



2009 Minerals Yearbook

INDIA

THE MINERAL INDUSTRY OF INDIA

By Chin S. Kuo

India is endowed with large resources of metallic and industrial minerals. Its mineral sector includes mineral mining and processing industries and is the backbone of industrial production. The mineral sector provides the basic raw materials, such as aluminum, coal, copper, industrial minerals, petroleum, and steel, to the manufacturing sector. India's reserves and resources of barite, bauxite, chromium, coal, iron ore, limestone, and manganese ore were among the 10 largest in the world. In terms of production, the country was among the eight leading producers in the world of aluminum, barite, bauxite, chromium, coal, iron ore, kyanite, manganese ore, mica (sheet), steel, talc, and zinc (Ministry of Mines, 2010, p. 152-155).

Minerals in the National Economy

The mineral industry was an important segment of the Indian economy. Mining and quarrying accounted for 1.91% of the gross domestic product. Overall mineral production in terms of tonnage increased by 7.92% in 2009. The total value of mineral production increased by 4.61%. Mineral fuels accounted for 62.23% of the total value; metals, 21.55%; and industrial minerals, 16.22%. The value of mineral exports increased by 14.5% and that of mineral imports increased by 47% compared with those of 2008 (Ministry of Mines, 2010, p. 147-148).

Government Policies and Programs

The Government expected to raise \$4.9 billion from the sale of a 10% stake in state-run National Mineral Development Corp. Ltd. (NMDC) and planned to begin the public offering of shares of stock in March 2009 and to finalize its divestment by mid-January 2010. NMDC was India's leading iron ore producer and exporter. The company also owned a mechanized diamond mine at Panna in the State of Madhya Pradesh, which was reopened in June 2009 and produced 100,000 carats per year of rough diamond (Antwerp Facets, 2009).

The Government revised the royalty rate for uranium, which would be levied based on its value, to 2% of the compensation amount paid to the Uranium Corp. of India Ltd. Because uranium was a strategic mineral, mining operations in this sector were restricted to the public sector undertakings only. The royalties on all minerals are paid to the respective State government by the holder of a mining lease for any minerals removed from the leased area. The new mining royalty structure was expected to introduce a 10% duty (based on the value of the commodity) for many minerals, including iron ore (Government of India, 2009).

The Ministry of Environment and Forests issued a notification classifying all types of ferrous and nonferrous scrap as hazardous wastes and allowing only actual (end) users to import them without license or restrictions. The materials included metal and metal-alloy wastes, such as aluminum scrap, copper scrap, iron and steel scrap, and nickel scrap, among others

(Metal Bulletin, 2009e). The Ministry subsequently lifted the ban forbidding the importation of scrap.

In the State of Orissa, the government asked the owners of 69 illegally operated mines, including 41 located in the Sundargarh District, to stop operations for allegedly violating stipulated mining rules; the other mines were located in the Joda District. The government also suspended 482 licenses of mine operators who undertook mining outside of their leased mines (Press Trust of India, The, 2009).

In the State of Goa, the government planned to close all mines located within 1 kilometer (km) of wildlife sanctuaries in the State. Companies that extracted iron ore from barred forested areas or at closed pits and whose licenses had expired would also be closed. These mines accounted for nearly 18% of Goa's iron ore exports of 46 million metric tons (Mt), which represented 40% of the country's total iron ore exports. These mines also caused the discrepancies between figures given for the royalty earned by the State and the tonnage of iron ore exported from the State. The royalty rate for iron ore fines was \$0.17 per metric ton and that for lumpy ore having iron content of between 58% and 62% was \$0.24 per metric ton (Economic Times, The, 2009b).

Production

The country produced 86 minerals, including 46 industrial minerals, 23 minor minerals, 10 metallic minerals, 4 mineral fuels, and 3 nuclear minerals. Production from opencast mines accounted for 80% of the total mine output. The number of underground operations was in decline. Capacity utilization in general was up. In 2009, production of such mineral commodities as cobalt, some ferroalloys, ilmenite, iron ore, and zircon increased by more than 10% whereas output of bauxite and wollastonite decreased by more than 10%. The increased production of iron ore was the result of a new mine being put into operation. Demand for ferromanganese and ferrosilicon was strong owing to expansion of steelmaking capacity. Expansion of mineral sands operations increased the production of ilmenite. Bauxite production was disrupted by a rebel attack at National Aluminium Co. Ltd.'s (Nalco) bauxite mine (table 1).

Structure of the Mineral Industry

India's mineral industry was characterized by a large number of small operating mines. Small mines in the private sector continued to be operated either as proprietary or partnership ventures. Public sector undertakings under the Ministry of Mines were Bharat Gold Mines Ltd., which had been closed in 2001, Hindustan Copper Ltd., Mineral Exploration Corp. Ltd., and Nalco. Two others had been disinvested and management control transferred to strategic partners. The public sector companies accounted for 72% of the total value of mineral production. Total employment in the mineral industry was estimated to be more than 500,000, of which the public sector

accounted for 82% and the private sector accounted for 18% (table 2).

Mineral Trade

The total value of exports of ores and minerals in 2009 was about \$23.5 billion. Diamond (mostly cut) was the principal item of export, accounting for 66.2%; iron ore, 20%; granite, 4.4%; and alumina, 1.5%. The total value of imports of ores and minerals was about \$111 billion. Crude petroleum was the main component of imports, accounting for 67.5%; diamond (uncut), 14.6%; coal, 8.1%; copper ore and concentrate, 3.5%; and natural gas, 2.5%. The country continued to be largely self-sufficient in such mineral commodities as bauxite, chromite, refined copper, ferroalloys (ferrochrome, ferromanganese, and ferrosilicon), iron ore, ilmenite, manganese ore, and rutile among metals; barite, dolomite, feldspar, limestone, sillimanite, silica minerals, and talc among industrial minerals; and coal and lignite among mineral fuels (Ministry of Mines, 2010, p. 149-151, 156).

Commodity Review

Metals

Bauxite and Alumina.—In 2009, Maoist rebels attacked one of Nalco's bauxite mines in the State of Orissa, and the mine was temporarily shut down. The open pit mine had bauxite reserves of more than 310 Mt. The company had a total production capacity of 4.8 million metric tons per year (Mt/yr). The rebels indicated that they were fighting for the rights of poor farmers and landless laborers (Mineweb.com, 2009).

Outotec OYJ of Finland and Hindustan Dorr-Oliver Ltd. (HDO) signed a contract with Anrak Aluminium Ltd. to provide service to Anrak's alumina refinery in the State of Andhra Pradesh. Outotec was responsible for the delivery of the technology package and HDO would oversee the detailed engineering, procurement, installation, and commissioning work. The refinery was designed to produce 1.5 Mt/yr of alumina, and the project was expected to take 10 months to complete (Outotec OYJ, 2009).

FLSmidth Minerals received orders worth \$41 million from Utkal Alumina International Ltd. for a bauxite grinding and washing plant to be completed in 2011. The contracts for deep cone technology included design, engineering, supply, installation, and commissioning. The bauxite grinding package included three 300-metric-ton-per-hour rod mills, storage silos, handling equipment, and pumps. The bauxite washing package included nine settler/washer tanks in the washing circuit along with flocculant dosing systems, holding tanks, pumps and valves, and piping (FLSmidth Minerals, 2009).

