable devices. Sales of secondary batteries were expected to increase at an annual rate of 1.5% through 2012. 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 below the global average rate (Freedonia Group, Inc., The, 2009, 2010).

References Cited

Agency for Toxic Substances and Disease Registry, 2009: Health consultation—Marietta area air investigation, Marietta, Ohio: Atlanta, GA, Agency for Toxic Substances and Disease Registry, July 1, 24 p. (Accessed March 19, 2011, at http://www.atsdr.cdc.gov/HAC/pha/marietta3/ATSDRMariettaHealthConsultationIII2009Final.pdf.)

Assore Limited, 2009, Production cutbacks at Assmang: Johannesburg, South Africa, Assore Limited news release, April 14, 1 p. (Accessed May 27, 2009, via http://www.assore.com/Company_Releases.html.)

Bateman Mineral Recovery, 2008, Riders, USA: Braamfontein, South Africa, Bateman Mineral Recovery project description. (Accessed March 25, 2010, at http://www.bateman-bmr.com/Riders.htm.)

BHP Billiton Ltd., 2009, Form 20-F—BHP Billiton Ltd. fiscal year ended 30 June 2009: Securities and Exchange Commission, September 14, [variously paginated and unpaginated]. (Accessed March 24, 2011, at http://google.brand.edgar-online.com/EFX_dll/EDGARpro.dll?FetchFilingHTML1?ID=6798216&SessionID=EKB3HFAQq_fo627.)

Defense National Stockpile Center, 2008, Annual materials plan for FY 2009: Fort Belvoir, VA, Defense National Stockpile Center news release, October 3, 2 p.

Defense National Stockpile Center, 2009, Stockpile accepts ferromanganese offers: Fort Belvoir, VA, Defense National Stockpile Center news release, October 1, 1 p.

Eramet SA, 2010, 2009 reference document: Paris, France, Eramet SA, April 16, 284 p. (Accessed March 19, 2011, at http://www.eramet.fr/us/PRODUCTION_GALLERY_CONTENT/DOCUMENTS/Investisseurs/Publications/Document_de_reference_2009UK.pdf.)

Freedonia Group, Inc., The, 2009, Batteries US industry study with forecasts for 2012 & 2017: Cleveland, OH, The Freedonia Group study #2449 brochure, March, 7 p. (Accessed March 18, 2009, at http://www.freedoniagroup.com/brochure/24xx/2449smwe.pdf.)

Freedonia Group, Inc., The, 2010, World batteries Industry study with forecasts for 2014 & 2019: Cleveland, OH, The Freedonia Group study #2703 brochure, November, 8 p. (Accessed March 24, 2011, at http://www.freedoniagroup.com/brochure/27xx/2703smwe.pdf.)

GlobeNewswire, Inc., 2009, Ruukki Group acquires Mogale Alloys: Los Angeles, CA, GlobeNewswire, Inc., May 25. (Accessed March 31, 2010, at https://newsclient.omxgroup.com/cdsPublic/viewDisclosure.action?disclosureId=328313&messageId=393868.)

Grupo FerroAtlántica, S.L. 2010, Grupo FerroAtlántica operations: Madrid, Spain, Grupo FerroAtlántica S.L. (Accessed January 6, 2011, via http://www.ferroatlantica.es/grupo_ferroatlantica/html/english/index_english.html.)

Ideas 1st Information Services Pvt. Ltd., 2010, Manganese: Mumbai, India, Ideas 1st Information Services Pvt. Ltd., May 10, 72 p. (Accessed March 18, 2011, at http://ideasfirst.in/Admin/Downloads/Reports/1580573763_Manganese Report - Final - 31May20101.pdf.)

Li, Tongqing, 2010, 2009 EMD market review and forecast: International Manganese Institute 7th Electrolytic Products Division China Conference, Nanning, Guangxi Province, China, March 23, Presentation, 30 p. (Accessed March 23, 2011, at http://www.manganese.org/__data/assets/pdf_file/0008/88460/6_-_EMD_Market_Li_Tongqing.pdf.)

MEPS (International) Ltd., 2010, Record high global steel production in 2010 despite second half weakness: Sheffield, United Kingdom, MEPS Steel News, October 27. (Accessed November 2, 2010, at http://www.meps.co.uk/GlobalSteelProduction2010.htm.)

Metal-Pages, 2009a, ARM sees profitable manganese, but chrome at risk: London, United Kingdom, Metal-Pages, April 29. (Accessed August 28, 2009, via http://www.metal-pages.com/.)

Metal-Pages, 2009b, Assmang to shut ferro-chrome furnace until next Feb': London, United Kingdom, Metal-Pages, April 29. (Accessed August 28, 2009, via http://www.metal-pages.com/.)

Metal-Pages, 2009c, Chinese electrolytic manganese offers rebound amid uncertainty: London, United Kingdom, Metal-Pages, June 5. (Accessed August 28, 2009, via http://www.metal-pages.com/.)

Metal-Pages, 2009d, Duties and taxes—Chinese export tariffs 2009: London, United Kingdom, Metal-Pages, June 22. (Accessed August 17, 2010, via http://www.metal-pages.com/.)

Metal-Pages, 2009e, Eramet Marietta to cut ferro-alloys production, jobs: London, United Kingdom, Metal-Pages, January 12. (Accessed March 18, 2009, via http://www.metal-pages.com/.)

Metal-Pages, 2009f, Eramet secures manganese power deal through 2018: London, United Kingdom, Metal-Pages, November 3. (Accessed March 18, 2009, via http://www.metal-pages.com/.)

Metal-Pages, 2009g, EU imposes anti-dumping on silico-manganese: London, United Kingdom, Metal-Pages, September 21. (Accessed March 23, 2011, via http://www.metal-pages.com/.)

Metal-Pages, 2009h, Manganese ore market weakens further on demand: London, United Kingdom, Metal-Pages, February 3. (Accessed August 28, 2009, via http://www.metal-pages.com/.)

Metal-Pages, 2009i, US SiMn producer at full pace, demand even stronger: London, United Kingdom, Metal-Pages, September 19. (Accessed March 19, 2011, via http://www.metal-pages.com/.)

