



2007 Minerals Yearbook

INDIA

THE MINERAL INDUSTRY OF INDIA

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The country's industrial output surged as a result of a rapid expansion in manufacturing in 2007 and then leveled off owing to higher interest rates. Mining showed a positive growth of 4.4%. India produced more than 80 different mineral commodities, and was among the world's leading producers of bauxite, coal, mica, and iron ore. Its large reserves of barite, bauxite, chromite, coal, iron ore, and manganese ore placed India among the top 10 countries in the world in terms of the economic importance of its mineral reserves and resources (Indian Bureau of Mines, 2007).

Minerals in the National Economy

Owing to the country's healthy economic growth, the demand for metals and minerals in India and in other developing countries has led to a steady growth in the country's mineral industry and been a vital part of the industrial production. Greater investment in exploration and mineral production also increased the productivity and efficiency of the mining and processing operations. The value of mineral output was \$25.3 billion in fiscal year 2007-08 and accounted for 3% of the gross domestic product. The values of mineral imports and exports were \$77.5 billion and \$20.6 billion, respectively, in 2006-07 and accounted for 34% and 14% of the values of total imports and exports, respectively (Ministry of Mines, 2007).

Government Policies and Programs

The Mines and Minerals Regulatory Authority of India was created to oversee the production and use of strategic minerals, which were designated by the Government to be ilmenite, monazite, and rutile sands that contained thorium and titanium. Titanium was a space-age mineral, and thorium, which was the mainstay of India's nuclear program, had the potential to make the nation energy independent. Therefore, instead of using placer deposit mineral sands to produce titanium oxide at Tata Iron and Steel Company Ltd.'s plants at Sattankulan in the State of Tamil Nadu and at Chattarpur in the State of Orissa, plans were in place to build plants to produce thorium and titanium metals instead and reserve them for India's strategic development imperatives (Kalyanaraman, 2007).

In India, only \$2 million was spent annually on prospecting and exploring for minerals and metals (Wilburn, 2008). The Geological Survey of India and Mineral Exploration Corp. limited their exploration activities to bulk minerals, such as bauxite and iron ore. Foreign investment could affect the scope of exploration and the commodity types being sought. The Government approved the floating of a \$500 million high-risk fund (with Canadian participation) to support exploration in a 1.82-million-square-kilometer area in India.

Production

Mineral fuels accounted for 69% of the total value of mineral production in India in fiscal year 2007-08; metals, 20%; and industrial minerals, 11%. The total value of mineral output increased by 9% compared with that of fiscal year 2006-07 (Ministry of Mines, 2007). In terms of world production, India ranked first in mica sheet output; second in barite; third in chromite; fourth in iron ore, pyrophyllite, and talc; and sixth in bauxite. In 2007, production of smelted copper, cobalt metal, and chromite decreased by 18%, 17%, and 8%, respectively, compared with that of 2006. Output of bauxite, mined copper, gold, direct-reduction iron, and silver each showed an increase of more than 20% owing to extensive exploitation of base metals (table 1).

Structure of the Mineral Industry

The Government's grip on the mining sector remained strong. The public sector continued to control 83% of India's ore and mineral output, by value, which, in 2007, included 95% of coal output and all mined copper output. Greater autonomy was given to Hindustan Copper Ltd. (HCL), Mineral Exploration Corp. Ltd. (MECL), and National Aluminium Co. Ltd. to enhance efficiency and increase productivity. The public-sector companies are in control of the mining and processing of aluminum, copper, and gold. MECL is responsible for mineral exploration. In addition, the Government holds a 49% equity interest in Bharat Aluminium Co. Ltd. and a 29.54% equity interest in Hindustan Zinc Ltd. (HZL). Coal India Ltd., which is under the Ministry of Coal, has seven coal producing subsidiaries, as well as Neyveli Lignite Corp. Ltd. and Singareni Collieries Co. Ltd. (a joint undertaking with the State government of Andhra Pradesh) (table 2).

Mineral Trade

India exported, in descending order of value, diamond (mostly cut), iron ore, granite, alumina, precious and semiprecious stones, and chromite in fiscal year 2006-07. The country imported, in descending order of value, crude petroleum, diamond (uncut), and other commodities, including coal, coke, copper ores and concentrates, iron ore, phosphate rock, and sulfur.

Commodity Review

Metals

Aluminum.—Hindalco Industries Ltd. agreed to purchase Alcan Inc. of Canada's 45% stake in Utkal Alumina International Ltd. for an undisclosed amount. The Utkal joint venture involved the development of a new bauxite mine and an

alumina refinery with a capacity of 1.5 million metric tons per year (Mt/yr) in the State of Orissa. Hindalco Industries initially acquired a 20% stake in Utkal Alumina when it bought out Indian Aluminum Co. Ltd. (Indal) in 2000 and later increased its stake to 55% (Financial Express, The, 2007a).

AluChem Inc. of the United States and Gujarat Mineral Development Corp. Ltd. (GMDC) signed a memorandum of understanding to build a \$400 million 1-Mt/yr specialty alumina plant in the Kutch region. Production would include activated, calcined, hydrated, tabular, and thermally active aluminas. The plant, which was to be fueled by locally sourced lignite, would begin commercial production in 2010. GMDC, which would own 26% of the joint venture, would conduct the exploration work and supply AluChem with medium-grade bauxite feedstock (Industrial Minerals, 2007a).