Nalco put on hold the commissioning of an expanded alumina refinery at Damanjodi in the State of Orissa to 2.1-Mt/yr capacity from 1.6 Mt/yr owing to local problems. Security was tightened at its bauxite mine in July 2009 after suspected Maoist rebels threatened to attack the site in April. The company had initially expected to start bauxite production in May (Thomson Reuters, 2009).

Iron and Steel.—Jindal Steel & Power Ltd. planned to develop a coal gasification-based Midrex® direct-reduced iron (DRI) plant in the Angul District in the State of Orissa. The plant would have a production capacity of 1.8 Mt/yr and would use domestically available iron ore and coal. It would use syngas that was generated in the gasifier to produce DRI that would be melted in an electric arc furnace. The DRI would be used in meltshop applications for Jindal (Recycling Today, 2009).

Visa Steel Co. Ltd. continued to ramp up production of coke, DRI, and pig iron ahead of the commissioning of a 500,000-metric-ton-per-year (t/yr) alloy and stainless steel plant in 2010. DRI output would increase to between 150,000 t and 200,000 t in 2009 towards a capacity of 300,000 t/yr from 30,000 t in 2008. Pig iron output would increase to 180,000 t in 2009 towards a capacity of 225,000 t/yr from 85,000 t in 2008. Coke output would increase to 360,000 t in 2009 towards a capacity of 400,000 t/yr from 340,000 t in 2008 (Metal Bulletin, 2009a).

Neco Group planned to build a second 1-Mt/yr steel plant at Raigarh in the State of Chhattisgarh with a 300,000-t/yr steelmaking unit and a 35-megawatt (MW) captive powerplant in the initial stage. The company's existing steel plant had a 750,000-t/yr blast furnace, two sinter plants with a combined capacity of 600,000 t/yr, two DRI kilns with a combined capacity of 255,000 t/yr, a 55-MW powerplant, and a 100,000-t/yr nonrecovery coke oven that was being expanded to 300,000 t/yr (Metal Bulletin, 2009b).

Bhusan Steel Ltd. commissioned a Conarc® furnace in November at its integrated steel complex in the State of Orissa. The company planned to construct a blast furnace and a hot-strip mill in phase 2 to produce 2.5 Mt/yr of hot-rolled products. The steelmaking equipment would be supplied by SMS Siemag of Germany (Steelguru.com, 2009).

Tata Steel Ltd. inaugurated the upgraded C blast furnace using GIMBAL technology at its Jamshedpur steel works in the State of Jharkhand. The technology was sourced from Siemens VAI Metals Technologies of Austria and provided total flexibility in material distribution, which enabled the operator to achieve significant cost savings and benefit from improvements in the blast furnace's operation and maintenance. The capacity of the C blast furnace was increased to 700,000 t/yr from 400,000 t/yr (Machinist, 2009).

Tata Steel decided to merge with its wholly owned subsidiary Hooghly Metcoke Ltd. The merger was to be effective beginning on April 1, 2009, subject to the company obtaining the necessary approvals. Tata Steel used coke manufactured by Hooghly Metcoke in the process for converting iron ore to steel in its blast furnaces. The merger was intended to help reduce administrative costs, streamline control, and eliminate procedural bottlenecks (Economic Times, The, 2009d).

Tata Steel planned to start the construction of its \$4.5 billion 6-Mt/yr Kalinga Nagar integrated greenfield steel plant in the Jajpur District in the State of Orissa in August 2009 and to commission the plant in 2010. The investment included the displacement of about 1,200 families. The issues pertaining to land acquisition and allotment of iron ore mines for the plant were resolved in April. The company placed orders for

construction equipment worth \$1.3 billion for the plant and started offsite steel fabrication for hot-strip mills in the area (Business Standard, 2009b).

JSW Steel planned to expand its 7.8-Mt/yr Vijayanagar steel plant in the State of Karnataka to 10 Mt/yr by March 2011. This expansion at Bellary-Hospet included a second 2.8-Mt/yr blast furnace, two single-strand conventional slab casters, and an additional 1.5-Mt/yr of capacity at the hot-strip mill. The company also commissioned the No. 3 blast furnace at its Toranagallu steel works, which had been equipped and installed by Siemens. The furnace had a production capacity of 2.8 Mt/yr, which was the largest in India (Metal Bulletin, 2009a).

Steel Authority of India Ltd.'s (SAIL's) Rourkela steel plant in the State of Orissa planned to expand its plate mill production capacity to 1.8 Mt/yr from the proposed 1.02 Mt/yr. The proposed mill would produce 4.3-meter (m)-wide plate. The plate project was part of an expansion and modernization program that included raising the Rourkela plant's crude steel production capacity to 4.5 Mt/yr from 2 Mt/yr. Equipment orders for the steel expansion project pushed total expansion costs to \$2.4 billion (Metal Bulletin, 2009d).

Welspun Power & Steel Co. Ltd. planned to set up a 1.5-Mt/yr integrated slab plant at Salav in the State of Maharashtra to feed its 1.5-Mt/yr plate mill in the State of Gujarat. The new \$1.25 billion steel plant would use an electric arc furnace to produce slab in 2012. The company bought slab from JSW Steel and overseas suppliers to feed its plate mill (Metal Bulletin, 2009c).

Essar Steel Co. Ltd. agreed to acquire Shree Precoated Steel Ltd. to become India's leading cold-rolled and color-coated steel producer. Shree Precoated Steel's assets included a 400,000-t/yr color coating line, a 600,000-t/yr cold-rolling mill, a 500,000-t/yr galvanizing line, and a 650,000-t/yr hot-rolled pickling line (Metal Bulletin, 2009b).

Rashtriya Ispat Nigam Ltd. (RINL) entered into a joint-venture agreement with Manganese Ore India Ltd. (MOIL) to form RINMOIL Ferro-Alloys Pvt. Ltd. to produce ferroalloys in the Vizianagaram District in the State of Andhra Pradesh. RINL implemented a project to increase the steelmaking capacity to 6.3 Mt/yr, which would require 70,000 t/yr of silicomanganese, 15,000 t/yr of ferrosilicon, and 2,000 t/yr of ferromanganese. The joint-venture company would install and commission the furnaces to produce ferroalloys (Economic Times, The, 2009c).

Iron Ore.—SAIL discovered an iron ore deposit in the Bhilwara District in the State of Rajasthan. The company was conducting a feasibility study to extract iron ore from the deposit (Times of India, The, 2009). JSW Steel Co. Ltd. of India received a mining lease and started mining iron ore at the 100-Mt Hadimpada deposit in the State of Karnataka. The deposit had a grade of 63% to 64% iron. The company was acquiring another mining lease for the 100-Mt Donimalai iron ore deposit, also located in Karnataka, and mining might start a year or two later. JSW Steel had one iron-ore beneficiation plant with a capacity of 3 Mt/yr and planned to finish construction of a 4-Mt/yr beneficiation plant close to its Vijayanagar steel plant in 2010 (Metal Bulletin, 2009a).