Minera Autlán, S.A.B. de C.V., 2010, Annual report 2009: San Pedro Garza García, Mexico, Minera Autlán, S.A.B. de C.V., April, 80 p. (Accessed March 23, 2011, at http://www.autlancom.mx/Descargas/AnnualReport2009.pdf)

Nippon Mining & Metals Co., Ltd., 2009: Tokyo, Japan, Nippon Mining & Metals Co., Ltd. news release, September 3, 3 p. (Accessed March 23, 2011, at http://www.nmm.jx-group.co.jp/english/news/2009/20090903e.)
Office of the United States Trade Representative, 2009, WTO dispute settlement proceeding regarding China Measures related to the exportation of various raw materials: Federal Register, v. 74, no. 232, December, p. 63812–63814.
OM Holdings Limited, 2009a, 31 March 2009 quarterly market update: Singapore, OM Holdings Limited, April 28, 13 p. (Accessed March 23, 2011, at http://us-cdn.creamermedia.co.za/assets/articles/attachments/21034_omh_mar_09_quarterly_final.pdf.)
OM Holdings Limited, 2009b, Tshipi Kalahari Manganese Project—Update: Singapore, OM Holdings Limited, November 26, 3 p. (Accessed March 24, 2011, at http://www.omholdingsltd.com/news_announce09/No.61.pdf.)
OM Holdings Limited, 2010, 31 March 2010 quarterly market update: Singapore, OM Holdings Limited, April 23, 12 p. (Accessed March 23, 2011, at http://www.omholdingsltd.com/news_announce10/No 31.pdf.)
Platts Metals Week, 2009a, Ukraine's Nikopol to raise output: Platts Metals Week, v. 80, issue 27, July 6, p. 10.
Platts Metals Week, 2009b, Ukraine's ZFP restarts five furnaces: Platts Metals Week, v. 80, issue 23, June 8, p. 6.
Rocher Deboule Minerals Corp., 2009, Progress at Artillery Peak manganese project: White Rock, British Columbia, Rocher Deboule Minerals Corp. news release, November 2, 4 p. (Accessed March 22, 2011, at http://www.americanmanganeseinc.com/progress-at-artillery-peak-manganese-project-3/.)
Roskill Information Services Ltd., 2008, The economics of manganese (11th ed.): London, United Kingdom, Roskill Information Services Ltd., 444 p.
Ruukki Group Plc, 2010, Ruukki Group annual report 2009: Espoo, Finland, Ruukki Group Plc, April, 152 p. (Accessed March 24, 2011, at http://www.ruukkigroup.fi/loader.aspx?id=37ebf4c6-18a8-4556-a870-201063f299fe.)
Ryan's Notes, 2009a, Manganese alloy prices begin to slide: Ryan's Notes, v. 15, no. 11, March 16, p. 2.
Ryan's Notes, 2009b, Manganese ore and alloy output down: Ryan's Notes, v. 15, no. 18, May 4, p. 1–2.
Tan, Zhuzhong, 2010, China's EMM industry review in 2009 and outlook in 2010: International Manganese Institute 7th Electrolytic Products Division China Conference, Nanning, Guangxi Province, China, March 23, Presentation, 22 p. (Accessed March 23, 2011, at http://www.manganese.org/__data/assets/pdf_file/0007/88441/3_-_Chinas_EMM_Review-Tan_Zhuzhong.pdf.)
TEX Report, The, 2009, Chinese Government raised value-added tax on imports of raw materials for ferro-alloys: The TEX Report, v. 41, no. 9641, January 6, p. 4.
TEX Report, The, 2010a, China imported 9,615,000 tons of manganese ores in CY 2009 as highest record in its history: The TEX Report, v. 42, no. 9897, January 29, p. 4–5.
TEX Report, The, 2010b, Quantities of ferro-alloys imported by China in CY 2009 exceeded those exported in same year: The TEX Report, v. 42, no. 9897, January 29, p. 3.
Tronox Incorporated, 2009, Tronox's U.S. operations file Chapter 11: Oklahoma City, OK, Tronox Incorporated news release, January 12, 2 p. (Accessed October 8, 2009, at http://www.tronox.com/NewsReleaseFiles/news_20090111.htm.)
U.S. Department of Defense, 2010, Strategic and critical materials operations report to the Congress—Operations under the Strategic and Critical Materials Stock Piling Act during the period October 2008 through September 2009: Washington, DC, U.S. Department of Defense, 70 p.
U.S. Environmental Protection Agency, 2009a, Mandatory reporting of greenhouse gas emissions: Federal Register, v. 74, no. 209, October 30, p. 56260–56519.
U.S. Environmental Protection Agency, 2009b, National emission standards for hazardous air pollutants for area sources—Chemical preparations industry: Federal Register, v. 74, no. 249, December 30, p. 69194–69214.
Vale S.A., 2010, Vale—2009 production report: Rio de Janeiro, Brazil, Vale S.A. news release, February 10, 14 p. (Accessed August 31, 2010, via http://www.vale.com/en-us/investidores/press-releases/Pages/default.aspx.)
World Steel Association, 2009, World crude steel production decreases by -8.0% in 2009: Brussels, Belgium, World Steel Association, January 22. (Accessed January 10, 2011, at http://www.worldsteel.org/?action=newsdetail&jaar=2010&id=285.)
World Trade Organization Dispute Settlement Body, 2010, China—Measures related to the exportation of various raw materials: Geneva, Switzerland, World Trade Organization Dispute Settlement Body summary, November 8. (Accessed January 6, 2011, at http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds394_e.htm.)

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Manganese. Ch. In Metal Prices in the United States Through 1998, 1999.
Manganese. Ch. in Mineral Commodity Summaries, annual.
Manganese. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
Manganese. International Strategic Minerals Inventory Summary Report, Circular 930–A, 1984.
Manganese. Mineral Industry Surveys, monthly.

Other

Company news releases and reports.
CRU Bulk Ferroalloys.
International Manganese Institute.
Manganese. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.
Metal Bulletin Research Ferro-alloys Monthly.
Mining & Metals Report. Interfax International Ltd., weekly.
Platts Metals Week, weekly.
Roskill Information Services Ltd. (London; last reported on manganese in 2008).
United Nations commodity trade statistics.

