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2006 Minerals Yearbook

INDIA

U.S. Department of the Interior
U.S. Geological Survey

March 2008

The Mineral Industry of India

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India is endowed with a modest variety of mineral resources, although deposits of specific resources—barite, bauxite, chromite, coal, iron ore, and manganese—were among the 10 largest in the world. The mineral industry produced many industrial minerals and several metals, but a limited number of mineral fuels. Overall, India was a major mineral producer. The country's production of mica sheet was ranked first in world output; barite, second; chromite, third: iron ore, talc and pyrophyllite, fourth; bauxite, sixth; crude steel and manganese, seventh; and aluminum, eighth (U.S. Geological Survey, 2007).

Minerals in the National Economy

The mining and quarrying sector contributed 2% to the country's gross domestic product in 2005, which was the latest year for which data were available. In 2005, the value of mineral fuel production accounted for 76% of the sector total; industrial minerals, 14%, and metals, 10%. In 2006, the value of mineral production totaled $19.7 billion, of which fuel minerals accounted for 73%, metallic minerals 15%, and industrial minerals 12%. In 2006, the value of metal output increased by 5%, whereas the values of mineral fuels and industrial minerals decreased by 3% and 2%, respectively. In 2006, the value of mineral exports accounted for 17% of the export total in India and that of mineral imports accounted for 36% of the import total (Indian Bureau of Mines, 2006).

Government Policies and Programs

In 2006, the Planning Commission of the Ministry of Mines planned to review the National Mineral Policy and recommend possible amendments to the Mines and Minerals Development and Regulation Act. The purpose was to make the provisions of the Act more in accord with international practice, streamline and simplify the procedures for the granting of mineral concessions, strengthen the infrastructure for mining activities, and improve the climate of investment in the mining sector (Ministry of Mines, 2006, p. 1).

In the face of increasing domestic demand for such mineral commodities as aluminum, coal, copper, and zinc, the Government moved ahead with the privatization of the country's large state-owned mining companies. These efforts opened up the country's mineral exploration and development activities to private and foreign investment. Such investment could make possible the development of the infrastructure needed to exploit the country's abundant mineral resources and provide opportunities for employment. The Government was considering a ban on the export of mineral resources deemed to be essential to the nation, such as iron ore and nonrenewable minerals (Industrial Minerals, 2006b).

In 2006, the Government slashed the customs duty on imports of ferroalloys, primary and secondary nonferrous metals (aluminum, copper, lead, and zinc), and steel to 7.5% from 10%. The duty on imported copper ore and concentrates also was reduced to 2% from 5%. The customs duty on steel melting scrap was increased to 5% from 0%, however, owing to lower steel prices (Platts, 2006c).

The Indian Government's Department of Atomic Energy announced on January 20, 2006, that "titanium ores and concentrates (ilmenite, rutile, and leucoxene) shall remain prescribed substances only till such time [as] the Policy on Exploration of Beach Sand Minerals notified vide Resolution Number 8/1(1)97-PSU/1422 dated the 6th of October, 1998 is adopted/revised/modified by the Ministry of Mines or till the 1st of January 2007, whichever occurs earlier and shall cease to be so thereafter" (WGI Heavy Minerals Inc., 2006a, p. 1).

Production

The country increased its output of aluminum, refined copper, crude oil, direct-reduced iron, iron ore, lead, steel, primary zinc, and some industrial minerals (table 1). Production of cadmium metal increased owing to the increased smelting capacity for imported zinc ores. Output of lead and zinc metals also increased with the commissioning of new lead and zinc smelters. Production of iron ore increased owing to better utilization of resources at the mines and more demand for iron ore. Output of cement increased steadily owing to the booming construction industry. Overall, the values of mineral fuels and industrial minerals decreased slightly compared with those of 2005 because of prices.

Structure of the Mineral Industry

The Ministry of Mines has under its administrative control four public-sector companies engaged in exploration, mining, and processing of minerals. They are Bharat Gold Mines Ltd. (BGML), Hindustan Copper Co. Ltd., Mineral Exploration Corp. Ltd., and National Aluminium Co. Ltd. BGML was closed in 2001 and as of 2006 had not restarted operations. In 2006, the Ministry granted these companies greater autonomy, which was expected to result in quicker decisionmaking, enhanced efficiency, and increased productivity. The Government also holds a 49% equity interest in Bharat Aluminium Co. Ltd. and a 29.5% equity interest in Hindustan Zinc Ltd. Large state-owned Coal India Ltd., through its subsidiaries, operates most of the country's coal mines (table 2). Public-sector companies continued to play a dominant role in the country's mineral production, accounting for 75% of its value. The 790 working public-sector mines employed 470,000 people and the 2,400 working private-sector mines employed 85,000 people.

Trade

The export value of ores and mineral products in 2005, which was the latest year for which the data were available,

was $17.9 billion. Diamond (mostly cut) was the principal mineral commodity export and accounted for 64.4% of the total value of exports, followed by iron ore, 21.1%; granite, 4.4%; alumina, 2.2%; zinc ore and concentrates, 1.4%; precious and semiprecious stones, 0.9%; and chromite, 0.8%. Bauxite, building and monumental stones, coal (including lignite), emerald, and marble were the other important export minerals. The import value of ores and mineral products in 2005 was $54.8 billion. Crude petroleum was the main mineral commodity imported and accounted for 70.7% of the total value of imports, followed by diamond (uncut), 16.3%. Alumina, coal, coke, copper ores and concentrates, iron ore, natural gas, phosphate rock, precious and semiprecious stones, and sulfur were the other important import minerals (Ministry of Mines, 2006, p. 13).

Commodity Review

Metals

Aluminum.—Continental Resources (USA) Ltd. held discussions with major aluminum producers and officials in the State of Orissa for the development of the Gandhamardan bauxite deposit. Continental Resources was a wholly owned subsidiary of Balaton Power Inc. The initial work on the first phase of the project was on schedule. Field activities had selected several sites for a powerplant and an alumina refinery. Geologic reports and maps were prepared for submission to the Government for approval (Balaton Power Inc., 2006).