Titanium.—Ashapura Minechem Ltd. planned to establish a titanium dioxide (TiO₂) pigment plant in the Puri District in the State of Orissa. The plant would source its feedstock

from local operations and provide TiO₂ pigment for domestic and international paint markets. Indian Rare Earths Ltd. mined 250,000 t/yr of ilmenite (50% to 51% TiO₂) from its Orissa sands complex. The operation was expected to expand to 500,000 t/yr. Trimex Industries Ltd. began mining of 200,000 t/yr of ilmenite from the State of Andhra Pradesh (Industrial Minerals, 2009b).

Industrial Minerals

Cement.—Jaiprakash Associates Ltd. started operations at a new \$324 million 2.4-Mt/yr cement plant in the State of Gujarat, adding to its current (2009) capacity of 14.7 Mt/yr. The company was in the process of expanding production capacity to 22.8 Mt/yr by March 2010 (Forbes.com, 2009). Jaypee Group, which was a subsidiary of Jaiprakash Associates, would increase its production capacity of cement to 23 Mt/yr from 13.5 Mt/yr in 2010 and to 35 Mt/yr in 2011 with an investment of \$594 million. Shree Cement Ltd. planned to invest \$239 million in 2009 to expand its capacity to 11.5 Mt/yr from the existing 9 Mt/yr (Global Cement, 2009).

Commercial production began at JK Lakshmi Cement Ltd.'s new 600,000-t/yr cement plant at Motibhoyan in the State of Gujarat. The \$22 million plant and the company's Sirohi plant in the State of Rajasthan would bring the total capacity to 2 Mt/yr. Another 2.7-Mt/yr greenfield plant at Durg in the State of Chhattisgarh would be completed in 2011. The company also operated 11 ready-mix concrete plants in India (World Cement, 2009a).

Chettinad Cement Co. Ltd. in the State of Tamil Nadu planned to expand the production capacity of its brownfield Karikkali cement plant by 4,000 metric tons per day (t/d). The construction contract was with FLSmidth A/S of Denmark, which had supplied a 4,000-t/d line to Chettinad Cement's Ariyalur Line-1 project in 2006 and a second line to its Ariyalur-2 project in 2007 (FLSmidth A/S, 2009).

JSW Cement Co. Ltd. planned to build a \$410 million cement plant with a production capacity of 5 Mt/yr by 2011 in either the State of Andhra Pradesh or the State of Karnataka. The company had steel plants and a captive cement plant in Karnataka, and would use slag and fly ash for cement manufacturing and acquire power from various powerplants in both States. The company also planned to set up a grinding unit at Vijaynagar and to commission a 300-MW powerplant at Jaigarh in the State of Maharashtra (World Cement, 2009b).

Grasim Industries Ltd. decided to merge its cement operations with those of its subsidiary UltraTech Cement Ltd., which would make it a leading cement producer in India with a combined capacity of about 50 Mt/yr. Grasim Industries had a capacity of 26.3 Mt/yr in 2009 and UltraTech Cement had a capacity of 23.1 Mt/yr. The merged company would have a cement market share of 20% in India and a combined captive power generating capacity of 500 MW. The merger would be completed in mid-2010. The merged company planned to acquire additional capacity of 25 Mt/yr to reach 75 Mt/yr in the next 5 years with an investment of \$3 billion. Grasim Industries also commissioned its 3.3-Mt/yr clinker facility in the State of Andhra Pradesh (Building Bulletin, 2009).

Shree Cement commissioned a 1-Mt/yr clinker unit at Bangur in the State of Rajasthan in a record time of 367 days against the industry standard of 630 days. The company was ranked among the top cement producers in India and was considered one of the most energy efficient and environmentally friendly. It planned to set up a 43-MW green power project based on waste heat recovery from a cement plant (World Cement, 2009c).

SAIL planned to set up two greenfield slag-based cement plants with a total capacity of 3 Mt/yr through joint ventures, which would be decided by a bidding process. The cement plant at Rourkela in the State of Orissa would have a capacity of 2 Mt/yr and the one at Burnpur in the State of West Bengal would have a capacity of 1 Mt/yr. SAIL was building two cement plants at Bhilai in the State of Chhattisgarh (2.2 Mt/yr) and Bokaro in the State of Jharkhand (2 Mt/yr) through a joint venture with Jaiprakash Associates; the plants were expected to begin cement production in mid-2010 and July 2011, respectively (Business Standard, 2009a).

Clay and Shale.—Laviosa Chimica Mineraria SpA of Italy (55%) and Trimex Industries (45%) formed a joint-venture company, Laviosa Trimex Industries Pvt. Ltd., to mine and process bentonite at Buhj in the State of Gujarat. The plant would have a production capacity of 70,000 t/yr of bentonite and 120,000 t/yr of dried granular products. Industrial applications included cat litter, iron pelletization, and oilfield drilling media. The plant was expected to begin production in 2010, and its output would be exported to Asia, Europe, and the Middle East (Industrial Minerals, 2009d).

20 Microns Ltd. planned to invest \$20 million in new acquisitions of attapulgite, bentonite, and other clay mines in the State of Gujarat during the next 3 to 4 years. The company produced barite, iron oxide, mica, and silica. It operated four mines and eight processing plants across India. Its new 40,000-t/yr kaolin plant was under construction in 2009 (Industrial Minerals, 2009a).

Diamond.—Rio Tinto plc of the United Kingdom discovered a large diamond resource in the State of Madhya Pradesh. A scoping study identified an inferred resource of 37 Mt at an estimated grade of 0.7 carat per metric ton. Rio Tinto spent most of about \$60 million on its Bunder diamond project in the State and applied for a mining lease of 10 square kilometers (km²) for the project (Antwerp World Diamond Center, 2009).

Indian diamond processors sought \$4 billion from the Government amid a slump in jewelry exports that forced companies to lay off workers. About 50% of the labor force was laid off owing to the global financial crisis. Jewelry exports accounted for 20% of the total exports. Diamond exporters wanted a 2-year tax holiday on earnings. Purchases of rough diamond also were halved. The diamond processing center of Surat imported rough diamond from African nations, Australia, and Russia, and exported more than 90% of this diamond (Bloomberg.com, 2009).

NMDC planned to restart mining operations at the Panna diamond mine in the State of Madhya Pradesh in August 2009. Because it was unable to obtain environmental clearance and an approval from the adjoining wildlife sanctuary, the mine had been shut down in 2005 (Economic Times, The, 2009a).

Magnesite.—Dalmia Magnesite Corp. completed trials for making magnesia spinel bricks in the company's cement plants. The company produced refractory products, which included 50,000 t/yr of monolithic and 10,000 t/yr of bricks. It had a production capacity of 72,000 t/yr of dead-burned magnesite (Industrial Minerals, 2009c).

Wollastonite.—Wolkem India Ltd. had the rights to mine the Belkappahar wollastonite deposit in the Sirohi District of the State of Rajasthan in addition to the adjacent Kheratarla wollastonite and calcite mine. The Belkappahar ore contained 96% wollastonite and associated minor calcite, diopside, garnet, and quartz. The proven reserves were estimated to be 50 Mt. Production of 170,000 t/yr of wollastonite made the company the leading producer in India (Industrial Minerals, 2009e).