TABLE 1

SALIENT MANGANESE STATISTICS[1]

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

	2005	2006	2007	2008	2009
United States:					
Manganese ore (20%[r] or more Mn):					
Exports	13	2	29	48	15
Imports for consumption	656	572	602	571	269
Consumption[2]	368	365	351	464 [r]	422
Stocks, December 31, consumers[2]	337	153	190	255 [r]	115
Ferromanganese:					
Exports	14	22	29	23	24
Imports for consumption	255	358	315	448	157
Consumption	286	297	272	304	242
Stocks, December 31, consumers and producers	30	31	31 [r]	27 [r]	31
Consumption, apparent, manganese content[3]	773	1,060	979 [r]	844 [r]	445
Ore price, c.i.f.[4] U.S. ports, dollars per metric ton unit	4.39	3.22	3.10	12.15	6.61
World, production of manganese ore	31,000	33,200 [r]	35,100 [r]	38,100 [r]	33,600

[r]Revised.

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

[2]Exclusive of iron and steel plants.

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

[4]Cost, insurance, and freight.

TABLE 2

U.S. GOVERNMENT DISPOSAL AUTHORITIES AND INVENTORIES FOR MANGANESE MATERIALS AS OF YEAREND 2009[1]

(Metric tons, gross weight)

		Physical inventory[e]				
		Uncommitted				
Material	Disposal authority	Stockpile grade	Nonstockpile grade	Total	Sold, pending shipment	Grand total
Metallurgical ore	2,420	--	(8,910) [2]	(8,910)	XX	(8,910)
High-carbon	436,000	403,000	--	403,000	33,700	436,000

[e]Estimated. XX Not applicable. -- Zero.

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

[2]Negative inventory, as reported by the Defense National Stockpile Center.

Source: Defense National Stockpile Center.

TABLE 3
DOMESTIC PRODUCERS OF MANGANESE PRODUCTS IN 2009

Company	Plant location	Products[1]			Type of process
		FeMn	SiMn	MnO_2	
Energizer Holdings, Inc., Eveready Battery Co.	Marietta, OH			X	Electrolytic.
Erachem Comilog	Baltimore, MD			X	Chemical.
Do.	New Johnsonville, TN			X	Electrolytic.
Eramet Marietta Inc.	Marietta, OH	X	X		Electric furnace.
Felman Productions Inc.	Letart, WV		X		Do.
Tronox LLC	Henderson, NV			X	Electrolytic.

Do. Ditto.

[1]FeMn, ferromanganese; SiMn, silicomanganese; MnO_2, synthetic manganese dioxide.

TABLE 4
U.S. CONSUMPTION, BY END USE, AND INDUSTRY STOCKS OF MANGANESE FERROALLOYS AND METAL IN 2009[1]

(Metric tons, gross weight)

End use	Ferromanganese			Silicomanganese	Manganese metal
	High carbon	Medium and low carbon	Total		
Steel:					
Carbon	82,800	89,800	173,000	56,400	746
High-strength, low-alloy	13,500	9,620	23,100	5,590	5
Stainless and heat-resisting	6,570	2,190	8,760	14,200	954
Full alloy	14,700	14,000	28,700	13,500	23
Unspecified[2]	939	338	1,280	922	1,900
Total	118,000	116,000	234,000	90,600	3,630
Cast irons	6,550	356	6,910	406	W
Superalloys	W	W	W	--	350
Alloys (excluding alloy steels)	460	497	957	2,750	10,400 [3]
Miscellaneous and unspecified	W	W	W	W	W
Grand total	125,000	117,000	242,000	93,700 [4]	14,300
Total manganese content,[5] 2009	99,100	100,000	200,000	61,900	14,300
Total manganese content,[5] 2008	129,000 [r]	121,000 [r]	250,000 [r]	74,400 [r]	22,200
Total manganese content,[5] 2007	130,000 [r]	92,700 [r]	222,000 [r]	61,000	19,700
Stocks, December 31, 2009, consumers and producers	10,100	21,300	31,400	25,800	682

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

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

[2]Includes electrical and tool steel.

[3]Approximtely 79% of this combined total was for consumption in aluminum alloys.

[4]Internal evaluation indicates that silicomanganese consumption is considerably understated.

[5]Estimated based on typical percentages of manganese content.

TABLE 5

U.S. EXPORTS OF MANGANESE ORE, FERROALLOYS, AND METAL, BY COUNTRY[1]

Country	2008 Quantity, gross weight (metric tons)	2008 Value, f.a.s.[2] (thousands)	2009 Quantity, gross weight (metric tons)	2009 Value, f.a.s.[2] (thousands)
Ore and concentrates with 20% or more manganese:[3]				
Canada	1,630	$565	13,900	$923
China	45,300	7,290	--	--
Germany	882	1,800	668	1,750
Korea, Republic of	361	631	527	893
Other (14 countries)	142 r	435 r	184	256
Total	48,300	10,700	15,300	3,830
Ferromanganese, all grades:[4]				
Canada	15,100	11,900	10,900	11,600
Japan	6	4	1,000	1,400
Malaysia	47	48	1,080	1,160
Mexico	4,580	3,390	6,890	8,220
Netherlands	796	734	2,260	2,620
Spain	1,640	176	--	--
Other (16 countries)	1,270 r	4,330 r	1,990	2,880
Total	23,400	20,600	24,200	27,900
Silicomanganese:[4]				
Canada	901	837 r	5,410	5,580
Italy	203	285	2,540	2,010
Mexico	2,650	4,250	7,050	6,510
Netherlands	429	603	1,490	1,340
Spain	1,640	1,650	--	--
Other (10 countries)	1,320 r	1,400 r	2,290	2,040
Total	7,140	9,020	18,800	17,500
Metal, including alloys and waste and scrap:[3]				
Belgium	613	1,740	50	227
China	684	1,520	936	2,310
Hong Kong	522	1,450	820	2,340
Japan	1,120	2,460	462	1,010
Other (27 countries)	1,640 r	4,420 r	1,200	3,140
Total	4,580	11,600	3,470	9,040
Manganese dioxide:[4]				
Belgium	2,170	5,550 r	1,930	4,870
Canada	5,320	4,010	4,090	3,900
Mexico	808	770	341	432
Other (45 countries)	2,710 r	4,260 r	2,060	4,220
Total	11,000	14,600	8,420	13,400

rRevised. -- Zero.