Copper.—HCL planned to expand its mines and explore for new copper deposits in the States of Jharkhand, Madhya Pradesh, and Rajasthan with the goal of producing 7.93 Mt/yr of ore by 2011. The company controlled three-quarters of India's established copper deposits, which hosted 370 million metric tons (Mt). India had a smelting capacity of 900,000 metric tons per year (t/yr) but produced only 734,000 t/yr of copper. HCL had a small capacity of 65,000 t/yr at its smelters at Khetri in Rajasthan and at Ghatsila in Jharkhand. The company planned to become self-sufficient in copper concentrate production and to generate surplus concentrate by 2012. HCL applied to the Jharkhand State government for the award of the lease to the 80-Mt Chapri Sideshwar deposit. HCL also wanted to develop the Banwas Mine in Rajasthan and planned to invest \$293 million to change its Malanjhand open pit mine in Madhya Pradesh, which produced 2 Mt/yr of ore, into an underground mine that would produce 4 Mt/yr of ore (Metal Bulletin, 2007a).

Sterlite Industries Ltd., which was the country's other copper producer, owned a captive Konkola copper mine in Zambia and a copper mine in Australia. It also operated a copper smelter with a capacity of 400,000 t/yr at Tuticorin in the State of Tamil Nadu and a copper refinery with a capacity of 300,000 t/yr at Silvassa in the State of Gujarat (Vedanta Resources plc, 2007).

HCL decided to resume mining at the Surda Mine in Jharkhand in alliance with India Resources Ltd. of Australia with an initial production of 4,500 t/yr of copper concentrate. The mine had been closed in January 2003. First production and plant recommissioning were scheduled for November 2007 (India Resources Ltd., 2007).

Gold.—Adi Gold Mining Pvt. Ltd., which was a subsidiary of Pebble Creek Mining Ltd. of Canada, held 100% of the mineral rights to the Askot deposit in the State of Uttaranchal. The copper-gold-silver-lead-zinc deposit was drilled by Pebble Creek in 2007 to verify the limits of the mineral occurrence. Preliminary study indicated a mining operation that would require little capital and have low operating costs. The economic vitality of the Askot deposit depended on metal prices. Under Indian law, profits from mining operations could be repatriated (Pebble Creek Mining Ltd., 2007a).

Pebble Creek's drilling program identified Gadarwara's large magnetic anomaly as being caused by a banded iron formation (BIF). The Gadarwara high magnetic anomaly was 1,800 meters (m) wide and 20 kilometers (km) long. The presence of sulfides

and sulfates in the BIF system was considered an important indicator for gold mineralization. The BIF assemblage belonged to the Mahakoshal Formation of Archean to early Proterozoic age. In the company's Banda gold prospect in the State of Uttar Pradesh, De Beers India Pvt. Ltd. withdrew from the technical consulting services and option agreement of 2006 with Pebble Creek. Pebble Creek had no immediate plans to perform additional work at Banda (Pebble Creek Mining Ltd., 2007b).

Indo Gold Ltd. of Australia reported results from soil, stream sediment, and rock chip sampling at the Jagpura joint-venture project with Metal Mining Pvt. Ltd. in the State of Rajasthan. Additional soil sampling at Bhukia increased the extent of geochemical anomalies to the north, east, and west. The regional stream sediment and rock chip sampling continued to define gold anomalies along a strike of 60 km where significant gold and (or) copper mineralization was identified. Previous drilling data from the Geological Survey of India and Hindustan Zinc Ltd. showed gold mineralization within the Bhukia soil anomalies (Indo Gold Ltd., 2007).

Iron and Steel.—India's iron ore exports were expected to increase in 2007 despite an export tax of \$6.78 per metric ton imposed by the Government in February. The increase in exports was owing to the sustained Chinese demand for Indian iron ore (64% iron content). China imported a combined total of 350 Mt/yr of iron ore from Australia, Brazil, and India. In 2006, India's total iron ore exports were 90 Mt, of which 74 Mt went to China. For China, iron ore sent by freight from India cost \$18 per metric ton less than the iron ore that was shipped from Brazil. Meanwhile, the Indian steel industry demanded a complete phaseout of iron ore exports by fiscal year 2011-12. All major steel companies were expanding and, as a result, the country's iron ore reserves could be exhausted in 20 years (Financial Express, The, 2007b).

The Chhattisgarh State government withdrew National Mineral Development Corp.'s (NMDC's) right to a part (100 Mt) of the Bailadila iron ore reserves, which the government wanted to grant to Essar Steel Co. Ltd. instead. Essar Steel planned to build a 3.2-Mt/yr steel plant in Chhattisgarh at a cost of \$1.33 billion. NMDC planned to challenge the government's decision (Metal Bulletin, 2007d).