Mineral Fuels

Coal.—India has plentiful reserves of anthracite and bituminous coal, which the country used domestically for power generation and exported abroad. The country had the fourth largest proven coal reserves in the world. The Energy & Resources Institute reported that India was likely to run out of usable coal reserves in about 45 years. Coal was estimated to provide about 60% of India's total energy requirements. According to the Energy & Resources Institute, the country's coal imports could be reduced to 200 Mt/yr by 2030 if the Government were to launch initiatives on renewable energy. In addition, solar energy could replace the consumption of petroleum products. On the other hand, production of coal would need to be doubled to 1,000 Mt/yr to feed new and existing powerplants whose capacities are expected to be doubled to 157,400 MW by the end of 2012. Much of the increased coal production was expected to come from Coal India Ltd., which planned to increase output to 520 Mt/yr in 2012 (Energy & Resources Institute, 2009).

The Government offered 10 blocks in different coalfields for the exploration and production of coal-bed methane. The blocks, which cover an area of 5,000 km², were located in the States of Assam, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, and Tamil Nadu. The Government invited foreign and Indian companies to bid for the blocks through a competitive bidding system. A total of 26 blocks covering an area of 13,600 km² had been awarded under three previous bidding rounds, and 3 of these blocks had entered into the development phase (Mondaq.com, 2009).

Natural Gas.—Jubilant Energy encountered hydrocarbon-bearing sands in its 4,000-m-deep Kathalchari exploration well located in the Assam Arakkan Basin Block in the State of Tripura. The block was located close to the producing Baramura gasfield and was within 60 km of several producing gasfields in Bangladesh. Two exploration wells were drilled under the phase 1 work program and two additional wells would be drilled during the phase 2 program (Alexander's Gas & Oil Connections, 2009).

Oil and Natural Gas Corp. (ONGC)'s C-series gasfields located offshore Mumbai were ready to come onstream in 2009. Production from 22 wells would ramp up production from 800,000 cubic meters per day to 3,000,000 cubic meters per day

within 1 year (Petroleum Economist, 2009a). Reliance Energy Ltd. expected to bring its Dhirubhai-1 and Dhirubhai-3 fields onstream in mid-2009. These fields are located in the D6 Block offshore and would be developed with 17 wells and produce 79 million cubic meters per day of gas. Reliance Energy (the operator) owned a 90% interest in the fields and its partner Niko Resources Ltd. owned the remaining 10% interest (Offshore Engineer, 2009).

Great Eastern Energy Corp. Ltd. completed the laying and testing of a 53.46-km gas pipeline from Asansol to Durgapur in the State of West Bengal. The total pipeline network of 77.62 km included 11.8 km of pipeline that connected the gas-gathering station to the central gathering station (Asansol) and 12.36 km of pipeline that connected Asansol to Kulti. The pipeline system was capable of transporting 990,000 cubic meters per day of gas (Great Eastern Energy Corp. Ltd., 2009).

Essar Exploration and Production India Ltd. planned to begin coalbed methane production at the Ranigunj East Block in the State of West Bengal in December 2009 and spent \$20 million on the program. Initial production was estimated to be 0.05 to 0.1 million cubic meters per day of methane gas from 15 wells; this amount would be increased to 2.5 to 3 million cubic meters per day from 700 wells in 6 years at a cost of \$400 million to \$450 million. ONGC was producing 0.35 million cubic meters per day from the Parbatpur Block and Great Eastern Energy 1 million cubic meters per day from the Ranigunj Block (Business Line, The, 2009).

Petroleum.—Cairn Energy plc of the United Kingdom discovered the Mangala field in the Barmer Basin in the State of Rajasthan. A total of 25 discoveries had been made. The total area under long-term contract to Cairn Energy was 3,111 km². The fields were being developed by Cairn Energy, which first produced oil there in 2009, and a production rate of 175,000 barrels per day of oil was expected by 2011. Recoverable reserves were estimated to be about 1 billion barrels of oil. The Mangala processing terminal would act as the hub for processing crude oil from all the fields (Cairn Energy plc, 2009).

In 2009, Reliance Industries Ltd. planned to buy 1.4 million barrels of crude oil from fields being developed by Cairn Energy in the State of Rajasthan. The oil would be shipped to the 1.24-million-barrel-per-day Jamnagar refinery in the State of Gujarat. Cairn Energy would sell the oil to Reliance Industries at a 10% to 15% discount. The deal would make Reliance Industries the first private-sector refiner to process domestic oil. Reliance Industries also would buy back United States-based Chevron Corp.'s 5% stake in the refinery for \$300 million (Petroleum Economist, 2009b).

Reserves and Resources

The country's mineral resources include large deposits of barite, bauxite, chromium, coal, iron ore, limestone, and manganese. Barite deposits occur in the State of Andhra Pradesh. Bauxite resources are found in the States of Andhra Pradesh, Chhattisgarh, Gujarat, and Orissa. Iron ore deposits in the form of hematite and magnetite occur in the States of Bihar, Karnataka, Madhya Pradesh, Orissa, and Tamil Nadu. India's coal resources amounted to 250 billion metric tons (Gt)

and are located in the States of Andhra Pradesh, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, and West Bengal. Its lignite reserves totaled 38 Gt and are found in the States of Gujarat, Jammu and Kashmir, Kerala, Rajasthan, and Tamil Nadu (table 3).

Outlook

Production of alumina is expected to increase slightly owing to Anrak's new alumina refinery that is under construction and Nalco's alumina refinery that is being expanded. The mining activities for iron ore are expected to intensify as JSW Steel starts mining iron ore from two deposits. Many steel producers are expected to plan greenfield steel plants and power projects in the future; however, they face the uncertainties of iron ore and coal supplies, excessive delay in land acquisition, and local protests. Cement output is expected to increase substantially with capacity expansions and the construction of new plants by several cement companies in the next 2 to 3 years. Production of coal is expected to be doubled to feed new and existing powerplants whose capacities are expected to be doubled by the end of 2012. Several gasfields operated by ONGC and Reliance Energy are expected to come onstream and will increase the total production capacity of natural gas in the country.