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

[2]Free alongside ship.

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

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

Source: U.S. Census Bureau.

TABLE 6

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY[1]

Country	2008			2009		
	Quantity		Value, customs (thousands)	Quantity		Value, customs (thousands)
	Gross weight (metric tons)	Mn content (metric tons)		Gross weight (metric tons)	Mn content (metric tons)	
Ore and concentrates with 20% or more manganese:[2]						
All grades:						
Australia	103,000	51,900	$25,500	35,700	15,400	$12,300
Belgium	--	--	--	1,180	609	136
Brazil	68,300	34,400	19,300	2,960	1,540	929
China	862	516	436	4,170	2,150	617
Gabon	356,000	181,000	85,200	186,000	96,500	65,000
Ghana	12,500	6,230	5,580	37,500	37,100	3,400
India	4	1	8	--	--	--
Mexico	--	--	--	1,490	671	303
Morocco	--	--	--	16	9	11
South Africa	30,800	14,600	18,400	--	--	--
Total	571,000	289,000	154,000	269,000	154,000	82,600
More than 20% but less than 47% manganese:[2]						
Australia	--	--	--	25,600	10,500	10,200
Brazil	4,950	1,540	1,100	--	--	--
Gabon	122,000	57,400	20,400	--	--	--
India	4	1	8	--	--	--
Mexico	--	--	--	1,490	671	303
Total	127,000	58,900	21,500	27,100	11,100	10,500
47% or more manganese:[2]						
Australia	103,000	51,900	25,500	10,100	4,970	2,070
Belgium	--	--	--	1,180	609	136
Brazil	63,300	32,800	18,200	2,960	1,540	929
China	862	516	436	4,170	2,150	617
Gabon	233,000	124,000	64,800	186,000	96,500	65,000
Ghana	12,500	6,230	5,580	37,500	37,100	3,400
Morocco	--	--	--	16	9	11
South Africa	30,800	14,600	18,400	--	--	--
Total	443,000	230,000	133,000	242,000	143,000	72,100
Ferromanganese:[3]						
All grades:						
Australia	1,530	1,170	3,870 r	11,000	8,460	11,600
China	111,000	88,500	318,000	10,100	9,160	24,600
India	20,000	14,900	51,000	5,910	4,510	5,930
Korea, Republic of	31,200	24,200	87,100	8,790	7,120	15,700
Mexico	23,600	19,000	49,900	7,750	6,110	13,300
Norway	6,000	4,900	19,100	10,100	8,250	16,300
South Africa	197,000	153,000	451,000	90,200	69,900	118,000
Ukraine	26,200	20,600	68,000 r	4,290	3,360	3,670
Other (18 countries)	31,400 r	24,700 r	86,300 r	4,930	3,830	5,810
Total	448,000	351,000	1,130,000	153,000	121,000	215,000

See footnotes at end of table.

TABLE 6—Continued

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY[1]

Country	2008			2009		
	Quantity		Value, customs (thousands)	Quantity		Value, customs (thousands)
	Gross weight (metric tons)	Mn content (metric tons)		Gross weight (metric tons)	Mn content (metric tons)	
1% or less carbon:						
China	33,500	28,100	$111,000	8,580	7,940	$21,900
Korea, Republic of	2,000	1,610	6,940	3,460	2,810	5,370
Mexico	10,900	8,840	26,000	4,340	3,450	8,090
Norway	3,830	3,150	14,200	2,660	2,160	4,710
South Africa	--	--	--	1,020	827	2,560
Other (4 countries)	763	603	2,600	27	21	58
Total	51,000	42,300	160,000	20,100	17,200	42,700
More than 1% to 2% or less carbon:						
China	39,600	31,400	120,000	740	600	1,610
Korea, Republic of	7,600	6,140	25,400	4,630	3,770	9,460
Mexico	12,600	10,100	23,800	1,520	1,210	3,080
Norway	1,170	962	3,420	7,410	6,030	11,400
South Africa	33,300	26,800	82,100	12,300	9,740	26,800
Other (4 countries)	7,210 r	5,910 r	21,100 r	39	31	198
Total	102,000	81,400	276,000	26,600	21,400	52,600
More than 2% but not more than 4% carbon:						
China	633	498	275	--	--	--
Norway	--	--	--	16	13	25
South Africa	54	44	122	216	179	500
Other (3 countries)	3,270 r	2,800 r	10,800 r	405	304	460
Total	3,960	3,340	11,200	637	496	986
More than 4% carbon:						
Australia	1,530	1,170	3,870	11,000	8,460	11,600
China	37,400	28,500	87,100	816	614	1,140
India	20,000	14,900	51,000	5,910	4,510	5,930
Korea, Republic of	21,600	16,400	54,800	701	546	869
Mexico	43	34	147	1,900	1,450	2,130
Norway	1,000	786	1,530	57	46	92
South Africa	164,000	126,000	369,000	76,700	59,100	88,600
Ukraine	24,700	19,300	62,700	4,290	3,360	3,670
Other (12 countries)	21,700 r	16,700 r	57,100 r	4,460	3,480	5,100
Total	292,000	224,000	687,000	106,000	81,600	119,000
Silicomanganese:[3]						
Australia	36,500	23,900	68,800	18,400	12,200	17,200
Georgia	59,800	44,900	116,000	20,300	13,500	15,600
Korea, Republic of	3,820	2,390	7,540	7,090	4,620	6,380
Macedonia	12,900	8,470	27,500	--	--	--
Mexico	16,400	10,800	21,900	1,600	1,050	1,660
Norway	72,500	45,400	136,000	15,200	9,460	22,300
Saudi Arabia	5,150	3,430	10,700	8,760	3,510	7,540
South Africa	153,000	102,000	284,000	55,400	36,800	60,500
Other (8 countries)	5,140 r	3,520 r	10,000 r	3,600	2,320	4,040
Total	365,000	245,000	682,000	130,000	83,500	135,000

See footnotes at end of table.