Qingtongxia Aluminium of China signed a preliminary 50-50 joint-venture agreement with Ashapura Minechem to jointly develop an alumina plant in the State of Gujarat. The planned production capacity of the refinery was 1 million metric tons per year (Mt/yr) of alumina; the plant would be constructed in two stages at an estimated cost of $600 million. Gujarat has abundant bauxite resources and was reported to have bauxite reserves of up to 45 million metric tons (Mt) (Platts, 2006a).

The Jindal Group proposed to build an alumina refinery and an aluminum smelter in the Kutch area in the State of Gujarat at a cost of $1.2 billion. The project would produce 7 Mt/yr of alumina and 2.5 Mt/yr of aluminum. Earlier, the company also developed plans for a larger, $2.3 billion project at Visakhapatnam in the State of Andhra Pradesh; that plant would produce 14 Mt/yr of alumina and 5 Mt/yr of aluminum (Hindu Business Line, The, 2006).

Bharat Aluminium (Balco), which was majority owned by Vedanta Resources plc of the United Kingdom through Sterlite Industries Ltd., expected to start production at its new 1.4-Mt/yr Lanjigarh alumina refinery in the State of Orissa in March 2007, but the company was still waiting for final Government approval of its bauxite mine permits. Balco had an alumina capacity of 200,000 metric tons per year (t/yr), which was used to feed its 100,000-t/yr operations at Korba Smelter-I. Madras Aluminium, which also was majority owned by Vedanta Resources through Sterlite Industries, had an alumina production capacity of 80,000 t/yr and an aluminum production capacity of 40,000 t/yr. In 2005, Balco commissioned its new 250,000-t/yr Smelter-II, which consisted of 288 pots, at Korba. Full capacity was expected to be reached by April 2007. Balco planned to begin construction of the 500,000-t/yr Jharsuguda aluminum smelter in the State of Orissa in 2007. The first phase was scheduled to be completed in 2009 with a capacity of 250,000 t/yr and the second phase, by late 2010; it would have an additional capacity of 250,000 t/yr (Platts, 2006e).

Hindalco Industries Ltd. commissioned the first-phase expansion of its Hirakud aluminum smelter in the State of Orissa to 100,000 t/yr from 65,000 t/yr. The second-phase expansion would increase the capacity to 143,000 t/yr. The company operated another smelter at Renukoot in the State of Uttar Pradesh (Metals Insider, 2006).

The second-phase expansion program of National Aluminium Co. Ltd. (Nalco) was underway and was expected to be completed in December 2008. Nalco planned to increase bauxite production to 6.3 Mt/yr from 4.8 Mt/yr, alumina production to 2.1 Mt/yr from 1.6 Mt/yr, aluminum production to 460,000 t/yr from 345,000 t/yr, and captive power generation to 1,200 megawatts (MW) from 960 MW in capacity (Ministry of Mines, 2006, p. 2).

Copper.—Golden Patriot Mining Inc. of Canada filed three exploration licenses for a copper-gold project in the State of Rajasthan. The project was located within a major greenstone belt that hosted the high-grade, stratiform Rampura Agucha lead-zinc-silver deposit, the Kolar gold mine, and the Khetri Mine, which produced copper and gold. The mineralized zone at the latter mine was confirmed to extend over 10 kilometers (km). Drilling results in the area by Hindustan Copper Co. Ltd. indicated that the copper grade ranged up to 7.5% for 36 meters (m) in length and approximately 300 m below the surface (Golden Patriot Mining Inc., 2005).

Hindustan Copper operated copper mines in the States of Madhya Pradesh and Rajasthan. The Durda Mine in Jharkland was closed 4 years ago and could be reopened. Hindalco Industries Ltd. temporarily closed the 70,000-t/yr copper smelter at its Dahej complex in the State of Gujarat. Sterlite Industries, which is owned by Vedanta Resources, operated the Tuticorin copper smelter in the State of Tamil Nadu. The de-bottlenecking of the Tuticorin smelter to expand its capacity to 400,000 t/yr from 300,000 t/yr was completed and the smelter was fully operational in 2006.

Gold.—Indo Gold Ltd. of Australia upgraded the Mahi Zone inferred mineral resource in the Bhukia prospect in the State of Rajasthan to 24 Mt at a grade of 1.3 grams per metric ton (g/t) gold using a cutoff grade of 0.5 g/t gold. The company owned 70% of the Jagpura joint-venture project, and Metals Mining India Pvt. Ltd. owned the remaining 30%. A 12,000-m drilling program in late 2006 or early 2007 was aimed at upgrading the majority of the Mahi resource to indicated and measured status. The central portion of the Panch Mahuri Zone, which is located 500 m northeast of Mahi, could have a resource of 14.4 Mt at a grade of 1.6 g/t gold using a cutoff grade of 0.5 g/t gold, which would make its grade of mineralization higher than that at Mahi. A 10,000-m drilling program was to upgrade the mineral resource. The total resource estimate at the Bhukia prospect was 38.5 Mt at a grade of 1.4 g/t gold (Indo Gold Ltd., 2006).

In 2006, India, which imported 800 metric tons (t) of gold, was the world's leading importer and consumer of gold, most of

which was used in the fabrication of jewelry. Domestic demand for gold could rise to 980 t by 2010 and to 1,150 t by 2015. The country could be a price setter in the international market. India also was the world's leading exporter of value-added gold and silver jewelry items, including Indian ornaments, which it sold in Hong Kong, the Middle East, and the United States (Mineweb.net, 2006).