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TABLE 1
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2005	2006	2007	2008	2009	
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	12,385 ⁴	13,940 ⁴	20,343 ⁴	21,210 ⁴	14,000
Alumina, Al ₂ O ₃ equivalent	do.	2,700	2,800	2,900	3,000	3,100
Metal, primary		942,400 ⁴	1,105,100 ⁴	1,221,800 ⁴	1,307,500 ⁴	1,400,000
Cadmium metal		409 ⁴	457 ⁴	580 ⁴	599 ⁴	610
Chromium, chromite, gross weight		3,255,162 ⁴	3,600,400 ⁴	3,320,000 ⁴	3,900,000 ⁴	3,800,000 ⁴
Cobalt metal		1,220 ⁴	1,184 ⁴	980 ⁴	858 ⁴	1,001 ⁴
Copper:						
Mine output, Cu content		26,900 ⁴	27,400 ⁴	33,900 ⁴	30,600 ⁴	31,000
Metal, primary:						
Smelter		486,600 ⁴	610,000 ⁴	500,400 ⁴	643,800 ⁴	630,000
Refinery:						
Electrolytic, cathode		477,000 ⁴	614,000 ⁴	698,600 ^{r,4}	654,200 ^{r,4}	650,000
Fire refined		20,000	15,000	15,000	15,000	15,000
Total		497,000	629,000	714,000 ^r	669,000 ^r	665,000
Gold metal, smelter	kilograms	3,100 ⁴	2,400 ⁴	3,000 ⁴	2,700 ⁴	2,800
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	152,000 ⁴	177,000 ⁴	207,000 ⁴	220,000 ⁴	245,000 ⁴
Fe content	do.	97,500 ⁴	113,000 ⁴	126,000 ⁴	141,000 ⁴	157,000 ⁴
Metal:						
Pig iron	do.	27,125 ⁴	28,300 ⁴	28,800 ⁴	29,000 ⁴	29,500
Direct-reduced iron	do.	12,040 ⁴	14,740 ⁴	18,100 ⁴	20,200 ⁴	21,000
Ferroalloys:						
Ferrochromium, including charge chrome		611,373 ⁴	634,200 ⁴	820,000 ⁴	750,000 ⁴	873,385 ⁴
Ferrosilicon		10,000	10,000	10,000	10,000	10,000
Ferromanganese		192,900 ⁴	230,000 ^r	280,000 ^r	330,000 ^r	388,243 ⁴
Ferrosilicon		56,000	68,000 ^r	80,000 ^r	92,000 ^r	101,337 ⁴
Silicomanganese		69,224 ⁴	65,000 ^r	60,000 ^r	56,000 ^r	52,465 ⁴
Other		9,000	9,000	9,000	9,000	9,000
Steel, crude	thousand metric tons	45,800 ⁴	49,500 ⁴	53,100 ⁴	55,200 ⁴	56,600 ⁴
Semimanufactures ⁵	do.	42,947 ⁴	45,000	47,000	49,000	50,000
Lead:						
Mine output, Pb content		60,400 ⁴	69,200 ⁴	77,500 ⁴	87,300 ⁴	92,000
Metal, refined:						
Primary		56,000 ⁴	49,600 ⁴	53,800 ⁴	62,000 ⁴	65,000
Secondary		35,000 ⁴	55,600 ⁴	70,000 ⁴	76,000 ⁴	78,000
Total		91,000 ⁴	105,200 ⁴	123,800 ⁴	138,000 ⁴	143,000
Manganese:						
Ore and concentrate, gross weight	thousand metric tons	2,386 ⁴	2,084 ⁴	2,300	2,400	2,500
Mn content	do.	927 ⁴	844 ⁴	900	960	980
Rare-earth metals, monazite concentrate, gross weight		5,000	5,000	5,000	5,000	5,000
Selenium	kilograms	13,000	13,000	14,000	14,000	15,000
Silver, mine and smelter output	do.	31,500 ⁴	30,900 ⁴	82,300 ⁴	96,000 ⁴	95,000
Titanium mineral concentrates, gross weight:						
Ilmenite		686,000	690,000	700,000	610,000 ^r	700,000
Rutile		20,100	21,000	21,000	21,000	21,000
Zinc:						
Mine output, concentrate:						
Gross weight		447,100 ⁴	501,700 ⁴	538,900 ⁴	613,600 ⁴	630,000
Zn content		262,000	294,000	314,000	337,000	365,000

See footnotes at end of table.

TABLE 1—Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2005	2006	2007	2008	2009
METALS—Continued					
Zinc—Continued:					
Metal:					
Primary	266,200 ⁴	420,900 ⁴	430,800 ⁴	545,800 ⁴	560,000
Secondary	23,000	23,000	23,000	22,000	22,000
Total	289,000	444,000	454,000	568,000	582,000
Zirconium concentrate, zircon, gross weight	26,700	28,000	29,000	30,000	37,000
INDUSTRIAL MINERALS					
Abrasives, natural, n.e.s.: ⁶					
Corundum, natural kilograms	1,100	1,000	1,000	1,000	1,000
Garnet	120,000	115,000	120,000	125,000	127,000
Jasper	8,700	8,800	9,000	8,900	8,700
Asbestos	19,000	20,000	21,000	20,000	19,000
Barite	1,200,000	950,000	1,000,000	1,100,000	1,200,000
Bromine, elemental	1,500	1,500	1,500	1,500	1,500
Cement, hydraulic thousand metric tons	145,000	160,000	170,000	177,000 ^r	180,000
Chalk	120,000	120,000	125,000	125,000	125,000
Clays:					
Ball clay	420,000	420,000	430,000	430,000	440,000
Diaspore	11,000	10,000	10,000	10,000	10,000
Fire clay	370,000	375,000	380,000	390,000	395,000
Kaolin:					
Salable crude thousand metric tons	560	560	570	570	580
Processed do.	190	200	200	210	210
Total do.	750	760	770	780	790
Other do.	80	80	85	85	85
Diamond:					
Gem thousand carats	16	15	15	15	14
Industrial do.	42	40	40	38	38
Total do.	58	55	55	53	52
Feldspar	414,637 ⁴	386,685 ⁴	397,328 ⁴	400,000	410,000
Fluorspar:					
Concentrates, metallurgical-grade	6,500	5,800	5,000	5,500	5,600
Other fluorspar materials, graded	4,400	500	1,000	1,500	1,600
Gemstones, excluding diamond:					
Agate, including chalcedony pebble	180	180	170	160	160
Garnet kilograms	850	800	800	800	800
Graphite ⁷	130,000	120,000	130,000	140,000	130,000
Gypsum	2,400,000	2,450,000	2,500,000	2,550,000	2,600,000
Kyanite and related materials:					
Kyanite	6,800	7,000	7,300	7,500	7,700
Sillimanite	15,000	15,000	15,200	16,000	16,500
Lime	920,000	910,000	900,000	910,000	920,000
Magnesite	380,000	370,000	360,000	350,000	340,000
Mica:					
Crude	1,600	1,700	1,700	1,700	1,800
Scrap and waste	2,100	2,200	2,200	2,300	2,300
Total	3,700	3,900	3,900	4,000	4,100
Nitrogen, N content of ammonia thousand metric tons	10,800	10,900	11,000	11,100	11,200
Phosphate rock, including apatite	1,200,000	1,200,000	1,210,000	1,220,000	1,230,000
Pigments, mineral, natural, ocher	360,000	370,000	375,000	380,000	385,000
Pyrites, gross weight	130,000	125,000	120,000	120,000	115,000

See footnotes at end of table.