TABLE 6—Continued

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY[1]

Country	2008			2009		
	Quantity		Value, customs (thousands)	Quantity		Value, customs (thousands)
	Gross weight (metric tons)	Mn content (metric tons)		Gross weight (metric tons)	Mn content (metric tons)	
Metal:[2]						
Unwrought:[4]						
China	21,700	XX	$75,000	15,500	XX	$38,100
Germany	1,420	XX	8,220	555	XX	1,660
South Africa	5,570	XX	23,500	4,980	XX	14,100
Other (10 countries)	1,610 r	XX	3,950 r	459	XX	1,150
Total	30,300	XX	111,000	21,500	XX	55,000
Other manganese, wrought:						
China	649	XX	2,320	263	XX	710
Mexico	426	XX	2,530	299	XX	1,530
Other (4 countries)	9	XX	52	52	XX	208
Total	1,080	XX	4,900	614	XX	2,450
Waste and scrap:						
Canada	312	XX	81	701	XX	239
Other (4 countries)	--	XX	--	185	XX	131
Total	312	XX	81	886	XX	370
Manganese dioxide:[2]						
Australia	4,380	XX	6,230	--	XX	--
Japan	4,730	XX	8,620	4,570	XX	11,400
Mexico	3,000	XX	1,420	10	XX	16
South Africa	9,500	XX	19,100	12,200	XX	29,200
Other (11 countries)	1,310 r	XX	2,250 r	723	XX	1,300
Total	22,900	XX	37,600	17,500	XX	42,000
Potassium permanganate:[2]						
Czech Republic	395	XX	1,100	565	XX	1,870
India	305	XX	858	560	XX	1,870
Other (1 country)	14	XX	37	18	XX	62
Total	714	XX	1,990	1,140	XX	3,800

rRevised. XX Not applicable. -- Zero.

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

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

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

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

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

TABLE 7
MANGANESE ORE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country[3]	Mn content, percentage[e, 4]	2005	2006	2007	2008	2009
Australia:[5]						
Gross weight		3,136	4,556	5,289	4,812 [r]	4,451
Mn content	37–53	1,500	2,192	2,540	2,320	2,140
Brazil:[6]						
Gross weight		3,200	3,390 [r]	1,570 [r]	3,160 [r]	2,200 [p]
Mn content	33–51[r]	1,370	1,120 [r]	520 [r]	1,040 [r]	730 [p]
China:[e, 7, 8]						
Gross weight		7,500	8,000	10,000	11,000	12,000
Mn content	20–30	1,500	1,600	2,000	2,200	2,400
Gabon:[9]						
Gross weight		2,859	3,000	3,300	3,250 [r]	2,000
Mn content	45–53	1,342 [r]	1,393 [r]	1,532 [r]	1,441 [r]	881
Ghana:						
Gross weight		1,715	1,659	1,173 [r]	1,261 [r]	1,007
Mn content[e]	32–34	600	580	410	440 [r]	351
India:[10]						
Gross weight		2,386	2,084	2,300	2,400	2,500
Mn content	10–54	927	844	900	960	980
Kazakhstan, crude ore:						
Gross weight		2,208	2,531	2,482	2,485	2,467
Mn content[e]	20–30	540	550	600	600	595
Mexico:[11]						
Gross weight		369	346	423	472 [e]	470 [e]
Mn content	36–37	133	124	152	170	169 [e]
South Africa:[9]						
Gross weight		4,612	5,213	5,996	6,807	4,576
Mn content	30–48+	2,100	2,300	2,600	2,900	1,900 [e]
Ukraine:						
Gross weight		2,260	1,606	1,720	1,447	932
Mn content[e]	30–35	770	546	580	490	375
Other:[e, 12]						
Gross weight		745	772	843 [r]	1,000 [r]	965
Mn content	XX	231	227	254 [r]	312 [r]	299
Total:						
Gross weight		31,000	33,200 [r]	35,100 [r]	38,100 [r]	33,600
Mn content	XX	11,000	11,500 [r]	12,100 [r]	12,900 [r]	10,800

[e]Estimated. [p]Preliminary. [r]Revised. XX Not applicable.

[1]World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through August 2, 2010. 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.

[3]In addition to the countries listed, Cuba, Panama, Philippines, and Sudan may have produced manganese ore and (or) manganiferous ore, but available information is inadequate to make reliable estimates of output levels.

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

[5]Metallurgical ore.

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

[7]Includes manganiferous ore.

[8]The International Manganese Institute estimated Chinese manganese ore production, in gross weight and Mn content, respectively, in metric tons, as follows: 2005—12,000,000 and 2,400,000; 2006—11,000,000 and 2,200,000; 2007—14,000,000 and 2,800,000; 2008—19,000,000 and 3,400,000; and 2009—15,000,000 and 2,700,000.

TABLE 7—Continued
MANGANESE ORE: WORLD PRODUCTION, BY COUNTRY[1, 2]

[9]Calculated metal content includes allowance for assumed moisture content. Includes ore and sinter.
[10]Reported on a fiscal year-basis. Much of India's production grades below 35% Mn; content averaged 38.3% Mn for fiscal years 2005–06 through 2009–10.
[11]Mostly oxide nodules; may include smaller quantities of direct-shipping carbonate and oxide ores for metallurgical and battery operations.
[12]Category 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), Thailand, Turkey, and Zambia.

