

THE MINERAL INDUSTRY OF

INDIA

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India's economic recovery continued in 1999 with increased industrial production, exports, and imports. Economic growth was expected to be around 6% with industry contributing a larger share to the gross domestic product than it did in 1998 (Far Eastern Economic Review, 1999). Agricultural output remained flat following the cyclone that devastated the State of Orissa in October. Inflation remained under check at 3.1%. The rupee was stable at 43.41 to the U.S. dollar. Foreign exchange reserves were at an all-time high of \$34 billion. The Indian Parliament approved economic reforms that would allow companies to buy back 25% of their shares and bring India into compliance with patent rules mandated by the World Trade Organization.

Under a joint collaboration project between the Geological Survey of India and Bureau de Recherches Geologiques et Minières of France, a new type of platinum-group metals mineralization was discovered in the Baula-Nuasahi chromite belt in Orissa. A total resource of 14 million metric tons (Mt) at a cutoff grade of 0.5 part per million platinum and palladium was estimated (Mining Journal, 1999a). Geologic indications suggested that the total resource would be larger in this prospect. The large width of the mineralization and the easy access to the ore via the existing infrastructure from chromite operations were considered to be positive factors for further development.

Government Policies and Programs

The Government approved a bill that amended the Mines and Minerals Act to delegate more authority so that States would have the power to review and approve mining leases for certain nonmetallic and industrial minerals and to review exploration licenses. The amendment was to strengthen the powers of the States to curb illegal mining and transport of minerals.

The Government decided to raise customs duties from \$5.88 to \$9.40 per 10 grams on gold bullion imports, effective January 5, 1999. The World Gold Council predicted that the raise would drive the Indian gold industry underground and cause widespread unofficial gold transfer. India was the world's largest gold market.

The Finance Ministry of India exempted pig iron and sponge iron producers from paying a 5% special customs duty on imports of specified inputs used in steel manufacture. Specified inputs also include ferronickel, charge nickel, and nickel oxide sinter. Indian steel exporters faced dumping charges in the European Union, Southeast Asia, and the United States. The Ministry of Steel decided to extend financial support to fight charges. The scheme also was available for exporters of pig

iron, sponge iron, and semifinished steel.

The Finance Ministry also proposed to reduce the import duty on hot rolled coil from 30% to 25%; the cold rolled coil duty remained unchanged at 35%. Most other import duties on steel products and steelmaking raw materials were unchanged except for a cut in the duty on scrap for melting to 5% from 10%. The duty on imports of rerollable scrap was unchanged at 25%. In July, the Government added zinc ash to the list of free imports; it already included zinc ash in dispersible form and skimmings that contain zinc greater than 65% and lead and cadmium equal to or less than 1.25% and 0.1%, respectively.

The Government decided to sell a 51% interest in Bharat Aluminium Co. Ltd. (Balco) through a global tender. A public offer would be made in the domestic market at a later date to reduce its holding to 26%. Balco had a 100,000-metric-ton-per-year (t/yr) primary aluminum smelter and a 200,000-t/yr alumina refinery at Korba, State of Madhya Pradesh. The company planned to spend \$225 million in modernization and expansion that would include development of new bauxite mines and the building of a 40,000-t/yr cold rolling mill and strip casting facilities, as well as expansion of a captive powerplant. National Aluminium Co. Ltd. (Nalco), Kudremukh Iron Ore Co. Ltd. (KIOCL), and Hindustan Zinc Ltd. (HZL) also were targeted for the selloff of equity of public sector undertakings. The Nalco sale would be limited to 30%, and for KIOCL, a stake of 30% was up for sale. Sale of 25% of HZL's shares held by the Government was recommended to reduce the Government's holding to 51%. The Government also recommended the privatization of Ferro Scrap Nigam, Minerals and Metals Trading Corp. (MMTC), Metal Scrap Trading Corp., Sponge Iron India Ltd., and Mecon, which was an engineering consulting firm.

From April 1, MMTC began to hedge on the London Metal Exchange, initially with nickel and later with other nonferrous metals, such as copper, tin, and zinc. The company also looked into the possibility of hedging in gold and silver once the Reserve Bank of India issued hedging guidelines. MMTC increased its activities in importing and processing concentrates or importing and keeping concentrates in warehouses before smelting.