Ilmenite.—WGI Heavy Minerals, Inc. withdrew the Strathcona Mineral Services report of July 2002, which contained estimates of reserves and resources at its Srikurmam heavy mineral sands property in the State of Andhra Pradeesh. All development of this mine had been suspended until licensing, regulatory, and other issues could be resolved. Ilmenite was present in the beach sands at the Srikurmam Mine and the company had not had a license to mine ilmenite. However, ilmenite was expected to be removed from the Government's list of prescribed substances by January 1, 2007. In addition, the mining lease, which was for about 95 hectares (ha), ran approximately 11 km along the beach and extended inland between 50 and 150 m. The regulatory approval contained a prohibition on mining within 100 m of the high tide line, thus reducing the area available for mining to about 10 ha. The existing mining lease allowed the company to mine 60,000 t/yr of raw sand, yet the wet gravity separation plant constructed for the mine was designed with a capacity of 720,000 t/yr of raw sand. The dry garnet mill had an installed capacity to produce 70,000 t/yr of garnet (WGI Heavy Minerals, Inc., 2006b).

Iron and Steel.—Danieli Centro Met was awarded a contract to upgrade a fourth 150-t electric arc furnace (EAF) at the Hazira works of Essar Steel Co. Ltd. in 2006. The first two EAFs under the upgrade order in 2003 were modified and restarted in December 2004 and May 2005, respectively. The third EAF was upgraded and restarted in October 2005. These measures were aimed at increasing the plant's productivity (Danieli Corp., 2006).

Arcelor Mittal signed a memorandum of understanding with the State government of Orissa regarding the setting up of a greenfield steel plant in the Keonijhar district. The plant, which would have a production capacity of 12 Mt/yr of steel, was expected to cost $9 billion. Following the first phase of construction, which was expected to be completed in 4 years, the plant would have a capacity of 6 Mt/yr; during the second phase, which was expected to be completed within 4.5 years after the completion of the first phase, capacity would be expanded by an additional 6 Mt/yr (Arcelor Mittal, 2006).

Pohang Iron and Steel Co. Ltd. of the Republic of Korea planned to begin development of the first phase of its 12-Mt/yr steel plant in the State of Orissa by April 2007. The project would cost a total of $12 billion. Output would be split 50-50 between exports and the domestic market. Meanwhile, Bihar Tubes in the State of Uttar Pradesh planned to set up a $22 million steel strip mill, which would bring the company's total capacity to 400,000 t/yr. The company also planned to invest $2.2 million to set up another unit in the State of Maharashtra to serve the export market (Steel Times International, 2006).

Nava Bharat Ferro Alloys planned to restart its high-carbon ferrochrome plant in the State of Orissa in June following a shutdown of the plant in January 2006. The plant had a production capacity of 75,000 t/yr of ferrochrome. The company had an existing 30-MW powerplant and might add a new 64-MW coal-fired powerplant. About 60 MW of the total power would be used for ferrochrome production, and the remaining would be sold to other users. In addition, the company produced high-carbon ferromanganese, high-carbon silicomanganese, and ferrosilicon from its operation at Paloncha in the State of Andhra Pradesh. The company sold its products to major steel producers in India and exported them to Indonesia, Japan, and the Republic of Korea (Platts, 2006f).

IMFA Group inaugurated its first-phase expansion project, which consisted of a 27-megavoltampere furnace for ferrochrome at Choudwar in the State of Orissa. The plant's production capacity was 35,000 t/yr of ferrochrome. The expansion plan included two more furnaces and a 120-MW powerplant. The company's total ferrochrome capacity was 100,000 t/yr and it was the leading exporter of ferrochrome in India. The company owned chromite mines at Nuasahi and Sukinda (Geological Survey of Iran, 2006).

Lead and Zinc.—Hindustan Zinc Ltd. commissioned its 50,000-t/yr Ausmelt lead plant, which was expected to reach full capacity in April 2007 and increase the company's total capacity to 85,000 t/yr. The company's new 170,000-t/yr zinc smelter at Chanderiya was commissioned in May 2005. When full capacity is reached in 2008, the company's total zinc smelting capacity would be increased to 570,000 t/yr from 400,000 t/yr in 2006 (London Stock Exchange, 2006).

Pebble Creek Mining Ltd.'s Askot project, which is located in the Himalayan foothills in the State of Uttaranchal 325 km northeast of New Delhi, consisted of a high-grade deposit of zinc and copper, with secondary gold, lead, and silver. The company applied for a 30-year mining lease for an area of 380 ha. Earlier resource estimates were 770,000 t to 1.6 Mt at the average grades of 5.87% zinc, 4.14% lead, 2.37% copper, 85 g/t silver, and 0.53 g/t gold. The company planned to continue confirmation, fill-in, and extension drillings from the surface and underground; metallurgical testing; transportation, marketing, and taxation studies; and a feasibility study in 2007-08 (Pebble Creek Mining Ltd., 2006).

Industrial Minerals

Cement.—Following the approval of the State government of Himachai Pradesh, Lafarge S.A. planned to build a new 3-Mt/yr cement plant in Alsindi. The project represented an investment of $200 million. The plant was expected to be completed in 2010. The company also planned to expand the production capacity by 3 Mt/yr in 5 years at its 1.4-Mt/yr Sonadih cement plant in the State of Chhattisgarh. With an investment of $180 million, the first phase would increase the plant's capacity by 1.6 Mt/yr to 3 Mt/yr and be completed in 2 years. A new grinding plant of 1 Mt/yr would be constructed at Mejia in the State of West Bengal. During the second phase, the grinding capacity would be increased by 2 Mt/yr to 3 Mt/yr (World Cement, 2006).

Shree Digvijay Cement Co. Ltd. commissioned a cement production line RAS III with a capacity of 3,000 metric tons per day (t/d) and placed another order with Hmboldt Wedag

India for the same line as RAS IV. Startup of the new RAS III line was scheduled for the first quarter of 2007. Vikram Cement placed an order to increase the capacity of the clinker grinding system at its Bathinda cement plant to 210 t/d from 155 t/d. In 2005, the company purchased a complete clinker grinding unit for its cement plant at Dadri. Commissioning was scheduled for early 2007 (Cement News, 2006).