TABLE 8
FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country	2005	2006	2007	2008	2009[e]
Argentina, electric furnace, silicomanganese[e]	13,290 [r]	9,268 [r]	8,917 [r]	9,172 [r]	6,644 [3]
Australia, electric furnace:[e]					
Ferromanganese	120,000	125,000	115,000 [r]	147,000 [r]	87,000
Silicomanganese	120,000 [r]	120,000 [r]	110,000 [r]	125,000 [r]	74,000
Total	240,000 [r]	245,000 [r]	225,000 [r]	272,000 [r]	161,000
Brazil, electric furnace:					
Ferromanganese	182,400	280,770	205,000 [r, e]	190,000 [r, e]	66,000
Silicomanganese	297,600	292,230	214,000 [r, e]	198,000 [r, e]	69,000
Total	480,000	573,000	419,000 [r, e]	388,000 [r, e]	135,000
China:[e]					
Blast furnace, ferromanganese	500,000	600,000	600,000	600,000	500,000
Electric furnace:					
Ferromanganese	1,150,000	1,400,000	1,930,000	2,100,000	2,300,000
Silicomanganese	3,000,000	3,600,000	4,340,000	5,000,000 [r]	5,200,000
Total	4,150,000	5,000,000	6,270,000	7,100,000	7,500,000
Total, blast and electric furnaces	4,650,000	5,600,000	6,870,000	7,700,000 [r]	8,000,000
Egypt, electric furnace, ferromanganese[e]	30,000	30,000	30,000	30,000	30,000
France, electric furnace:[e]					
Ferromanganese	113,000 [r]	137,000 [r]	144,000 [r]	46,600 [r]	46,000
Silicomanganese[4]	52,300	63,300	65,400 [r]	60,200 [r]	54,100
Total	165,000 [r]	200,000 [r]	209,000 [r]	107,000 [r]	100,000
Georgia, electric furnace:[e]					
Ferromanganese	13,945 [3]	5,130 [3]	5,000	5,000	4,500
Silicomanganese	109,414 [3]	116,945 [3]	120,000	120,000	105,000
Total	123,359 [3]	122,075 [3]	125,000	125,000	110,000
India, electric furnace:[5]					
Ferromanganese:	273,057 [r]	296,726 [r]	391,210 [r]	384,577 [r]	389,465 [3]
Silicomanganese	596,372 [r]	782,962 [r]	911,402 [r]	891,458 [r]	1,099,838 [3]
Total	869,429 [r]	1,079,688 [r]	1,302,612 [r]	1,276,035 [r]	1,489,303 [3]
Indonesia, electric furnace:[e]					
Ferromanganese	12,000	12,000	12,000	12,000	12,000
Silicomanganese	4,000	5,000	6,000	7,000	7,000
Total	16,000	17,000	18,000	19,000	19,000
Iran, electric furnace, ferromanganese[6]	NA	NA	NA	NA	NA
Italy, electric furnace:[e]					
Ferromanganese	9,000 [r]	4,500 [r]	4,800 [r]	8,500 [r]	5,500
Silicomanganese	21,500 [r]	33,500 [r]	37,000 [r]	25,500 [r]	17,000
Total	30,500 [r]	38,000 [r]	41,800 [r]	34,000 [r]	22,500
Japan, electric furnace:					
Ferromanganese	448,616	406,162	420,151	431,181 [r]	361,375 [3]
Silicomanganese	94,725	59,424	52,901	58,884 [r]	49,205 [3]
Total	543,341	465,586	473,052	490,065 [r]	410,580 [3]

See footnotes at end of table.

TABLE 8—Continued
FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country	2005	2006	2007	2008	2009[e]
Kazakhstan, electric furnace:					
Ferromanganese[e]	2,100	2,100	2,100	2,100	1,900
Silicomanganese	170,214	220,000	188,445	179,939	160,000
Total	172,314	222,100	190,545	182,039	162,000
Korea, Republic of, electric furnace:					
Ferromanganese	124,434	169,202	209,321	251,125	250,000
Silicomanganese	74,193	94,119	105,607	76,184	80,000
Total	198,627	263,321	314,928	327,309	330,000
Macedonia, electric furnace:					
Ferromanganese	--	--	--	12,623	--
Silicomanganese	--	--	70,472	54,931	--
Total	--	--	70,472	67,554	--
Mexico, electric furnace:[7]					
Ferromanganese	89,642	62,485	74,578	97,366	42,492 [3]
Silicomanganese	104,780	97,457	109,286	114,320	85,065 [3]
Total	194,422	159,942	183,864	211,686	127,557 [3]
Norway, electric furnace:[e]					
Ferromanganese	250,000	245,000	245,000	309,000 [r]	205,000
Silicomanganese	230,000	230,000	225,000	252,000 [r]	200,000
Total	480,000	475,000	470,000	561,000 [r]	405,000
Poland:					
Blast furnace, ferromanganese	7,800	4,100	2,100 [r]	4,100 [r, e]	4,100
Electric furnace, silicomanganese	10,242	3,310	15,600 [r]	24,000 [r, e]	24,000
Total	18,042	7,410	17,700 [r]	28,100 [r, e]	28,100
Romania, electric furnace:					
Ferromanganese	18,625	3,329	--	--	--
Silicomanganese	100,957	53,085	26,868	10,000	--
Total	119,582	56,414	26,868	10,000	--
Russia:[e]					
Blast furnace, ferromanganese	110,000	130,000	120,000	110,000	100,000
Electric furnace, silicomanganese	48,000	40,000	40,000	40,000	35,000
Total	158,000	170,000	160,000	150,000	135,000
Slovakia, electric furnace:					
Ferromanganese	43,458	59,391	74,065	61,194	60,000
Silicomanganese	47,843	59,128	71,587	59,940	60,000
Total	91,301	118,519	145,652	121,134	120,000
South Africa, electric furnace:					
Ferromanganese	570,574	656,235	698,654	503,000 [r]	260,000
Silicomanganese[e]	231,000	247,000	302,000	233,000 [r]	110,000
Total	801,574	903,235	1,000,654	736,000 [r]	370,000
Spain, electric furnace:[e]					
Ferromanganese	10,000	10,000	10,000	10,000	10,000
Silicomanganese	100,000	100,000	100,000	30,000 [r]	30,000
Total	110,000	110,000	110,000	40,000 [r]	40,000
Ukraine:					
Blast furnace, ferromanganese	79,000 [r]	30,000 [r]	26,700 [r]	16,000 [r]	--
Electric furnace:					
Ferromanganese	359,000	373,000	368,000	361,501	129,400 [3]
Silicomanganese	1,040,000	1,168,000	1,281,000	958,667	741,900 [3]
Total	1,399,000	1,541,000	1,649,000	1,320,168	871,300 [3]
Total, blast and electric furnaces	1,478,000 [r]	1,571,000 [r]	1,675,700 [r]	1,336,168 [r]	871,300 [3]
United States, electric furnace, ferromanganese[8]	W	W	W	W	W

See footnotes at end of table.