Vedanta Resources plc acquired 100% of Finsider International Ltd. of the United Kingdom, which owned a 51% stake in Sesa Goa Ltd., from Mitsui & Co. Ltd. of Japan for \$981 million. Sesa Goa was a low-cost iron ore miner in the States of Goa, Karnataka, and Orissa; the company exported iron ore to China, Europe, and Japan. Sesa Goa's iron ore reserves were estimated to be 207 Mt, which could support 20 years of mine production. India's huge iron ore reserves were ranked third in the world. Sesa Goa's metallurgical coke and pig iron plants each had a capacity of 250,000 t/yr. Vedanta Resources planned to make an open offer to acquire an additional 20% of Sesa Goa. The total cash value for 71% of Sesa Goa was \$1.37 billion. Vedanta Resources planned to finance the acquisition with a \$1.1 billion of bank loan and cash resources for the remainder (London Stock Exchange, 2007).

The State of Maharashtra had reserves of 180 Mt of high-grade iron ore with an iron content of 64% to 66% in the Districts of Chandrapur and Gadchiroli. Of this amount, 80 Mt

had been allocated for Lloyds Steel Industries Ltd., which owned a 500,000-t/yr steel plant in the Wardha District, and 30 Mt had been allocated for Ispat Industries, which owned a 3-Mt/yr steel plant at Dolvi. Sindhurg Mining Corp. planned to invest \$80 million for the development of a mine and the installation of beneficiation plants at Sindhurg. In the Redi District, Tata Metallics took over the 400,000-t/yr Usha Ispat pig iron plant. The State had 12 direct-reduced iron producers with a combined total production capacity of 1.5 Mt/yr (Metal Bulletin, 2007b).

India's top steelmaker, by output, was Tata Steel Co. Ltd., which also was the world's lowest cost producer, followed by Steel Authority of India (SAIL) and JSW Steel. Tata Steel and SAIL had their own iron ore and coal mines. JSW Steel produced 7 Mt/yr of steel and planned to start a 10-Mt/yr-capacity steel plant in the State of West Bengal by 2009. A similarly sized steel plant was to begin operations in the State of Jharkhand by 2012 (Agarwal, 2007).

Tata Steel outbid Companhia Siderúrgica Nacional of Brazil to take over Corus Group, which was a European steelmaker, for \$11.3 billion. The Corus board of directors decided to recommend the Tata Steel bid to its shareholders. The deal would represent the largest acquisition by an Indian company to date. After the acquisition, Tata Steel would become the world's fifth ranked steelmaker (Washington Post, The, 2007b).

SAIL's \$9 billion corporate plan for 2012 called for the 2.5-Mt/yr expansion of the Iisco steel plant in the State of West Bengal, the construction of a meltshop and a cold-rolling mill for Salem Steel in the State of Tamil Nadu, and the expansion of SAIL's Bokaro steel plant in Jharkhand to 7.5 Mt/yr from 4.6 Mt/yr. The plan would increase the company's crude steel output to 22.5 Mt/yr. The company tried to regain control of the Chiria iron ore deposit in Jharkhand, which hosted 2,000 Mt of reserves. The company also owned another set of deposits at Gua. SAIL needed the Chiria deposit to implement its growth plan, which included the construction of a 12-Mt/yr steel plant in Jharkhand (Metal Bulletin, 2007c).

Jindal Stainless Ltd. was India's leading manufacturer of stainless steel followed by SAIL and other producers, such as Shah Alloys and Sunflag Iron and Steel Ltd. The country produced 17 Mt/yr of stainless steel; about 1.2 Mt/yr of the stainless steel was used to make utensils, and the rest was exported. India imported 36,000 t/yr of nickel mainly from Australia, Canada, and Russia. The stainless steel industry asked the Government to cut the import duty to zero from 5% in line with the import duties in Japan and the Republic of Korea (Financial Express, The, 2007c).

Ferro Alloys Corp. Ltd. planned to build a 500,000-t/yr stainless steel plant and a powerplant in Orissa with an investment of \$635 million. Power generated would be used to run the stainless steel complex. Ferro Alloys Corp. was part of Facor Group, which was India's leading producer of specialty steel and ferrochrome products (Platts, 2007).

Visa Steel Ltd. established a joint-venture company (Visa Bao Ltd.) with Baosteel Trading Co. of China and Visa Comtrade AG of Switzerland to set up a 100,000-t/yr ferrochrome plant in the Jajpur District in the State of Orissa. The cost of the project would be \$63 million, which would be financed through a 65/35

debt-equity mix. Visa Steel would hold a 51% stake; Baosteel, 35%; and Visa Comtrade, 14%. The plant would ensure a stable supply of ferrochrome for Baosteel's stainless plant in China (Visa Steel Ltd., 2007).

Lead and Zinc.—Exide Industries Ltd. completed its acquisition of Tandon Metals Ltd. for \$5.6 million. Exide Industries planned to invest an additional \$2.8 million to increase the lead smelting production of Tandon Metals at Pune, Maharashtra, to 10,000 t/yr in the first part of 2009. Smelting capacity could be further expanded to 20,000 t/yr in the next 2 to 3 years. Present output was between 700 and 800 t/yr owing to a lack of raw materials and fewer customer orders. The expansion project would reduce Exide Industries' dependence on high-cost imported lead (Business Standard, 2007).