Holcim Group of Germany acquired a 14.8% stake in Ambuja Cements Ltd. for $477 million and planned to spend $560 million to acquire a further 20% equity interest. Ambuja Cements, which was India's third ranked cement producer, had four cement plants and two grinding stations with a total capacity of 14 Mt/yr (Holcim Group, 2006).

Diamond.—India's diamond industry was expected to supply the world's fastest growing market. De Beers developed special diamond jewelry brands for India. Rio Tinto plc of Australia decided to extend mining at the Argyle underground diamond mine in Western Australia to produce 20.4 million carats per year after 2008. This move could preserve jobs and increase processing facilities for India's diamond industry. About 2,500 jobs in India were dependent on the Argyle production (Antwerp Facets News Service, 2006b).

Meanwhile, De Beers submitted an application for two permits to prospect in abandoned diamond mines in the State of Madhya Pradesh. The permits covered an area of 3,900 square kilometers (km^2) in the Datiya and the Shivpuri districts. The State government would provide De Beers with geographical information and other support. Reopening of these mines could stimulate the local diamond industry and lead to increased employment (Antwerp Facets News Service, 2006a).

National Mineral Development Corp. petitioned the Indian Supreme Court to allow it to reopen its Panna diamond mine in the State of Madhya Pradesh that had been shut down for environmental reasons. The company had cleared all the regulatory hurdles and complied with requirements for the reopening. The company also received diamond reconnaissance permits for a 2,300-km^2 site at Kalyandurg in the Anantapur district and a 2,010-km^2 site in the Panna/Satna area (Antwerp Facets News Service, 2006c).

Dwyka Diamonds Ltd. reported positive results from its stream sediment sampling programs in the State of Uttar Pradesh. Analysis of two samples suggested that the indicator minerals were derived from a diamondiferous source rock. The sample site was located 100 km northwest of the Bunder kimberlite field discovered by Rio Tinto. The surface textures of the indicator minerals suggested that the indicator minerals might be sourced from undiscovered kimberlite bodies (Dwyka Diamonds Ltd., 2006).

Feldspar.—Jumbo Mining Ltd. (JML) mined, processed, and exported industrial minerals, such as clays, feldspar, fuller's earth, and quartz. The company, which operated three mines in the State of Andhra Pradesh, produced 100,000 t/yr of potassium feldspar for the glass and ceramic industries. The greenstone belt hosted a number of large potassium feldspar deposits in the State. The estimated ore reserves for potassium feldspar were about 1.5 Mt. JML also operated a state-of-the-art crushing and grinding plant at Kadthal, which is located 50 km from Hyderabad. The company planned to build a quartz sand plant in the Mahboobnagar district in the State of Andhra Pradesh (Industrial Minerals, 2006a).

Soda Ash.—India was expanding its soda ash capacity to serve the increasing domestic demand for glass and ceramic products, as well as the increased demand for these products in the export markets of Southeast Asia. India consumed 1.7 Mt/yr of soda ash; most of this demand was met by domestic production. The leading Indian soda ash producers were Gujarat Heavy Chemicals Ltd. and Tata Chemicals Ltd. However, a cut in the customs duty on soda ash to 15% from 20% in 2005 effectively made imports cheaper. India imported between 200,000 and 250,000 t/yr of soda ash from Europe and Kenya. The producers aimed to fill the rising demand with production capacity expansions (Industrial Minerals, 2006c).

Mineral Fuels and Other Sources of Energy

India's existing electricity production capacity was 116 gigawatts (GW) and it needed to acquire additional generating capacity of 65 GW to sustain its economic growth in the next 5 to 10 years. Coal would be the dominant energy source, contributing 30 GW, and natural gas could add 14 GW in the future. The expected remaining demand could be supplied by nuclear energy. The country's current nuclear power accounted for only 3 GW with small 200-megawatt (MW) reactors and a 540-MW unit. Plans were for 1-GW units to come onstream in 2008, namely the Kudankulam 1 and 2 in the State of Tamil Nadu and the Tarapur 3 and 4 in the State of Maharashtra. With the assistance of the United States, which offered to share civilian nuclear technology with India, the nuclear capacity could increase by 10 GW (Petroleum Economist, 2006a).

Natural Gas.—In 2006, an Indian Government panel approved a proposal to allow foreign companies to build and operate natural gas pipelines in the country. The 100% foreign direct investment was allowed by the Government. The Government also considered a proposal to establish a special zone in which global oil and gas industry service providers would be allowed to set up their facilities and provide their services to the upstream and downstream companies in India and abroad (Platts, 2006b).

Petroleum.—Aiming to enhance its domestic production of oil and gas, Oil and Natural Gas Corp. (ONGC) planned to develop 28 small and marginal offshore fields along the country's west coast. Development activities began in March 2006, and production was expected to start by 2008. Total production of 36,700 to 51,300 barrels per day (bbl/d) of oil and 15 million to 20 million cubic meters per day of gas from these fields was envisioned. ONGC also planned to set up a hub development system to monitor its small-field-related activities in 2007 (Rigzone.com, 2006).

Cairn Energy discovered the Mangala Field in its 5,000-km^2 lease in the State of Rajasthan in 2004. Cairn and Eni were the successful bidders for blocks in Rajasthan in the 2005 round of the new exploration licensing policy. The field was estimated to contain recoverable reserves of 320 million barrels of oil. The field would produce 100,000 to 110,000 bbl/d in 2008, or about 20% to 25% of India's total output (Petroleum Economist, 2006b).

Indian Oil Corp. planned to increase its refining capacity to 1.6 million barrels per day in 2011. The company's seven oil refineries had a combined refining capacity of 740,000 bbl/d. Indian Oil planned to build two new oil refineries with a capacity of 300,000 bbl/d each at Haldia and Paradip. It planned to expand the capacity of its Panipat refinery in Haryana to 300,000 bbl/d from 240,000 bbl/d in 2006 (Platts, 2006d).