TABLE 8—Continued
FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country	2005	2006	2007	2008	2009[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	11,000,000 [r]	12,500,000 [r]	14,100,000 [r]	14,300,000 [r]	13,100,000
Of which:					
Blast furnace, ferromanganese	697,000 [r]	764,000 [r]	749,000 [r]	730,000 [r]	604,000
Electric furnace, excluding United States:					
Ferromanganese	3,830,000 [r]	4,290,000 [r]	4,950,000 [r]	4,980,000 [r]	4,280,000
Silicomanganese[9]	6,500,000 [r]	7,430,000 [r]	8,440,000 [r]	8,560,000 [r]	8,240,000
Total	10,300,000	11,700,000	13,400,000	13,500,000	12,500,000

[e]Estimated. [r]Revised. W Withheld to avoid disclosing company proprietary data; not included in "Grand total." NA Not available. -- Zero.
[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]Table includes data available through December 31, 2010.
[3]Reported figure.
[4]Includes silicospiegeleisen, if any.
[5]Reported on a fiscal year basis, which is from April 1 to March 31.
[6]In addition to ferromanganese, Iran is thought to have produced silicomanganese, but production information is inadequate for the formulation of estimates of output levels.
[7]Salable products from Cía Minera Autlán S.A. de C.V.
[8]U.S. output of ferromanganese includes silicomanganese.
[9]Includes silicospiegeleisen, if any, for France.

TABLE 9

MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2013[1, 2, 3]

(Metric tons, gross weight, unless otherwise specified)

Projected year of first production	Country	Project and company	Project type	Incremental annual production capacity	Total annual production capacity	Manganese product[4]
2009	Australia	Bootu Creek Manganese Mine OM Holdings Ltd.[r]	mine expansion	150,000	850,000	Mn ore.
2009	Do.	Groote Eylandt Mining Company Pty. Ltd. BHP Billiton Limited (60%) and Anglo American Corporation (40%)	do.	700,000	4,200,000 [r]	Do.
2009	China	Anhui EMM Plant Anhui Chizhou Jinshan Mining Co., Ltd. (50%)[e] and Hubei Jiayu Gaoqiang Manganese Co., Ltd. (50%)[e]	new EMM plant	NA	30,000	EMM.
2009	Do.	Erdos EJM Manganese Alloys Co. ERDOS Group (51%), JFE Steel Corporation (24.5%), and Mitsui & Co. (24.5%)	ferroalloys plant expansion	300,000 NA	450,000 186,000	SiMn. FeMn.
2009	Do.	Guangxi Eramet-Comilog EMD Plant Guangxi Eramet-Comilog Chemicals Co., Ltd.	EMD plant expansion	10,000	20,000	EMD.
2009	Do.	Henan Qi County Qianyuan Plant Henan Qi County Qianyuan Furnace Charge Co., Ltd.	ferroalloys plant expansion	50,000	170,000	SiMn.
2009	Do.	Sinosteel Jilin Ferroalloy Plant Sinosteel Jilin Ferroalloy Co., Ltd.	do.	45,000	205,000	Do.
2009	Do.	Windsor Manganese Ltd. Singapore Windsor Holdings	new ferroalloys plant	NA	100,000	Do.
2009	Gabon	Moanda Mine Compagnie Miniere de 1'Ogooue (Comilog) S.A.	mine expansion	200,000	3,700,000	Mn ore.
2009	India	Aryan Mining Trade Company Stemcor Group	do.	60,000	120,000	Do.
2009	Do.	Orissa Manganese and Minerals Pvt. Ltd. Adhunik Metaliks Ltd.	do.	NA	300,000	Do.
2009	Russia	Selezen Manganese Mine SGMK Shalymskaya Mining Company	new mine	NA	NA	Do.
2009	Do.	Siberian Mining and Metallurgical Company (SGMK) Ferro Alloys Plant SGMK	new ferroalloys plant	NA	45,000	Mn alloys.
2010	Australia	Ant Hill and Sunday Hill Mesa Minerals Limited[r, 5]	do.	NA	300,000	Do.
2010	Do.	Bootu Creek Manganese Mine OM Holdings Ltd.[r]	mine expansion	150,000	1,000,000	Do.
2010	Do.	Nicholas Downs (formerly Balfour Downs) Manganese Project Mineral Resources Limited (50%) and Hancock Prospecting Pty. Ltd. (50%)[r]	do.	NA	350,000 [r]	Do.
2010	Do.	Peak Hill District Manganese Project Mineral Resources Limited	do.	85,000	220,000	Do.
2010[e]	China	CITIC Dameng Tiandong Plant CITIC Dameng Tiandong New Materials Co., Ltd.	new EMM plant	NA	30,000	EMM.

See footnotes at end of table.

TABLE 9—Continued
MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2013[1, 2, 3]

(Metric tons, gross weight, unless otherwise specified)