The Government decided to split Hindustan Copper Co. Ltd. into two companies and sell them off to strategic buyers. In the first phase, the 31,000-t/yr Khetri smelter in the State of Rajasthan and the 60,000-t/yr Taloja continuous cast copper rod plant would be turned into a separate company. In the second phase, the Ghatsila smelter in the State of Bihar and the Malanjkhand mining complex in Madhya Pradesh would be

restructured and then sold to another strategic buyer.

The Government relaxed its controls on imports of nonferrous scrap. The combined content of copper and zinc was to be no less than 80%, and the total metallic content, no less than 50% in imported brass dross. Imports of zinc ash from overseas were announced on July 1.

Production

The Ministry of Mines is responsible for the survey and exploration of all minerals, except natural gas and petroleum; for mining and metallurgy of nonferrous metals; and for the administration of the Mines and Minerals (Regulation and Development) Act, 1957, in respect of all mines and minerals, except coal, natural gas, and petroleum. India's mica production ranked first in world output; barite, second; chromite, third; bauxite and iron ore, fifth; and coal and lignite, seventh (Asian Journal of Mining, 1999).

Commodity Review

Metals

Aluminum.—Because of protests by local inhabitants and environmental groups, Tata Iron & Steel Co. Ltd. (Tisco) withdrew from the 1-million-metric-ton-per-year (Mt/yr) greenfield Utkal alumina refinery project at Raygada, Orissa, and planned to concentrate on steel (Metal Bulletin, 1999j). The other three partners, Norsk Hydro SA of Norway (40%), Alcan Aluminium Co. Ltd. of Canada (20%), and Indian Aluminium Co. Ltd. (20%), were expected to take up Tisco's equity of 20%. The project was estimated to have a capital cost of \$1 billion. The alumina production would be exported to Alcan and Norsk Hydro. The project's capacity would be expanded to 2.5 Mt/yr in the second phase, and bauxite mining would be increased to 7.5 Mt/yr from 3.6 Mt/yr.

Madras Aluminium Co. Ltd. (Malco), which was owned by Sterlite Industries Ltd., planned to expand its alumina plant from the current 60,000 t/yr to 200,000 t/yr, of which 72,000 t/yr would be for captive consumption and the balance exported. The project was to be completed in 2 years at a cost of \$34.6 million (Metal Bulletin, 1999g). Malco had an aluminum smelter with a capacity of 25,000 t/yr that used 50,000 t/yr of alumina and was being expanded to 36,000 t/yr. In March, the company completed construction of a 75-megawatt (MW) coal-fired captive powerplant at a cost of \$57.6 million. Meanwhile, the State of Gujarat was planning to construct a \$541 million 750,000-t/yr alumina plant; the money would come from foreign investment. Reynolds Metals Co. of the United States was to prepare a feasibility study of the project by the end of 1999 (Mining Magazine, 1999b).

In March, Nalco reached its normal smelter capacity of 230,000 t/yr (430 pots) at Angul, Orissa. Its aluminum production was targeted at 218,000 metric tons (t) for 1999. The alumina production was targeted at 885,000 t in 1999, and alumina exports, around 600,000 t. Nalco owned high-quality bauxite deposits of 370 Mt at Panchpatmali and planned to double its mining capacity to 4.8 Mt/yr and to expand the

capacity of its alumina refinery from 1.57 Mt/yr from 870,000 t/yr at Damajodi by 2002 and that of its aluminum smelter to 345,000 t/yr from 230,000 t/yr by adding a new line of 240 pots (Financial Times, 1999b). Capacity at the captive powerplant also would be raised to 840 MW from 720 MW.

Hindalco Industries Ltd. was considering a major new integrated refining/smelting complex in Orissa that would increase its aluminum production to 500,000 t/yr. India's annual consumption of aluminum was expected to increase by 2 Mt during the next 5 years. Without capacity expansion, the supply shortage would be 230,000 t/yr. The company went ahead with plans for a major brownfield expansion at its 350,000-t/yr aluminum smelter and 210,000-t/yr alumina refinery at Renukoot, State of Uttar Pradesh. The company also would participate in the bidding process for the strategic sale of Balco. It decided, however, to shelve its \$1.84 billion greenfield project at Aditya, Orissa, that included a 1-Mt/yr alumina refinery, a 250,000-t/yr aluminum smelter, and a 650-MW captive powerplant.