BP p.l.c. was to fund a $9.4 million project by the Energy and Resources Institute in the State of Andhra Pradesh to demonstrate the feasibility of producing biodiesel from jatropha curcas, which is a non-edible oil-bearing crop. The project was expected to take 10 years and included the installation of all the equipment necessary for seed crushing and oil extraction and processing to produce 56,600 barrels per year of biodiesel. A full environmental and social impact assessment of all elements of the supply chain and life cycle analysis of greenhouse gas emissions would be completed as part of the project (BP News, 2006).

Reserves and Resources

India's mineral resources include large deposits of barite, bauxite, chromite, coal, iron ore, limestone, and manganese. The country ranked second after China in the world's barite resources. The Mangampet deposit in the State of Andhra Pradesh is the single largest barite deposit in the world. Bauxite was moderately abundant and occurs in the States of Andhra Pradesh, Bihar, Gujarat, Maharashtra, Orissa, and Tamil Nadu. Iron ore in the form of hematite or magnetite was found in the States of Bihar, Karnataka, Madhya Pradesh, Orissa, and Tamil Nadu; India ranked among the top 10 producers. Limestone was mostly cement-grade and occurs in the States of Andhra Pradesh, Karnataka, and Rajasthan. Bituminous coal was most abundant, of which coking coal accounted for 18%. Lignite occurred mostly in the State of Tamil Nadu (table 3).

Outlook

The mineral industry of India is expected to continue its increased output through expansion of the production capacities. The States of Gujarat and Orissa are abundant in bauxite; new and expanded capacities for alumina refining and aluminum smelting are expected to come onstream in 2007 or 2008. Availability of the country's iron ore may become a problem domestically because no new mines or mine expansions are foreseen for the next 2 to 3 years. Export restrictions and transport of iron ore from the States of Jharkland and Orissa to the State of Chhattisgarh for use in steel plants are necessary. Owing to the planned opening of two 12-Mt/yr steel plants in Orissa, India's steel production is expected to increase by more than 50% in the next 5 to 10 years. The country's abundant bituminous coal is expected to be extensively utilized to expand its role in energy production. Power generation projects are expected to be considered in conjunction with the planned expansions of aluminum smelters. With civilian nuclear technology available to India, nuclear energy will supplement the energy output to meet domestic demand.

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TABLE 1
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2002	2003	2004	2005	2006
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	9,647 [4]	10,414 [4]	11,285 [r, 4]	12,385 [r, 4]	12,732 [4]
Alumina, Al_2O_3 equivalent	do.	2,800	2,500	2,600	2,700	2,800
Metal, primary		671,200 [4]	798,800 [4]	861,800 [4]	942,400 [r, 4]	1,104,100 [4]
Cadmium metal		466 [4]	477 [4]	489 [4]	409 [r, 4]	453 [4]
Chromium, chromite, gross weight		2,698,577 [4]	2,210,000 [4]	2,948,944 [4]	3,255,162 [4]	3,300,000
Cobalt metal		270 [4]	255 [4]	545 [4]	1,220 [4]	1,184 [4]
Copper:						
Mine output, Cu content		31,500 [4]	28,500 [4]	29,500 [4]	26,900 [4]	23,600 [4]
Metal, primary:						
Smelter		385,400 [r, 4]	391,000 [r, 4]	401,000 [r, 4]	486,600 [r, 4]	490,000
Refinery						
Electrolytic, cathode		353,700 [4]	375,000 [4]	399,000 [4]	497,000 [4]	629,000 [4]
Fire refined		20,000	19,000	20,000	20,000	25,000
Total		374,000	394,000	419,000	517,000	654,000
Gold metal, smelter	kilograms	3,800 [4]	3,200 [4]	3,700 [4]	3,100 [r, 4]	2,500 [4]
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	86,400 [4]	99,100 [4]	120,600 [4]	140,000	160,000
Fe content	do.	55,300 [4]	63,400 [4]	77,200 [4]	90,000	102,000
Metal:						
Pig iron	do.	24,315 [4]	24,000	25,000	25,500	26,000
Direct-reduced iron	do.	6,590 [r, 4]	7,670 [r, 4]	9,370 [r, 4]	12,040 [r, 4]	14,740 [4]
Ferroalloys:						
Ferrochromium, including charge chrome		311,927 [4]	468,677 [4]	527,100 [4]	611,373 [4]	630,000
Ferrochromiumsilicon		10,000	10,000	10,000	10,000	10,000
Ferromanganese		165,000	165,000	170,000	170,000	180,000
Ferrosilicon		52,000	54,000	55,000	56,000	58,000
Silicomanganese		150,000	160,000	160,000	170,000	180,000
Other		9,000	9,000	9,000	9,000	9,000
Steel, crude	thousand metric tons	28,814 [4]	31,779 [4]	32,600 [r, 4]	40,900 [r, 4]	44,000 [4]
Semimanufactures[5]	do.	32,999 [r, 4]	35,639 [r, 4]	38,421 [r, 4]	42,947 [r, 4]	45,000
Lead:						
Mine output, Pb content		34,000 [r, 4]	44,000 [r, 4]	51,300 [r, 4]	60,400 [r, 4]	67,000
Metal, refined:						
Primary		74,200 [4]	77,500 [4]	40,000 [r, 4]	56,000 [r, 4]	77,100 [4]
Secondary		35,000 [4]	41,000 [4]	25,000 [4]	35,000 [r, 4]	35,000 [4]
Total		109,200 [4]	118,500 [4]	65,000 [r, 4]	91,000 [r, 4]	112,100 [4]
Manganese:						
Ore and concentrate, gross weight	thousand metric tons	1,700	1,650	1,700	1,750	1,800
Mn content	do.	630	620	630	640	650
Rare-earth metals, monazite concentrate, gross weight		5,000	5,000	5,000	5,000	5,000
Selenium	kilograms	11,500	12,000	12,000	13,000	13,000
Silver, mine and smelter output	do.	52,100 [4]	51,200 [4]	14,500 [4]	31,500 [r, 4]	22,600 [4]
Titanium concentrates, gross weight:						
Ilmenite		460,000	500,000	520,000	550,000	580,000
Rutile		18,000	18,000	19,000	19,000	19,000
Zinc:						
Mine output, concentrate:						
Gross weight		234,300 [4]	306,400 [r, 4]	347,100 [r, 4]	477,200 [r, 4]	420,800 [4]
Zn content		129,000	169,000 [r]	191,000 [r]	262,000 [r]	231,000

See footnotes at end of table.