Projected year of first production	Country	Project and company	Project type	Incremental annual production capacity	Total annual production capacity	Manganese product[4]
2010	China	Wuhai Mengjin Smelting Wuhai Mengjin Smelting Co. Ltd.	ferroalloys plant expansion	120,000	170,000	SiMn.
2010	Gabon	Manganese Project, Bembélé Mountains Compagnie Industrielle et Commerciale des Mines de Huazhou (CICMH)	new mine	NA	500,000	Mn ore.
2010	India	Bhilai Ferro-Alloys Plant Manganese Ore (India) Limited (MOIL) (50%) and Steel Authority of India Limited (50%)	new ferroalloys plant	NA	100,000 [r]	Mn alloys.
2010	Do.	Rohit Ferro Tech Haidia Plant Rohit Ferro Tech Ltd.	do.	NA	600,000 [r]	FeMn, SiMn.
2010	South Africa	Kalahari Manganese Project United Manganese of Kalahari	mine expansion	750,000	1,000,000	Mn ore.
2010[e]	Zambia	Otjosondu Manganese Mine Purity Manganese (pty.) Ltd.	do.	480,000	600,000	Do.
2011[e]	Do.	Taurian Manganese Ferroalloys Plant Dharni Sampda Private Limited Group (formerly Taurian Resources Private Limited)	new ferroalloys plant	NA	45,000	Mn alloys.
2011	Australia	Peak Hill District Manganese Project Mineral Resources Limited	mine expansion	60,000	280,000	Mn ore.
2011	China	Eramet New Guilin Project Eramet S.A.	new ferroalloys plant	NA	100,000 60,000	HC FeMn, SiMn. MC FeMn, LC FeMn.
2011	Do.	Guangxi Manganese Plant Guangxi Zhaohong Manganese Industry Co., Ltd.	new EMM plant	NA	24,000	EMM.
2011[e]	Cote d'Ivoire	Lauzoua Mine Societe pour le Developpement Minier en Cote d'Ivoire (51%), China National Geological & Mining Corporation (39%), and the State of Cote d'Ivoire (10%)	new mine	NA	150,000	Mn ore.
2011[e]	India	Chandrapur Plant Maharashtra Elektrosmelt Ltd.	ferroalloys plant expansion	60,000	180,000	FeMn, SiMn.
2011	Do.	Maithan Vizag Ferro-Alloys Plant Maithan Alloys Limited	new ferroalloys plant	NA	120,000	Mn alloys.
2011[r]	Do.	Patmunda Manganese Mine[r, 6] Orissa Manganese and Minerals Pvt. Ltd.	mine expansion	210,000 [r, e]	360,000 [r]	Mn ore.
2011	Do.	Rohit Ferro Tech Orissa Plant Rohit Ferro Tech Ltd.	ferroalloys plant expansion	50,000	160,000	HC FeCr, HC FeMn, SiMn.
2011	Do.	Rungta Manganese Mine Rungta Mines Ltd.	mine expansion	75,000	250,000	Mn ore.
2011	Do.	10 mines[7] MOIL	do.	600,000	2,000,000	Do.
2011	Korea, Republic of	Gwangyang Ferromanganese Plant POS-HiMetal	new ferroalloys plant	NA	75,000	FeMn.

See footnotes at end of table.

TABLE 9—Continued
MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2013[1, 2, 3]

(Metric tons, gross weight, unless otherwise specified)

Projected year of first production	Country	Project and company	Project type	Incremental annual production capacity	Total annual production capacity	Manganese product[4]
2011	Russia	Usink Manganese Mine ZAO ChEK.SU-Vk	new mine	NA	300,000 [e]	Do.
2011[r]	South Africa	Kalagadi Manganese Project Kalagadi Manganese (50%) and ArcelorMittal (50%)	new mine-beneficiation-sinter complex[8] (Northern Cape Province) and ferroalloys plant (Coega, Eastern Cape Province)	NA NA	3,000,000 320,000	Mn ore. FeMn.
2012	Cameroon	Nkamouna Cobalt-Nickel-Manganese Project Geovic Mining Corporation	new mine	NA	45,000	Mn ore.
2012[e]	China	Sinosteel Jilin Ferroalloy Plant Sinosteel Jilin Ferroalloy Co., Ltd.	new ferroalloys plant	NA	100,000	MC FeMn, LC FeMn.
2012[r]	Gabon	Moanda Mine Comilog S.A.	mine expansion	300,000	4,000,000	Mn ore.
2012[r]	India	Bobbili Ferro-Alloys Plant MOIL (50%), Rashtriya Ispat Nigam Limited (50%)	new ferroalloys plant	NA	45,000	SiMn.
2012[r]	Russia	Krasnoyarsk Ferroalloys Plant ZAO ChEK.SU-Vk and Krasnoyarsk Territory Administration Council	do.	NA	62,500 [r, 9]	Mn alloys.
2012	South Africa	Kalahari Manganese Project United Manganese of Kalahari	mine expansion	500,000	1,500,000	Mn ore.
2012	Do.	Wessels Mine BHP Billiton Limited	do.	500,000 [r]	1,500,000 [r]	Do.
2013[e]	China	Sinosteel Jilin Ferroalloy Plant Sinosteel Jilin Ferroalloy Co., Ltd.	ferroalloys plant expansion	600,000 [e]	1,000,000	FeMn.
2013	Gabon	Moanda Metallurgical Complex Comilog S.A.	new EMM and SiMn plants	NA NA	65,000 20,000	SiMn. EMM.
2013	Russia	Krasnoyarsk Ferroalloys Plant ZAO ChEK.SU-Vk and Krasnoyarsk Territory Administration Council	new ferroalloys plant	62,500 [e]	125,000 [r, 9]	Mn alloys.
2013[r]	South Africa	Tshipi Kalahari Manganese Project Pallinghurst Co.-Investors (49.9%), OM Holdings Limited (26%), Ntsimbintle Mining (PTY) Ltd. (24.1%)	new mine	NA	2,200,000	Mn ore.

[e]Estimated. [r]Revised. Do., do. Ditto. NA Not available.

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

[2]Projects in feasibility or later stages of development in 2009. Actual startup dates may be postponed, owing to economic or other factors. Additional projects might produce manganese materials by 2013, but not enough information was available to include them.

[3]Includes projects having the following minimum tonnage capacities: 45,000 metric tons of manganese alloys or manganese ore; and 10,000 metric tons of electrolytic manganese dioxide or electrolytic manganese metal.

[4]EMD Electrolytic manganese dioxide. EMM Electrolytic manganese metal. FeMn Ferromanganese. HC FeCr High-carbon ferrochromium. HC FeMn High-carbon ferromanganese. LC FeMn Low-carbon ferromanganese. MC FeMn Medium-carbon ferromanganese. Mn Manganese. SiMn Silicomanganese.

[5]In 2010, Mineral Resources Limited acquired 64% controlling ownership in project from Mesa Minerals.

[6]Includes five additional manganese mines situated in the same region of Sundargarth, Orissa.

[7]Manganese Ore (India) Limited (MOIL) 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.

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

TABLE 9—Continued
MANGANESE MATERIALS: PROJECTS SCHEDULED FOR COMPLETION, BY YEAR, BY YEAREND 2013[1, 2, 3]

[9]The plant's total production capacity will be 250,000 metric tons per year by 2016.

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