Indian Aluminium Co. Ltd. (Indal) was to close its 70,000-t/yr Belgaum smelter because the company failed to negotiate a favorable power contract for the plant with either the local electricity authorities or the private investors. Indal also was to downsize capacity at its Alupuram smelter in the State of Kerala to produce 13,000 t/yr of metal. The company, however, planned to double the capacity to 60,000 t/yr from 30,000 t/yr at its Hirakud smelter in Orissa and to increase power generation to 135 MW from 67 MW in the next 2 or 3 years. The company's 82,000-t/yr Muri alumina refinery in Bihar was to be expanded to 300,000 t/yr to supply alumina to the Hirakud smelter. The two-phase plan would expand the Belgaum alumina refinery to 510,000 t/yr from 290,000 t/yr (Financial Times, 1999a).

Sterlite took a 55% controlling interest in Indian Foils, which had a 19,000-t/yr capacity. Williamson Magor Group of Calcutta reduced its stake from 60% to 27%. Together with its own 5,000-t/yr capacity, Sterlite could capture 50% of the country's total capacity and would thus become the biggest operator in the Indian aluminum foils sector. Other leading foil producers were Hindalco and Indal.

Indal's aluminum remelt plant at Taloja near Mumbai was operating at a rate of 1,600 metric tons per month (t/mo). The installed capacity at the plant was 2,400 t/mo of aluminum alloy. The plant imported 60% of its feed with the balance coming from local purchases of scrap and internal generation. In India, about 100,000 t/yr of aluminum scrap was processed.

Copper.—The Government approved a revival package for Hindustan Copper with a loan of \$17.4 million. The company's immediate task was to expand its current smelter capacities to 70,000 t/yr from 47,000 t/yr and to close down its uneconomic mines at Kendadih and Pathorgora in Bihar. It planned to spend \$5.8 million to expand the Ghatsila smelter to 25,000 t/yr from 16,000 t/yr and \$11.6 million to expand the Khetri smelter to 45,000 t/yr from 31,000 t/yr. The viability of mines at Surda and Rakha, Bihar, and at Khetri also was at stake. A nonplan loan of \$95.4 million also was granted to the company to retire 11,000 workers in the next 4 years.

Meanwhile, SWIL Ltd.'s new \$140 million, 500,000-t/yr copper refinery in Gujarat, which used Boliden technology to refine scrap, was scheduled for trial production in September. Completion of the secondary copper refinery was delayed, however, owing to financial problems. The project had considerable cost and time overruns (Metal Bulletin, 1999h).

Birla Copper Co. Ltd. delayed the expansion of its copper smelter to 150,000 t/yr from 100,000 t/yr. Instead, the company wanted to debottleneck the existing unit to increase the smelting capacity. The expansion cost of the smelter, which initially cost \$426 million, was not given.

Sterlite was permitted to continue operations at its 100,000-t/yr Tuticorin copper smelter in the State of Tamil Nadu at 40% capacity from yearend 1998 until the end of April; the smelter had been closed because of pollution problems. Permission was later extended until the end of April. By May, the smelter was operating at full capacity. Sterlite was planning to expand the smelter's capacity to 150,000 t/yr within the next 2 years.

To ensure the continued availability of its source of copper concentrates, the company was looking into the possibility of taking over the Mount Lyell copper mine, which was owned by Mount Lyell Mining, in Tasmania; the mine had been producing 30,000 t/yr of copper in concentrate (Mining Journal, 1999b). The commissioning of a phosphoric acid unit at the plant was cleared by the Tamil Nadu Pollution Control Board.

Gallium.—Nalco's \$3 million gallium plant was expected to be commissioned by early 2001. The Government provided grant of \$1.25 million. The 1-t/yr-capacity plant would produce high-purity gallium (99.99%) to be used primarily for defense requirements (Elements, 1999).