TABLE 1—Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2002	2003	2004	2005	2006
METALS—Continued						
Zinc—Continued:						
Metal:						
Primary		231,400 [4]	253,900 [4]	238,400 [4]	266,200 [r, 4]	370,900 [4]
Secondary		24,000	24,000	24,000	23,000	23,000
Total		255,000	278,000	262,000	289,000 [r]	394,000
Zirconium concentrate, zircon, gross weight		19,000	20,000	20,000	20,000	21,000
INDUSTRIAL MINERALS						
Abrasives, natural, n.e.s.[6]:						
Corundum, natural	kilograms	1,200	1,150	1,100	1,100	1,000
Garnet		120,000	120,000	125,000	120,000	115,000
Jasper		8,000	8,500	8,500	8,700	8,800
Asbestos		18,000	19,000	18,000	19,000	20,000
Barite		675,000 [r]	723,000 [r]	1,100,000 [r]	1,200,000 [r]	950,000
Bromine, elemental		1,500	1,500	1,500	1,500	1,500
Cement, hydraulic	thousand metric tons	115,000	123,000	130,000 [r]	145,000 [r]	155,000
Chalk		110,000	115,000	115,000	120,000	120,000
Clays:						
Ball clay		400,000	390,000	400,000	420,000	420,000
Diaspore		12,000	12,000	11,000	11,000	10,000
Fireclay		355,000	360,000	365,000	370,000	375,000
Kaolin:						
Salable crude	thousand metric tons	540	550	550	560	560
Processed	do.	170	180	180	190	200
Total	do.	710	730	730	750	760
Other	do.	70	75	75	80	80
Diamond:						
Gem	thousand carats	17	16	16	16	15
Industrial	do.	45	44	43	42	40
Total	do.	62	60	59	58	55
Feldspar		110,000	150,000	150,000	150,000	160,000
Fluorspar:						
Concentrates, metallurgical-grade		6,296 [4]	6,300	6,400	6,500	6,600
Other fluorspar materials, graded		4,188 [4]	4,200	4,300	4,400	4,600
Gemstones, excluding diamond:						
Agate, including chalcedony pebble		200	200	200	180	180
Garnet	kilograms	700	800	850	850	800
Graphite[7]		130,000	110,000	120,000	130,000	120,000
Gypsum		2,300,000	2,300,000	2,350,000	2,400,000	2,450,000
Kyanite and related materials:						
Kyanite		6,000	6,000	6,200	6,800	7,000
Sillimanite		14,000	14,000	14,500	15,000	15,000
Lime		900,000	900,000	900,000	920,000	910,000
Magnesite		380,000	380,000	370,000	380,000	370,000
Mica:						
Crude		1,500	1,600	1,600	1,600	1,700
Scrap and waste		2,000	2,000	2,100	2,100	2,200
Total		3,500	3,600	3,700	3,700	3,900
Nitrogen, N content of ammonia	thousand metric tons	9,827 [4]	10,048 [4]	10,718 [4]	10,800	10,900
Phosphate rock, including apatite		1,250,000	1,175,000 [4]	1,180,000	1,200,000	1,200,000
Pigments, mineral, natural, ocher		360,000	365,000	360,000	360,000	370,000
Pyrites, gross weight		115,000	115,000	120,000	130,000	125,000

See footnotes at end of table.

TABLE 1—Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2002	2003	2004	2005	2006
INDUSTRIAL MINERALS—Continued						
Salt:						
Rock salt	thousand metric tons	3	3	3	3	3
Other	do.	14,500	15,000	15,000	15,500	15,500
Total	do.	14,500	15,000	15,000	15,500	15,500
Sand:						
Calcareous	do.	250	250	255	260	265
Silica	do.	1,400	1,500	1,500	1,600	1,600
Other	do.	2,800	2,900	3,000	3,100	3,200
Slate		10,000	10,500	11,000	12,000	12,500
Soda ash		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Stone, sand and gravel:						
Calcite		51,000	52,000	52,000	53,000	54,000
Dolomite	thousand metric tons	2,900	2,900	3,000	3,000	3,000
Limestone	do.	115,000	120,000	125,000	120,000	123,000
Quartz and quartzite	do.	250	250	260	270	270
Sulfur, byproduct from fertilizer plants		11,500	11,500	12,000	13,000	14,000
Talc and related materials:						
Pyrophyllite		85,000	86,000	86,000	85,000	86,000
Steatite, soapstone		550,000	552,000	550,000	545,000	560,000
Vermiculite		4,300	4,400	4,400	4,500	4,600
Wollastonite		105,000	120,000	115,000	120,000	125,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	325,000	328,000	330,000	333,000	350,000
Liginte	do.	24,000	25,000	25,000	27,000	26,000
Total	do.	349,000	353,000	355,000	360,000	376,000
Gas, natural:						
Gross	million cubic meters	26,000	27,000	28,000	29,000	30,000
Marketable	do.	25,000	25,000	26,000	27,000	28,000
Petroleum:						
Crude	thousand 42-gallon barrels	240,000	241,000	244,000	248,000	250,000
Refinery products:						
Liquefied petroleum gas	do.	43,000	44,000	44,000	45,000	45,000
Gasoline	do.	42,000	42,000	43,000	43,000	44,000
Kerosene and jet fuel	do.	60,000	59,000	60,000	60,000	62,000
Distillate fuel oil	do.	172,000	171,000	172,000	173,000	173,000
Residual fuel oil	do.	69,000	70,000	71,000	71,000	72,000
Other	do.	94,000	93,000	93,000	94,000	95,000
Total	do.	480,000	479,000	483,000	486,000	491,000

[r]Revised.