HZL was India's only integrated zinc company. The company operated the Rampura Agucha Mine, which had low mining costs and high-grade ore, and the Chanderiya smelter, which used Ausmelt technology. Both the mine and the smelter are located in the State of Rajasthan. The mine was estimated to have reserves of 53.4 Mt at grades of 12.8% zinc and 2% lead. The smelting capacity for refined lead was 85,000 t/yr and, following a planned expansion of the mine by 2010, that for refined zinc would be 1 Mt/yr. The company had two primary lead smelters at Chanderiya in Rajasthan with capacities of 50,000 t/yr and 35,000 t/yr, respectively. HZL planned to build a 50,000-t/yr secondary lead smelter at a cost of \$33.9 million (Vedanta Resources plc, 2007).

Titanium.—The State government of Andhra Pradesh signed memorandums of understanding with Bothli Trades AG of Switzerland, Stork Handelsgees m.b.H. of Austria, and W Minerals to explore for beach sand and extract ilmenite deposits along its coast. About 19,000 hectares were allotted among the three companies (Industrial Minerals, 2007b).

Industrial Minerals

Cement.—OCL India Ltd. (formerly Orissa Cement Ltd.), which was a public-sector cement company based in the State of Orissa, had a production capacity of 1.85 Mt/yr. A \$170 million project (which would be financed in part by a \$50 million loan from the International Finance Corp.) included the addition of a 1.32-Mt/yr clinker production section at an estimated cost of \$109 million at Rajgangpur and a 900,000-t/yr grinding unit at an estimated cost of \$61 million at a greenfield location. The company would finance the project by raising funds through rights issue and long-term debt (International Finance Corp., 2007b).

In 2007, Humboldt Wedag India and KHD Humboldt Wedag of Germany won contracts for engineering and supply of the following: a new clinker grinding plant with a capacity of 175 metric tons per hour (t/h) to Grasim Industries Ltd.'s Aligarh Cement Grinding Unit in the State of Uttar Pradesh; a new clinker grinding unit with a capacity of 160 t/h to Orient Cement's Jalgaon cement plant in the Jalgaon District in the State of Maharashtra; and a new raw material grinding system with a capacity of 300 t/h to Orient Cement's Devapur cement plant in the Adilabad District in the State of Andhra Pradesh (KHD Humboldt Wedag GmbH, 2007).

Diamond.—Although De Beers had discovered 38 kimberlites, there were no diamond mining activities in India. The company's exploration for diamond was conducted by De Beers India, which would also be responsible for diamond mining once a viable kimberlite was identified. The company was actively exploring in the States of Karnataka, Madhya Pradesh, Orissa, and Uttar Pradesh. De Beers supplied rough diamond from South Africa through Hindustan Diamond Co. and marketed diamond jewelry through DTC Marketing India Pvt. Ltd. Hindustan Diamond, which was a 50-50 partnership between De Beers and the Government, supplied rough diamond to 238 small and medium manufacturers and exporters of polished diamond in India. DTC Marketing India's functions were marketing and consumer confidence activities (De Beers, 2007).

India Resources Ltd. of Australia, which had a commercial alliance with HCL, received five prospecting licenses in the State of Andhra Pradesh in an area that was part of the eastern Dharwar Archaean craton of South India. Dwyka Diamonds of Australia had identified and mapped two kimberlite pipes through previous drilling in the area. The area was highly prospective for diamond-associated indicator minerals. An exploration program was expected to begin in early 2008. India Resources also was exploring potential diamond prospects at Bhandara in Orissa and at Bundelkhand in Madhya Pradesh and had discovered kimberlitic indicators in stream sediment sampling in the Bhandara prospect (Antwerp Facets News Service, 2007).

Lime.—Ispat Industries Ltd. entrusted Maerz Ofenbau AG of Switzerland to supply equipment, materials, and engineering services for the installation of a 300-metric-ton-per-day (t/d) coal dust-fired lime shaft-typed kiln. The kiln would be equipped with 22 burner lances in each shaft to feed coal dust into the burning zone. Limestone would be calcined in the kiln to produce 300 t/d of quicklime (World Cement, 2007).

Mineral Fuels and Related Materials

Coal.—Indian coal was generally of low quality with high ash and low calorific value. Hard coal (anthracite and bituminous) accounted for 80% of the country's proven reserves, and lignite accounted for the remaining 20%. Hard coal occurs in the States of Bihar, Madhya Pradesh, Orissa, and West Bengal in 18 major coalfields. Coal was used mostly in electric power generation in India, and coal production could not keep up with the increasing demand for power in the country. As a result, India became a net importer of coal. India also imported most of its coking coal (Methane to Markets Partnership, 2007).

Natural Gas.—Reliance Industries Ltd. struck two gas-bearing zones in its prolific deepwater block in the Krishna Godavari basin; the two zones were expected to produce 80 million cubic meters per day of gas by mid-2008. Niko Resources Ltd. of Canada owned a 10% stake in the block. Reliance Industries also flowed 526,400 cubic meters per day of gas in the Gujarat-Saurashtra basin off the west coast. Hardy Oil & Gas plc held a 10% interest in the exploration license (Petroleum Economist, 2007a).