TABLE 1—Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2005	2006	2007	2008	2009	
INDUSTRIAL MINERALS—Continued						
Salt:						
Rock salt	thousand metric tons	3	3	3	3	3
Other	do.	15,500	15,500	16,000	16,000	16,500
Total	do.	15,500	15,500	16,000	16,000	16,500
Sand:						
Calcareous	do.	260	265	270	275	280
Silica	do.	1,600	1,600	1,600	1,700	1,700
Other	do.	3,100	3,200	3,100	3,200	3,300
Slate		12,000	12,500	13,000	13,500	14,000
Soda ash		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Stone, sand and gravel:						
Calcite		53,000	54,000	54,000	55,000	55,000
Dolomite	thousand metric tons	3,000	3,000	3,100	3,100	3,100
Limestone	do.	120,000	123,000	125,000	127,000	130,000
Quartz and quartzite	do.	270	270	280	280	280
Sulfur, byproduct from fertilizer plants		13,000	14,000	15,000	14,000	15,000
Talc and related materials:						
Pyrophyllite		85,000	86,000	87,000	87,000	88,000
Steatite, soapstone		545,000	560,000	555,000	560,000	550,000
Vermiculite		4,500	4,600	4,700	4,800	4,900
Wollastonite		120,000	125,000	120,000	125,000	110,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	333,000	350,000	380,000	420,000	450,000
Lignite	do.	27,000	26,000	25,000	26,000	25,000
Total	do.	360,000	376,000	405,000	446,000	475,000
Gas, natural:						
Gross	million cubic meters	29,000	30,000	32,407 ⁴	33,061 ⁴	35,000
Marketable	do.	27,000	28,000	27,069 ⁴	27,457 ⁴	30,000
Petroleum:						
Crude	thousand 42-gallon barrels	248,000	250,000	254,000 ⁴	253,000 ⁴	255,000
Refinery products:						
Liquefied petroleum gas	do.	45,000	45,000	49,000 ⁴	53,000 ⁴	55,000
Gasoline	do.	75,000	85,000	101,000 ⁴	119,000 ⁴	125,000
Kerosene and jet fuel	do.	115,000	120,000	127,000 ⁴	122,000 ⁴	120,000
Distillate fuel oil	do.	380,000	400,000	432,000 ⁴	468,000 ⁴	480,000
Residual fuel oil	do.	85,000	100,000	117,000 ⁴	130,000 ⁴	140,000
Other	do.	335,000	340,000	330,000 ⁴	319,000 ⁴	315,000
Total	do.	1,040,000	1,090,000	1,156,000 ⁴	1,211,000 ⁴	1,240,000

¹Revised. do. Ditto.

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

³Table includes data available through October 13, 2010.

⁴In addition to commodities listed, other gemstones (aquamarine, emerald, ruby, and spinel) and uranium are produced, but output is not reported, and available information is inadequate to make reliable estimates of output.

⁵Reported figure.

⁶Excludes production from steel miniplants.

⁷Not elsewhere specified.

⁸India's marketable production is 10% to 20% of mine production.

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
Alumina	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	Belgaum refinery, Karnataka	280
Do.	National Aluminium Co. Ltd. (Government, 100%)	Dhamanjodi refinery, Orissa	1,580
Do.	Bharat Aluminium Co. Ltd. [Government, 49%, and Sterlite Industries (India) Ltd., 51%]	Korba refinery, Chhattisgarh	200
Do.	Utkal Alumina International Ltd. (Hindalco Industries Ltd., 100%)	Koraput refinery, Orissa	1,500 ¹
Do.	Madras Aluminium Co. Ltd. [Sterlite Industries (India) Ltd., 80%, and others, 20%]	Mettur refinery, Tamil Nadu	80
Do.	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	Muri refinery, Jharkhand	88
Do.	Hindalco Industries Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot refinery, Uttar Pradesh	450
Aluminum	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	Alupuram smelter, Kerala	20
Do.	National Aluminium Co. Ltd. (Government, 100%)	Angul smelter, Orissa	345
Do.	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	Belgaum smelter, Karnataka	70
Do.	Hindalco Industries Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Hirakud smelter, Orissa	100
Do.	Bharat Aluminium Co. Ltd. [Government, 49%, and Sterlite Industries (India) Ltd., 51%]	Korba smelters, Chhattisgarh	350
Do.	Madras Aluminium Co. Ltd. [Sterlite Industries (India) Ltd., 80%, and others, 20%]	Mettur smelter, Tamil Nadu	40
Do.	Hindalco Industries Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot smelter, Uttar Pradesh	275
Barite	Andhra Pradesh Mineral Development Corp. Ltd. (Andhra Pradesh State government, 100%)	Cuddapah District mines, Andhra Pradesh	350
Do.	Associated Mineral Corp.	do.	75
Do.	Pragathi Minerals	do.	50
Do.	Shri C.M. Ram nath Reddy	do.	75
Do.	Vijayalaxmi Minerals Trading Co.	do.	50
Bauxite	Bharat Aluminium Co. Ltd. [Government, 49%, and Sterlite Industries (India) Ltd., 51%]	Amarkantak Mine, Madhya Pradesh	200
Do.	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	Kolhapur District mines, Maharashtra	600
Do.	Gujarat Mineral Development Corp. (Gujarat State government, 100%)	Kutch and Saurashtra Mines, Gujarat	500
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Mines in Lohardaga District, Jharkhand	750
Do.	Indian Aluminium Co. Ltd. (Indian interests, 60.4%, and Alcan Aluminium Ltd., 39.6%)	do.	200
Do.	National Aluminium Co. Ltd. (Government, 100%)	Mines in Panchpatmali Hills, Koraput District, Orissa	4,800
Do.	Minerals & Minerals Ltd. (Government, 100%)	Mines in Richuguta, Palamau District, Jharkhand	200
Boron	Borax Morarji Ltd.	Ambernath, Maharashtra	17
Cement	Larsen and Toubro Ltd.	Awarpur Plant, Maharashtra	2,300
Do.	Century Cement (Century Textiles and Industries Ltd., which is a subsidiary of the Birla Group, 100%)	Baikunth Plant, Madhya Pradesh	1,120
Do.	Ambuja Cements Ltd. (Holcim Group, 14.8%)	Plants in 7 States	14,000

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c	
Cement—Continued	Coromandel Fertilizers Ltd. [Chevron Chemical Co. (United States), 23.55%; International Minerals and Chemical Co., 20.89%; Parry and Co., 10.64%; E.I.D. Parry (India) Ltd., 6.65%; others, 38.27%]	Chilamkur Plant, Andhra Pradesh	1,000	
Do.	The Associated Cement Cos. Ltd. (Government, 34.86%, and private shareholders, 65.14%)	Gagal Plant, Himachal Pradesh	1,830	
Do.	Raymond Cement Works (a division of Raymond Woolen Mills Ltd., JK Singhania, principal shareholder)	Gopalnagar Plant, West Bengal	1,250	
Do.	Narmada Cement Co. Ltd. (Chowgule and Co. Ltd., 34%; Gujarat State government, 17.33%; others, 48.67%)	Jafrabad Plant, Gujarat	1,000	
Do.	Rajashree Cement (a division of Indian Rayon and Industries Ltd., 100%)	Khor Plant, Karnataka	1,020	
Do.	The Associated Cement Cos. Ltd. (Government, 34.86%, and private shareholders, 65.14%)	Kymore Plant, Madhya Pradesh	1,500	
Do.	Mangalam Cement Ltd.	Morak Plant, Rajasthan	1,000	
Do.	Mysore Cements Ltd. (Government institutions and banks, 41.13%; Corporate Trust Holdings, 21.70%; others, 37.17%)	Narasingarh Plant, Haryana	1,090	
Do.	Cement Corp. of India Ltd. (Government, 100%)	Nayagaon Plant, Madhya Pradesh	1,330	
Do.	JK Cement Works (which is a division of JK Synthetics Ltd.), 100%	Nimbahera Plant, Rajasthan	1,460	
Do.	OCL India Ltd.	Orissa	1,850	
Do.	The India Cement Co. Ltd. (Government, 26%; Life Insurance Corp. of India, 24%; others, 50%)	Sankarnagar Plant, Tamil Nadu	1,000	
Do.	Maihar Cement (Century Textiles and Industries Ltd., which is a subsidiary of the Birla Group, 100%)	Satna Plant, Madhya Pradesh	1,800	
Do.	Jaiprakash Associates Ltd.	Sewagram, Gujarat	2,400	
Do.	Shree Digvijay Cement Co. Ltd.	Shreeniwas Plant, Maharashtra	1,070	
Do.	Lakshmi Cement (a division of Straw Products Ltd., JK Singhania, principal shareholder)	Sirohi Plant, Rajasthan	1,400	
Do.	Lafarge S.A.	Sonadih, Chhattisgarh	1,400	
Do.	Manikgarh Cement (Century Textiles and Industries Ltd., which is a subsidiary of the Birla Group, 100%)	Tehsil Rajura Plant, Maharashtra	1,000	
Do.	Vasavadatta Cement (Kesoram Industries Ltd., 100%)	Vasavadatta Plant, Karnataka	1,000	
Do.	Vikram Cement (Grasim Industries Ltd., which is a subsidiary of the Birla Group, 100%)	Vikram Plant, Madhya Pradesh	1,000	
Do.	Raasi Cement Ltd. (Andhra Pradesh State government, 50%, and Development Co. Ltd., 50%)	Vishnupuram Plant, Andhra Pradesh	1,000	
Do.	The Associated Cement Cos. Ltd. (Government, 34.86%, and private shareholders, 65.14%)	Wadi Plant, Karnataka	2,180	
Chromium	Ferro Alloys Corp. Ltd.	Cuttack District, Orissa	120	
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	300	
Do.	Tata Steel	do.	100	
Do.	Ferro Alloys Corp. Ltd.	Dhenkanal District, Orissa	75	
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	200	
Do.	Mysore Minerals Ltd.	Hassan District, Karnataka	125	
Do.	Ferro Alloys Corp. Ltd.	Kendujhar District, Orissa	75	
Do.	Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	100	
Do.	Ferro Alloys Corp. Ltd.	Khammam District, Andhra Pradesh	100	
Coal, bituminous	million metric tons	Bharat Coking Coal Ltd. (a subsidiary of Government-owned Coal India Ltd., 100%)	Bihar and West Bengal	26
Do.	do.	Central Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Bihar	27
Do.	do.	Eastern Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Bihar and West Bengal	21