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

[2]Table includes data available through September 19, 2007.

[3]In 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.

[4]Reported figure.

[5]Excludes production from steel miniplants.

[6]Not elsewhere specified.

[7]India's marketable production is 10% to 20% of mine production.

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(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. (Canada), 39.6%]	Belgaum Refinery, Karnataka	280
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Dhamanjodi Refinery, Orissa	1,580
Do.	Bharat Aluminium Co. Ltd. (Indian Government, 49%, and Sterlite Industries Ltd., 51%)	Korba Refinery, Chhattisgarh	200
Do.	Utkal Alumina International Ltd. [Norsk Hydro A/S (Norway), 45%; Alcan Aluminium Ltd. (Canada), 35%; Hindalco Industries Ltd., 20%]	Koraput Refinery, Orissa	1,500 [1]
Do.	Madras Aluminium Co. Ltd. (Sterlite Industries Ltd., 80%, and others, 20%)	Mettur Refinery, Tamil Nadu	80
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 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. (Canada), 39.6%]	Alupuram Smelter, Kerala	20
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Angul Smelter, Orissa	345
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 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. (Indian Government, 49%, and Sterlite Industries Ltd., 51%)	Korba Smelters, Chhattisgarh	350
Do.	Madras Aluminium Co. Ltd. (Sterlite Industries 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.	Vijaylaxmi Minerals Trading Co.	do.	50
Bauxite	Bharat Aluminium Co. Ltd. (Indian Government, 49%, and Sterlite Industries Ltd., 51%)	Amarkantak Mine, Madhya Pradesh	200
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 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%)	Lohardarga district mines, Jharkhand	750
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	do.	200
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Panchpatmali Hills, Koraput district mines, Orissa	4,800
Do.	Minerals & Minerals Ltd. (Indian Government, 100%)	Richuguta, Palamau district mines, Jharkhand	200
Borax	Borax Morarji Ltd.	Ambernath, Maharashtra	17
Cement	Larsen and Toubro Ltd.	Awarpur Plant, Maharashtra	2,300
Do.	Century Cement (Century Textiles and Industries Ltd., 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 2006

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
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. (Indian 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. (Indian 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	1,089
Do.		Cement Corp. of India Ltd. (Indian Government, 100%)	Nayagaon Plant, Madhya Pradesh	1,330
Do.		JK Cement Works (a division of JK Synthetics Ltd., 100%)	Nimbahera Plant, Rajasthan	1,462
Do.		The India Cement Co. Ltd. (Indian Government, 26%; Life Insurance Corp. of India, 24%; others, 50%)	Sankarnagar Plant, Tamil Nadu	1,000
Do.		Maihar Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Satna Plant, Madhya Pradesh	1,800
Do.		Shree Digvijay Cement Co. Ltd.	Shreeniwas Plant, Maharashtra	1,060
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.		Manikgarth Cement (Century Textiles and Industries Ltd., 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., 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. (Indian Government, 34.86%, and private shareholders, 65.14%)	Wadi Plant, Karnataka	2,180
Chromite		Ferro Alloys Corp. Ltd.	Cuttack district, Orissa	120
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	300
Do.		Tata Iron and Steel Co. Ltd.	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 Coal India Ltd., Indian Government, 100%)	Bihar and West Bengal	26
Do.	do.	Central Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar	27
Do.	do.	Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar and West Bengal	21
Do.	do.	Mahanadi Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Orissa	21
Do.	do.	North Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Assam	640

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Coal, bituminous— Continued	million metric tons	Northern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh and Uttar Pradesh	24
Do.	do.	Singareni Collieries Co. Ltd. (Andhra Pradesh State government, 50%, and Indian Government, 50%)	Andhra Pradesh	18
Do.	do.	South Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh	36
Do.	do.	Western Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh and Maharashtra	18
Coal, lignite	do.	Neyveli Lignite Corp. Ltd. (Indian Government, 100%)	Tamil Nadu	17
Copper, mine		Hindustan Copper Co. Ltd. (Indian Government, 100%)	Indian Copper Complex mines, Ghatsila district, Jharkhand	31
Do.		do.	Khetri Copper Complex mines, Khetrinagar Rajasthan	15
Do.		do.	Malanjkhand 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 Co. Ltd. (Indian 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 Ltd.	Tuticorin Smelter, Tamil Nadu	400
Do.		do.	Silvassa Refinery, Gujarat	180
Diamond	carats	Indian Government	Mahjgawan Mine	25,000
Gold	kilograms	Hutti Gold Mines Co.	Hutti Mine, Karnataka	3,000
Ilmenite-rutile ore		Kerala Minerals and Metals Ltd. (Kerala State government, 100%)	Chavara, Kerala	100
Do.		Indian Rare Earths Ltd. (Indian Government, 100%)	do.	200
Do.		do.	Ganjam, Orissa	220
Do.		do.	Manavalakurichi, Tamil Nadu	65
Do.		VV Minerals Ltd.	Kanyakumari, Tamil Nadu	130
Iron and steel, crude steel		Visvesvaraya Iron and Steel Ltd. (Karnataka State government, 60%, and Steel Authority of India Ltd., Indian Government, 40%)	Bhadravati steel plant, Karnataka	180
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Bhilai steel plant, Jharkhand	4,930
Do.		do.	Bokaro steel plant, Bihar	4,000
Do.		Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Steel Authority of India Ltd., Indian Government, 100%)	Burnpur steel plant, West Bengal	1,500
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Durgapur steel plant, West Bengal	1,600
Do.		Tata Iron and Steel Co. Ltd.	Jamshedpur steel plant, Bihar	4,000
Do.		Steel Authority of India Ltd. (Indian 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	2,500
Do.		Ministeel plants (privately owned)	About 180 plants located throughout India	4,700
Do.		Essar Steel Co. Ltd.	Hazira, Gujarat	3,000
Iron ore		National Mineral Development Corp. Ltd. (Indian Government, 100%)	Bailadila, Chhattisgarh	9,000
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Bastar and Durg district, Chhattisgarh	7,000
Do.		Kudremukh Iron Ore Co. Ltd. (Indian Government, 100%)	Kudremukh, Chikmagalur district, Karnataka	10,300
Do.		National Mineral Development Corp. Ltd. (Indian Government, 100%)	Donimalai, Karnataka	9,000
Do.		Chowgule and Co. Ltd.	Goa	2,500