India, Iran, and Pakistan planned to start laying the \$7 billion Iran-Pakistan-India natural gas pipeline on a segmented basis

by September 2009. Each country would build the pipeline in its territory. The 1,092-km Iranian segment would cost \$3.99 billion, the 655-km Pakistani segment would cost \$2.64 billion, and the 344-km Indian segment would cost \$600 million. The pipeline was expected to be completed in 2014. Natural gas would originate from Iran's South Pars Gasfield in the Persian Gulf. Pakistan's natural gas sales and purchase agreement with National Iranian Gas Co. was signed in June 2007. The first flow of gas was expected in 2014. However, India had disputes with Pakistan's imposed transportation tariff and transit fee on gas delivered to India (Alexander's Gas & Oil Connections, 2007).

A memorandum of understanding signed in September with state-owned Oil and Natural Gas Corp. (ONGC) gave BP Exploration and Production Co. Ltd. (BP E&P) the right to explore and exchange technical know-how on deepwater hydrocarbons and coalbed methane. BP E&P acquired the exploration rights to a coalbed methane block in West Bengal. India has a large amount of coal resources, which could potentially be methane gas-bearing (BP Magazine, The, 2007).

India relied solely on domestic sources for natural gas, but supplies fell short of demand. Imports of liquefied natural gas (LNG) were through Petronet LNG Ltd. of India. Regasified LNG accounted for 20% of India's total gas consumption. The International Finance Corp. proposed to invest \$350 million in the form of loans for 13 years in Petronet LNG's expansion plan to more than double its existing import and regasification capacities. The plan called for expansion of the Dahej terminal in Gujarat and construction of the greenfield Kochi terminal in Kerala (International Finance Corp., 2007a, p. 4).

Petronet LNG planned to extend its short-term LNG import deal with Qatar until December 2008. The company imported 1.25 Mt of LNG from RasGas of Qatar in 2007 and planned to import an additional 0.75 Mt in 2008. Supplies would feed the Dabhol powerplant in Maharashtra (Petroleum Economist, 2007b).

Petroleum.—State-owned ONGC planned to spend \$19.5 billion on domestic upstream projects during the next 5 years, including \$1.5 billion at the offshore Mumbai High Oilfield. Eighty-six new wells were planned at the field and would produce an additional 162 million barrels of oil and increase output by 30,000 barrels per day (bbl/d) (Petroleum Economist, 2007b).

India was Asia's third ranked oil consumer and imported 70% of its crude oil requirements. To boost its domestic oil production, the Government planned to auction 57 offshore and onshore oil and gas blocks in December. These included 19 deepwater blocks, mostly on the west coast; 9 shallow water blocks; and 29 inland blocks. The bidding would be closed in April 2008 and the blocks would be allocated in July. Thirty-six foreign companies submitted bids in the previous round (Washington Post, The, 2007a).

Essar Oil Ltd. planned to build a 360,000-bbl/d oil refinery next to its existing 240,000-bbl/d plant at Vadinar in Gujarat by June 2010. The new plant would increase the company's total refining capacity to 680,000 bbl/d (Petroleum Economist, 2007b).

Uranium.—The Cabinet Committee on Economic Affairs cleared the development by Uranium Corp. of India of a uranium mine and processing plant at Tummalapalle in the

Kadapa District in Andhra Pradesh at a cost of \$281 million. The project was expected to meet the uranium fuel requirements of India's nuclear power program and would provide employment to 934 people. The mine was likely to be commissioned in 30 months, and the processing plant, in 36 months (Hindu, The, 2007).

Reserves and Resources

The country's mineral resources include large deposits of barite, bauxite, chromite, coal, iron ore, limestone, and manganese. India ranked second after China in barite resources; in iron ore reserves, it ranked third in the world. The country's bauxite, chromite, coal, limestone, and manganese reserves or resources were among the 10 largest in the world. Barite deposits occur in the State of Andhra Pradesh. Iron ore deposits in the form of hematite and magnetite occur in the States of Bihar, Karnataka, Madhya Pradesh, Orissa, and Tamil Nadu (table 3).

Outlook

India's mine production of copper is expected to increase with mine expansions and the development of a new mine by HCL, which would make the company self-sufficient in copper concentrates from domestic sources. Although the country shipped most (82%) of its iron ore exports to China, which had an advantage of low freight costs from India compared with those from Australia and Brazil, the iron ore exports are expected to decrease as domestic steel plants use more iron ore from the producing states in the next 4 to 5 years owing to capacity expansions and planned new steel plants. The lead and zinc smelting capacities are expected to increase owing to Exide Industries' and HZL's planned expansions by 2010. India has abundant hard coal resources; because of the coal's low calorific value, production shortfall, and strong demand for power, however, the country is expected to remain a net coal importer to feed its coal-fired powerplants in the near future.