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Coal, bituminous— Continued	million metric tons	Mahanadi Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Orissa	21
Do.	do.	North Eastern Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Assam	640
Do.	do.	Northern Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Madhya Pradesh and Uttar Pradesh	24
Do.	do.	Singareni Collieries Co. Ltd. (Andhra Pradesh State government, 50%, and Government, 50%)	Andhra Pradesh	18
Do.	do.	South Eastern Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Madhya Pradesh	36
Do.	do.	Western Coalfields Ltd. (a subsidiary of Government-owned Coal India Ltd.), 100%	Madhya Pradesh and Maharashtra	18
Coal, lignite	do.	Neyveli Lignite Corp. Ltd. (NLC) (Government, 100%)	Tamil Nadu	17
Copper, mine		Hindustan Copper Ltd. (HCL) (Government, 100%)	Indian Copper Complex Mines, Ghatsila District, Jharkhand	31
Do.		do.	Khetri Copper Complex Mines, Khetrinagar Rajasthan	15
Do.		do.	Malanjhand Copper Complex Mines, Balaghar District, Madhya Pradesh	22
Copper, metal		Hindalco Industries Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Birla Copper Complex smelter, Dahej, Gujarat	70
Do.		Hindustan Copper Ltd. (HCL) (Government, 100%)	Indian Copper Complex smelter-refinery, Ghatsila District, Jharkhand	20
Do.		do.	Khetri Copper Complex smelter-refinery, Khetrinagar District, Rajasthan	45
Do.		Sterlite Industries (India) Ltd.	Tuticorin Smelter, Tamil Nadu	400
Do.		do.	Silvassa Refinery, Gujarat	300
Diamond	carats	Government, 100%	Mahjgawan Mine	25,000
Gold	kilograms	Hutti Gold Mines Co.	Hutti Mine, Karnataka	3,000
Iron and steel, crude steel		Visvesvaraya Iron and Steel Ltd. (Karnataka State government, 60%, and Government-owned Steel Authority of India Ltd., 40%)	Bhadravati steel plant, Karnataka	180
Do.		Steel Authority of India Ltd. (Government, 100%)	Bhilai steel plant, Jharkhand	4,930
Do.		do.	Bokaro steel plant, Jharkhand	4,600
Do.		Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Government-owned Steel Authority of India Ltd.), 100%	Burnpur steel plant, West Bengal	1,500
Do.		Ispat Industries Ltd.	Dolvi, Maharashtra	3,000
Do.		Steel Authority of India Ltd. (Government, 100%)	Durgapur steel plant, West Bengal	1,600
Do.		Tata Steel	Jamshedpur steel plant, Jharkhand	6,800
Do.		do.	Jagdapur, Chattisgarh	2,000
Do.		do.	Duburi, Orissa	3,000
Do.		Steel Authority of India Ltd. (Government, 100%)	Rourkela steel plant, Orissa	1,800
Do.		Rashtriya Ispat Nigam Ltd.	Visakhapatnam steel plant, Andhra Pradesh	3,200
Do.		JSW Steel Co. Ltd.	Vijayanagar, Karnataka	7,800
Do.		Ministeel plants (privately owned)	About 180 plants located throughout India	4,700
Do.		Essar Steel Co. Ltd.	Hazira, Gujarat	3,000
Do.		Lloyds Steel Industries Ltd.	Wardha, Maharashtra	500
Do.		MSP Steel and Power Ltd.	Raipur, Chhattisgarh	750

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Iron ore	National Mineral Development Corp. Ltd. (NMDC) (Government, 100%)	Bailadila, Chhattisgarh	9,000
Do.	Steel Authority of India Ltd. (Government, 100%)	Bastar and Durg District, Chhattisgarh	7,000
Do.	Kudremukh Iron Ore Co. Ltd. (Government, 100%)	Kudremukh, Chikmagalur District, Karnataka	10,300
Do.	National Mineral Development Corp. Ltd. (NMDC) (Government, 100%)	Donimalai, Karnataka	9,000
Do.	Chowgule and Co. Ltd.	Goa	2,500
Do.	Dempo Mining Corp. Ltd.	do.	2,500
Do.	V.M. Salgaocar & Bros. Pvt. Ltd.	do.	2,500
Do.	Sesa Goa Ltd. (Vedanta Resources plc, 51%)	Codli and Sonshi, Goa	NA
Do.	Steel Authority of India Ltd. (Government, 100%)	Kendujhar District, Orissa	3,000
Do.	Tata Steel	do.	2,000
Do.	Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Government-owned Steel Authority of India Ltd.), 100%	Singhbhum District, Bihar	2,500
Do.	Steel Authority of India Ltd. (Government, 100%)	do.	3,500
Do.	Tata Steel	do.	3,500
Kyanite	Associated Mining Co.	Bhandara District, Maharashtra	10
Do.	Maharashtra Mineral Corp. Ltd.	do.	10
Do.	Bihar State Mineral Development Corp. Ltd. (Bihar State government, 100%)	Singhbhum District, Bihar	10
Do.	Hindustan Copper Ltd. (HCL) (Government, 100%)	do.	22
Lead:			
Primary	Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Chanderiya Smelters, Rajasthan	85
Do.	do.	Tundoo Smelter, Bihar	8
Secondary	Indian Lead Co.	Thane Refinery, Mumbai, Maharashtra	25
Do.	do.	Wada, Mumbai, Maharashtra	40
Lead ore	Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Agnigundala Mine, Andhra Pradesh	72
Do.	do.	Sargipalli Mine, Orissa	150
Lead-zinc ore	do.	Rampura-Agucha Mine, Rajasthan	1,300
Do.	do.	Zawar mine group, Rajasthan	1,200
Magnesite	Burn Standard Co. Ltd. (Government, 100%)	Salem, Tamil Nadu	150
Do.	Dalmia Magnesite Corp.	do.	72
Do.	Tamil Nadu Magnesite Ltd. (Tamil Nadu State government, 100%)	do.	150
Manganese ore ²	Manganese Ore India Ltd. (Government, 100%)	Adilabad, Andhra Pradesh	NA
Do.	Falechand Marsingdas	Andhra Pradesh	NA
Do.	Manganese Ore India Ltd. (Government, 100%)	Balaghat, Madhya Pradesh	NA
Do.	J.A. Trivedi Bros.	do.	NA
Do.	Sandur Manganese and Iron Ores Ltd.	Bellary, Karnataka	NA
Do.	Manganese Ore India Ltd. (Government, 100%)	Bhandara, Maharashtra	NA
Do.	Eastern Mining Co.	North Kanara, Karnataka	NA
Do.	Mysore Minerals Ltd.	do.	NA
Do.	Manganese Ore India Ltd. (Government, 100%)	Keonjhar, Orissa	NA
Do.	Mangilah, Rungta (Pvt.) Ltd.	do.	NA
Do.	Orissa Mining Corp. Ltd.	do.	NA
Do.	Rungta Mines (Pvt.) Ltd.	do.	NA
Do.	Serajuddin & Co.	do.	NA
Do.	S. Lall & Co.	do.	NA