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Iron ore—Continued	Dempo Mining Corp. Ltd.	Goa	2,500
Do.	V.M. Salgaocar & Bros. Pvt. Ltd.	do.	2,500
Do.	Sesa Goa Ltd.	Codli and Sonshi, Goa	NA
Do.	Steel Authority of India Ltd. (Indian Government, 100%)	Kendujhar district, Orissa	3,000
Do.	Tata Iron and Steel Co. Ltd.	do.	2,000
Do.	Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Steel Authority of India Ltd., Indian Government, 100%)	Singhbhum district, Bihar	2,500
Do.	Steel Authority of India Ltd. (Indian Government, 100%)	do.	3,500
Do.	Tata Iron and Steel Co. Ltd.	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 Co. Ltd. (Indian Government, 100%)	do.	22
Lead:			
Primary	Hindustan Zinc Ltd. (Sterlite Opportunities and Ventures Ltd., 64.9% and Indian Government, 29.5%)	Chanderiya (Ausmelt) Smelter, Rajasthan	50
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. (Sterlite Opportunities and Ventures Ltd., 64.9%, and Indian 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. (Indian Government, 100%)	Salem, Tamil Nadu	150
Do.	Dalmia Magnesite Corp.	do.	150
Do.	Tamil Nadu Magnesite Ltd. (Tamil Nadu State government, 100%)	do.	150
Manganese ore[2]	Manganese Ore India Ltd. (Indian Government, 100%)	Adilabad, Andhra Pradesh	NA
Do.	Falechand Marsingdas	Andhra Pradesh	NA
Do.	Manganese Ore India Ltd. (Indian 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. (Indian Government, 100%)	Bhandara, Maharashtra	NA
Do.	Eastern Mining Co.	North Kanara, Karnataka	NA
Do.	Mysore Minerals Ltd.	do.	NA
Do.	Manganese Ore India Ltd. (Indian 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
Do.	Tata Iron and Steel Co. Ltd.	do.	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 Iron and Steel Co. Ltd.	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

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Petroleum, refined products	thousand 42-gallon barrels per day	Cochin Refineries Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 55%, and private interests, 45%)	Ambalamugal Refinery, Kerala	93,000
Do.	do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%, and private interests, 9%)	Barauni Refinery, Bihar	66,000
Do.	do.	Bongaigaon Refinery and Petrochemicals Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 100%)	Bongaigaon Refinery, Assam	27,000
Do.	do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%, and private interests, 9%)	Digboi Refinery, Assam	12,000
Do.	do.	do.	Guwahati Refinery, Assam	20,000
Do.	do.	do.	Haldia Refinery, West Bengal	61,000
Do.	do.	do.	Koyali Refinery, Gujarat	185,000
Do.	do.	Madras Refineries Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 52%, and private interests, 48%)	Madras Refinery, Tamil Nadu	131,000
Do.	do.	Bharat Petroleum Corp. Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 67%, and private interests, 33%)	Mahul Refinery, Mumbai, Maharashtra	135,000
Do.	do.	Industan Petroleum Corp. Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 51%, and private interests, 49%)	do.	110,000
Do.	do.	do.	Visakhapatnam Refinery, Andhra Pradesh	90,000
Do.	do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%, and private interests, 9%)	Mathura Refinery, Uttar Pradesh	156,000
Do.	do.	do.	Panipat Refinery, Haryana	240,000
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. (Sterlite Opportunities and Ventures Ltd., 64.9% and Indian Government, 29.5%)	Maton Mine, Rajasthan	NA
Zinc		Binani Zinc Ltd.	Binanipuram Smelter, Kerala	38
Do.		Hindustan Zinc Ltd. (Sterlite Opportunities and Ventures Ltd., 64.9% and Indian Government, 29.5%)	Chanderiya Smelter, Rajasthan	170
Do.		do.	Debari Smelter, Rajasthan	78
Do.		do.	Visakhapatnam (Vizag) Smelter, Andhra Pradesh	54

[e]Estimated. NA Not available.
[1]Scheduled startup is delayed to 2006 or later.
[2]Capacity of clusters of surface mines varies extremely, depending on demand. Estimated total capacity is 1.8 million metric tons per year.
[3]Estimated total phosphate rock capacity is 1.2 million metric tons per year.

TABLE 3
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 2006

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Barite		39,000
Bauxite		524,000
Chromite		47,000
Coal:		
Bituminous		93,000,000
Lignite		36,000,000
Copper, in ore		290,000
Gold, in metal	kilograms	59,000
Graphite		4,800
Ilmenite and rutile		488,000
Iron, in ore		6,300,000
Kyanite and sillimanite		16,400
Lead and zinc, in ore		101,000,000
Limestone		12,000,000
Magnesite		123,000
Manganese, in ore		104,000
Phosphate rock		75,000
Talc and pyrophyllite		142,000
Zircon		28,000

Source: Indian Minerals Yearbook 2005, Indian Bureau of Mines.