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

(Metric tons unless otherwise specified)

| Commodity ³ | 2003 | 2004 | 2005 | 2006 | 2007 | |
|---|----------------------|------------------------|------------------------|------------------------|--------------------------|------------------------|
| METALS | | | | | | |
| Aluminum: | | | | | | |
| Bauxite, gross weight | thousand metric tons | 10,414 ⁴ | 11,285 ⁴ | 12,385 ⁴ | 13,940 ^{r,4} | 19,221 ⁴ |
| Alumina, Al ₂ O ₃ equivalent | do. | 2,500 | 2,600 | 2,700 | 2,800 | 2,900 |
| Metal, primary | | 798,800 ⁴ | 861,800 ⁴ | 942,400 ⁴ | 1,104,100 ⁴ | 1,223,100 ⁴ |
| Cadmium metal | | 477 ⁴ | 489 ⁴ | 409 ⁴ | 457 ^{r,4} | 580 ⁴ |
| Chromium, chromite, gross weight | | 2,210,000 ⁴ | 2,948,944 ⁴ | 3,255,162 ⁴ | 3,600,400 ^{r,4} | 3,320,000 |
| Cobalt metal | | 255 ⁴ | 545 ⁴ | 1,220 ⁴ | 1,184 ⁴ | 980 ⁴ |
| Copper: | | | | | | |
| Mine output, Cu content | | 28,500 ⁴ | 29,500 ⁴ | 26,900 ⁴ | 27,400 ^{r,4} | 34,700 ⁴ |
| Metal, primary: | | | | | | |
| Smelter | | 391,000 ⁴ | 401,000 ⁴ | 486,600 ⁴ | 610,000 ^{r,4} | 500,400 ⁴ |
| Refinery | | | | | | |
| Electrolytic, cathode | | 375,000 ⁴ | 399,000 ⁴ | 497,000 ⁴ | 629,000 ⁴ | 718,600 ⁴ |
| Fire refined | | 19,000 | 20,000 | 20,000 | 15,000 ^r | 15,000 |
| Total | | 394,000 | 419,000 | 517,000 | 644,000 ^r | 734,000 |
| Gold metal, smelter | kilograms | 3,200 ⁴ | 3,700 ⁴ | 3,100 ⁴ | 2,400 ^{r,4} | 3,000 ⁴ |
| Iron and steel: | | | | | | |
| Iron ore and concentrate: | | | | | | |
| Gross weight | thousand metric tons | 99,100 ⁴ | 120,600 ⁴ | 152,000 ^{r,4} | 177,000 ^{r,4} | 202,000 ⁴ |
| Fe content | do. | 63,400 ⁴ | 77,200 ⁴ | 97,500 ^{r,4} | 113,000 ^{r,4} | 129,000 ⁴ |
| Metal: | | | | | | |
| Pig iron | do. | 26,550 ^{r,4} | 25,117 ^{r,4} | 27,125 ^{r,4} | 28,300 ^{r,4} | 28,800 ⁴ |
| Direct-reduced iron | do. | 7,670 ⁴ | 9,370 ⁴ | 12,040 ⁴ | 14,740 ⁴ | 18,100 ⁴ |
| Ferroalloys: | | | | | | |
| Ferrochromium, including charge chrome | | 468,677 ⁴ | 527,100 ⁴ | 611,373 ⁴ | 634,200 ^{r,4} | 640,000 |
| Ferrochromiumsilicon | | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Ferromanganese | | 165,000 | 170,000 | 170,000 | 180,000 | 180,000 |
| Ferrosilicon | | 54,000 | 55,000 | 56,000 | 58,000 | 60,000 |
| Silicomanganese | | 160,000 | 160,000 | 170,000 | 180,000 | 180,000 |
| Other | | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 |
| Steel, crude | thousand metric tons | 31,779 ⁴ | 32,600 ⁴ | 45,800 ^{r,4} | 49,500 ^{r,4} | 53,100 ⁴ |
| Semimanufactures ⁵ | do. | 35,639 ⁴ | 38,421 ⁴ | 42,947 ⁴ | 45,000 | 47,000 |
| Lead: | | | | | | |
| Mine output, Pb content | | 44,000 ⁴ | 51,300 ⁴ | 60,400 ⁴ | 69,200 ^{r,4} | 77,600 ⁴ |
| Metal, refined: | | | | | | |
| Primary | | 77,500 ⁴ | 40,000 ⁴ | 56,000 ⁴ | 77,700 ^{r,4} | 88,800 ⁴ |
| Secondary | | 41,000 ⁴ | 25,000 ⁴ | 35,000 ⁴ | 35,000 ⁴ | 35,000 ⁴ |
| Total | | 118,500 ⁴ | 65,000 ⁴ | 91,000 ⁴ | 112,700 ^{r,4} | 123,800 ⁴ |
| Manganese: | | | | | | |
| Ore and concentrate, gross weight | thousand metric tons | 1,650 | 1,776 ^{r,4} | 2,386 ^{r,4} | 2,003 ^{r,4} | 2,300 |
| Mn content | do. | 620 | 630 | 927 ^{r,4} | 811 ^{r,4} | 900 |
| Rare-earth metals, monazite concentrate, gross weight | | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Selenium | kilograms | 12,000 | 12,000 | 13,000 | 13,000 | 14,000 |
| Silver, mine and smelter output | do. | 51,200 ⁴ | 14,500 ⁴ | 31,500 ⁴ | 30,900 ^{r,4} | 79,300 ⁴ |
| Titanium concentrates, gross weight: | | | | | | |
| Ilmenite | | 562,000 ^r | 621,000 ^r | 686,000 ^r | 690,000 ^r | 700,000 |
| Rutile | | 18,400 ^r | 19,600 ^r | 20,100 ^r | 21,000 ^r | 21,000 |
| Zinc: | | | | | | |
| Mine output, concentrate: | | | | | | |
| Gross weight | | 306,400 ⁴ | 347,100 ⁴ | 477,200 ⁴ | 535,500 ^{r,4} | 572,300 ⁴ |
| Zn content | | 169,000 | 191,000 | 262,000 | 294,000 ^r | 314,000 |