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Manganese ore ² —Continued		Tata Steel	Keonjhar, Orissa	NA
Do.		Orissa Mineral Development Co. Ltd.	Koraput, Orissa	NA
Do.		Orissa Mining Corp. Ltd.	do.	NA
Do.		Mysore Minerals Ltd.	Shimoga, Karnataka	NA
Do.		Aryan Mining & Trading Corp.	Sundargarh, Orissa	NA
Do.		Orissa Manganese & Minerals (Pvt.) Ltd.	do.	NA
Do.		Tata Steel	do.	NA
Do.		R.B.S. Shreeram Durga Prasad and Falechand Marsingdas	Vizianagaram, Andhra Pradesh	NA
Mica	metric tons	Micafab India Pvt. Ltd.	Sydapuram Mandal, Andhra Pradesh	4,500
Do.	do.	Premier Mica Co.	Rjupalem, Andhra Pradesh	200
Petroleum, refined products	thousand 42-gallon barrels per day	Cochin Refineries Ltd. (Oil and Natural Gas Corp., 55%, and private interests, 45%)	Ambalamugal refinery, Kerala	93
Do.	do.	Indian Oil Corp. (Oil and Natural Gas Corp., 91%, and private interests, 9%)	Barauni refinery, Bihar	66
Do.	do.	Bongaigaon Refinery and Petrochemicals Ltd. (a subsidiary of Government-owned Oil and Natural Gas Corp.), 100%	Bongaigaon refinery, Assam	27
Do.	do.	Indian Oil Corp. (Oil and Natural Gas Corp., 91%, and private interests, 9%)	Digboi refinery, Assam	12
Do.	do.	do.	Guwahati refinery, Assam	20
Do.	do.	do.	Haldia refinery, West Bengal	61
Do.	do.	Reliance Industries Ltd.	Jamnagar refinery, Gujarat	1,240
Do.	do.	do.	Koyali refinery, Gujarat	185
Do.	do.	Madras Refineries Ltd. (Oil and Natural Gas Corp., 52%, and private interests, 48%)	Madras refinery, Tamil Nadu	131
Do.	do.	Bharat Petroleum Corp. Ltd. (Oil and Natural Gas Corp., 67%, and private interests, 33%)	Mahul refinery, Mumbai, Maharashtra	135
Do.	do.	Hindustan Petroleum Corp. Ltd. (Oil and Natural Gas Corp., 51%, and private interests, 49%)	do.	110
Do.	do.	Essar Oil Ltd.	Vadinar refinery, Gujarat	240
Do.	do.	do.	Visakhapatnam refinery, Andhra Pradesh	90
Do.	do.	Indian Oil Corp. (Oil and Natural Gas Corp., 91%, and private interests, 9%)	Mathura refinery, Uttar Pradesh	156
Do.	do.	do.	Panipat refinery, Haryana	240
Phosphate rock ³		Rajasthan State Mineral Development Corp. Ltd. (Rajasthan State government, 100%)	Badgaon, Dakankotra, Kanpur, Kharbaria-ka-Guda, and Sallopat Mines, Rajasthan	NA
Do.		Pyrites Phosphates and Chemicals Ltd.	Durmala and Maldeota underground mines, Uttar Pradesh	NA
Do.		Madhya Pradesh State Mining Corp. Ltd. (Madhya Pradesh State government, 100%)	Hirapur and Khatamba Mines, Jharkhand	NA
Do.		Rajasthan State Mines and Minerals Ltd. (Rajasthan State government, 100%)	Jhamarkotra Mine, Rajasthan	NA
Do.		Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Maton Mine, Rajasthan	NA
Titanium, ilmenite-rutile ore		Kerala Minerals and Metals Ltd. (Kerala State government, 100%)	Chavara, Kerala	100
Do.		Indian Rare Earths Ltd. (IREL) (Government, 100%)	do.	250
Do.		do.	Ganjam, Orissa	220
Do.		do.	Manavalakurichi, Tamil Nadu	65
Do.		Trimex Industries Ltd.	Chennai, Andhra Pradesh	200
Do.		VV Minerals Ltd.	Kanyakumari, Tamil Nadu	130

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
Zinc	Binani Zinc Ltd.	Binanipuram Smelter, Kerala	38
Do.	Hindustan Zinc Ltd. (HZL) (Sterlite Opportunities and Ventures Ltd., 64.9%, and Government, 29.5%)	Chanderiya Smelter, Rajasthan	340
Do.	do.	Debari Smelter, Rajasthan	78
Do.	do.	Visakhapatnam (Vizag) Smelter, Andhra Pradesh	54

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

¹Scheduled startup is delayed to 2011.

²Capacity of clusters of surface mines varies extremely, depending on demand. Estimated total capacity is 1.8 million metric tons per year (Mt/yr).

³Estimated total phosphate rock capacity is 1.2 Mt/yr.

TABLE 3
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
Barite	32,000
Bauxite	539,000
Chromium, in ore	31,000
Coal:	
Bituminous	96,000,000
Lignite	38,000,000
Copper ore	135,000
Gold, in metal	67,000 kilograms
Graphite	5,200
Ilmenite and rutile	193,000
Iron, in ore	4,900,000
Kyanite and sillimanite	1,380
Lead and zinc, in ore	63,000
Limestone	7,500,000
Magnesite	21,000
Manganese, in ore	77,000
Phosphate rock	6,100
Talc and pyrophyllite	74,600
Zircon	28,000

Source: Indian Minerals Yearbook 2008, Indian Bureau of Mines.