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

| Commodity ³ | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------------------------|----------------------|----------------------|------------------------|----------------------|
| METALS—Continued | | | | | |
| Zinc—Continued: | | | | | |
| Metal: | | | | | |
| Primary | 253,900 ⁴ | 238,400 ⁴ | 266,200 ⁴ | 420,900 ^{r,4} | 416,800 ⁴ |
| Secondary | 24,000 | 24,000 | 23,000 | 23,000 | 23,000 |
| Total | 278,000 | 262,000 | 289,000 | 444,000 ^r | 440,000 |
| Zirconium concentrate, zircon, gross weight | 24,800 ^r | 25,400 ^r | 26,700 ^r | 28,000 ^r | 29,000 |
| INDUSTRIAL MINERALS | | | | | |
| Abrasives, natural, n.e.s.: ⁶ | | | | | |
| Corundum, natural kilograms | 1,150 | 1,100 | 1,100 | 1,000 | 1,000 |
| Garnet | 120,000 | 125,000 | 120,000 | 115,000 | 120,000 |
| Jasper | 8,500 | 8,500 | 8,700 | 8,800 | 9,000 |
| Asbestos | 19,000 | 18,000 | 19,000 | 20,000 | 21,000 |
| Barite | 723,000 | 1,100,000 | 1,200,000 | 950,000 | 1,000,000 |
| Bromine, elemental | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| Cement, hydraulic thousand metric tons | 123,000 | 130,000 | 145,000 | 160,000 ^r | 170,000 |
| Chalk | 115,000 | 115,000 | 120,000 | 120,000 | 125,000 |
| Clays: | | | | | |
| Ball clay | 390,000 | 400,000 | 420,000 | 420,000 | 430,000 |
| Diaspore | 12,000 | 11,000 | 11,000 | 10,000 | 10,000 |
| Fireclay | 360,000 | 365,000 | 370,000 | 375,000 | 380,000 |
| Kaolin: | | | | | |
| Salable crude thousand metric tons | 550 | 550 | 560 | 560 | 570 |
| Processed do. | 180 | 180 | 190 | 200 | 200 |
| Total do. | 730 | 730 | 750 | 760 | 770 |
| Other do. | 75 | 75 | 80 | 80 | 85 |
| Diamond: | | | | | |
| Gem thousand carats | 16 | 16 | 16 | 15 | 15 |
| Industrial do. | 44 | 43 | 42 | 40 | 40 |
| Total do. | 60 | 59 | 58 | 55 | 55 |
| Feldspar | 150,000 | 150,000 | 150,000 | 160,000 | 160,000 |
| Fluorspar: | | | | | |
| Concentrates, metallurgical-grade | 6,300 | 6,400 | 6,500 | 5,800 ^r | 5,000 |
| Other fluorspar materials, graded | 4,200 | 4,300 | 4,400 | 500 ^r | 1,000 |
| Gemstones, excluding diamond: | | | | | |
| Agate, including chalcedony pebble | 200 | 200 | 180 | 180 | 170 |
| Garnet kilograms | 800 | 850 | 850 | 800 | 800 |
| Graphite ⁷ | 110,000 | 120,000 | 130,000 | 120,000 | 130,000 |
| Gypsum | 2,300,000 | 2,350,000 | 2,400,000 | 2,450,000 | 2,500,000 |
| Kyanite and related materials: | | | | | |
| Kyanite | 6,000 | 6,200 | 6,800 | 7,000 | 7,300 |
| Sillimanite | 14,000 | 14,500 | 15,000 | 15,000 | 15,200 |
| Lime | 900,000 | 900,000 | 920,000 | 910,000 | 900,000 |
| Magnesite | 380,000 | 370,000 | 380,000 | 370,000 | 360,000 |
| Mica: | | | | | |
| Crude | 1,600 | 1,600 | 1,600 | 1,700 | 1,700 |
| Scrap and waste | 2,000 | 2,100 | 2,100 | 2,200 | 2,200 |
| Total | 3,600 | 3,700 | 3,700 | 3,900 | 3,900 |
| Nitrogen, N content of ammonia thousand metric tons | 10,048 ⁴ | 10,718 ⁴ | 10,800 | 10,900 | 11,000 |
| Phosphate rock, including apatite | 1,175,000 ⁴ | 1,180,000 | 1,200,000 | 1,200,000 | 1,210,000 |
| Pigments, mineral, natural, ocher | 365,000 | 360,000 | 360,000 | 370,000 | 375,000 |
| Pyrites, gross weight | 115,000 | 120,000 | 130,000 | 125,000 | 120,000 |

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

| Commodity ³ | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|----------------------------|-----------|-----------|-----------|-----------|
| INDUSTRIAL MINERALS—Continued | | | | | |
| Salt: | | | | | |
| Rock salt | thousand metric tons | 3 | 3 | 3 | 3 |
| Other | do. | 15,000 | 15,000 | 15,500 | 15,500 |
| Total | do. | 15,000 | 15,000 | 15,500 | 16,000 |
| Sand: | | | | | |
| Calcareous | do. | 250 | 255 | 260 | 270 |
| Silica | do. | 1,500 | 1,500 | 1,600 | 1,600 |
| Other | do. | 2,900 | 3,000 | 3,100 | 3,100 |
| Slate | | 10,500 | 11,000 | 12,000 | 12,500 |
| Soda ash | | 1,500,000 | 1,500,000 | 1,500,000 | 1,500,000 |
| Stone, sand and gravel: | | | | | |
| Calcite | | 52,000 | 52,000 | 53,000 | 54,000 |
| Dolomite | thousand metric tons | 2,900 | 3,000 | 3,000 | 3,100 |
| Limestone | do. | 120,000 | 125,000 | 120,000 | 123,000 |
| Quartz and quartzite | do. | 250 | 260 | 270 | 280 |
| Sulfur, byproduct from fertilizer plants | | 11,500 | 12,000 | 13,000 | 14,000 |
| Talc and related materials: | | | | | |
| Pyrophyllite | | 86,000 | 86,000 | 85,000 | 86,000 |
| Steatite, soapstone | | 552,000 | 550,000 | 545,000 | 560,000 |
| Vermiculite | | 4,400 | 4,400 | 4,500 | 4,600 |
| Wollastonite | | 120,000 | 115,000 | 120,000 | 125,000 |
| MINERAL FUELS AND RELATED MATERIALS | | | | | |
| Coal: | | | | | |
| Bituminous | thousand metric tons | 328,000 | 330,000 | 333,000 | 350,000 |
| Lignite | do. | 25,000 | 25,000 | 27,000 | 26,000 |
| Total | do. | 353,000 | 355,000 | 360,000 | 405,000 |
| Gas, natural: | | | | | |
| Gross | million cubic meters | 27,000 | 28,000 | 29,000 | 30,000 |
| Marketable | do. | 25,000 | 26,000 | 27,000 | 28,000 |
| Petroleum: | | | | | |
| Crude | thousand 42-gallon barrels | 241,000 | 244,000 | 248,000 | 250,000 |
| Refinery products: | | | | | |
| Liquefied petroleum gas | do. | 44,000 | 44,000 | 45,000 | 45,000 |
| Gasoline | do. | 42,000 | 43,000 | 43,000 | 44,000 |
| Kerosene and jet fuel | do. | 59,000 | 60,000 | 60,000 | 62,000 |
| Distillate fuel oil | do. | 171,000 | 172,000 | 173,000 | 173,000 |
| Residual fuel oil | do. | 70,000 | 71,000 | 71,000 | 72,000 |
| Other | do. | 93,000 | 93,000 | 94,000 | 95,000 |
| Total | do. | 479,000 | 483,000 | 486,000 | 491,000 |

¹Revised. do. Ditto.

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

²Table includes data available through October 20, 2008.

³In 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.

⁴Reported figure.

⁵Excludes production from steel miniplants.

⁶Not elsewhere specified.

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

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity ^c |
|-----------|--|---|------------------------------|
| 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. (Hindalco Industries Ltd., 100%) | 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 |
| Aluminium | 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. | Vijayalaxmi 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%) | Mines in Lohardaga District, 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%) | Mines in Panchpatmali Hills, Koraput District, Orissa | 4,800 |
| Do. | Minerals & Minerals Ltd. (Indian Government, 100%) | Mines in Richuguta, Palamau District, Jharkhand | 200 |
| Borax | Borax Morarji Ltd. | Ambarnath, 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 2007

(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. (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 Singhanian, 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. | OCL India Ltd. | Orissa | 1,850 | |
| 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 Singhanian, principal shareholder) | Sirohi Plant, Rajasthan | 1,400 | |
| Do. | Lafarge S.A. | Sonadih, Chhattisgarh | 1,400 | |
| Do. | Manikgarh 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 |

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(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 | North Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%) | Assam | 640 |
| Do. | do. | 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 | 300 |
| 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, Jharkhand | 4,600 |
| 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. | | Ispat Industries Ltd. | Dolvi, Maharashtra | 3,000 |
| 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, Jharkhand | 5,000 |
| Do. | | do. | Jagdalpur, Chattisgarh | 2,000 |
| Do. | | do. | Duburi, Orissa | 3,000 |
| 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 | 7,000 |
| 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 |

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(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. (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 |
| 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. (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 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. (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 |

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(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 | | 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 |
| 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. | Essar Oil Ltd. | Vadinar Refinery, Gujarat | 240,000 |
| 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 | 340 |
| Do. | | do. | Debari Smelter, Rajasthan | 78 |
| Do. | | do. | Visakhapatnam (Vizag) Smelter, Andhra Pradesh | 54 |

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

¹Scheduled startup is delayed to 2007 or later.

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

³Estimated total phosphate rock capacity is 1.2 million metric tons per year.

TABLE 3
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 2007

(Thousand metric tons unless otherwise specified)

| Commodity | Reserves |
|--|------------------|
| Barite | 39,000 |
| Bauxite | 524,000 |
| Chromite (45% Cr ₂ O ₃) | 21,000 |
| Coal: | |
| Bituminous | 93,000,000 |
| Lignite | 36,000,000 |
| Copper, in ore | 290,000 |
| Gold, in metal | 59,000 kilograms |
| 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 2006, Indian Bureau of Mines.