Gold.—The Government approved the proposal by HZL to take a 43% stake in a joint venture to explore the Pac Lang gold deposits in Vietnam. The partners were Gems and Gold Corp. of Vietnam and LaSource of France (Mining Magazine, 1999a).

Iron and Steel.—Rio Tinto Plc. (51%) and Orissa Mining Corp. Ltd. (49%) formed a joint venture to investigate the feasibility of developing a major iron ore mining operation in Orissa; development could cost as much as \$18 million. Orissa Mining transferred two mining blocks with reserves estimated to be 800 Mt to the joint venture (Engineering and Mining Journal, 1999a).

National Mineral Development Corp. Ltd. controlled the rich iron ore deposits at Bailadila in Orissa and the Donimalai mines in the Bellary-Hospet region in the State of Karnataka. The company planned to spend \$415 million to raise its mine capacity to 21.7 Mt/yr from 15 Mt/yr in the next 6 years. New projects included the upgrading of existing mines and opening of new mines in the Bailadila Range in Madhya Pradesh and the expansion of the Kumrarswamy iron ore mine at Bellary. In another development, Steel Authority of India Ltd. indefinitely delayed mining an iron ore deposit at Rowghat in Madhya Pradesh owing to forestry laws. The operation was to have provided 7.5 Mt/yr of ore to its Bhilai works.

Tamil Nadu Industrial Development Corp. (TIDCO) was looking for a private partner for a \$142 million iron ore mining, beneficiation, and pelletization project in the Salem and the Thiruvannamalai districts. The project was designed to mine 3 Mt/yr of ore and to produce 1 Mt/yr of pellets. The Kajamali Mine was expected to produce 2 Mt/yr of iron ore, and the Kavuthimalai Mine, 1 Mt/yr. A 1-Mt/yr pelletization plant, which also would be set up at Kajamali, would use two vertical-shaft kilns. Iron ore was to be concentrated up to 67% and pelletized. A local steel plant would take 300,000 t/yr of pellets, and the remainder would be sold on the open market. TIDCO would take an 11% equity in the project (Engineering and Mining Journal, 1999b).

Essar Steel signed a memorandum of understanding with Stemcor of the United Kingdom. Stemcor would put up \$40 million for a 51% stake in Essar Minerals, which ran an iron pellet plant. The funds were to be used to expand the pelletizing capacity to 7.0 Mt/yr from 3.3 Mt/yr. Stemcor's business with Essar Steel had encompassed only pig iron, scrap, and coils. Essar Steel planned to increase steel capacity to 2.4 Mt/yr during the next 3 years without any significant capital investments (Metal Bulletin, 1999e).

Southern Iron and Steel Co. Ltd. (Siscol) inaugurated its integrated iron and steel plant at Pottaneri in the Salem district in Tamil Nadu. The 300,000-t/yr steel capacity consisted of 192,000 t/yr of mild steel, 90,000 t/yr of low-alloy steel, and 18,000 t/yr of stainless steel. The plant also would produce 16,000 t/yr of pig iron. Siscol bought iron ore from National Mineral Development Corp.'s mines in the Bellary-Hospet region. The bar and rod mill was capable of producing 300,000 t/yr of 6- to 55-millimeter material.

Ispat Industries planned to double its production capacity of hot rolled coil to 2.5 Mt/yr by building a second compact strip production plant at Dolvi; the first plant had been commissioned in April 1998 with a design capacity of 1.2 Mt/yr. When the company's blast furnace came on-stream at the end of 1999, the Dolvi works could reach full capacity (Metal Bulletin, 1999c). As a result, India's excess capacity of hot rolled coil could be close to 50% in fiscal year 1999-2000.

Jindal Steel concluded a \$45 million export securitization deal with a Swiss-based trading house under the guarantee of the Industrial Credit & Investment Corp. of India because of a shortage of funds to complete its new 1.6-Mt/yr steelworks. The company would export 500,000 t of hot rolled coil during a 5-year period at a price agreed upon quarterly.

Jindal Steel planned to add a sixth coal-based direct reduction kiln at its Raigarh works to increase total capacity to 620,000 t/yr from 500,000 t/yr. The plant would become the world's largest coal-based sponge iron facility; India had 18 such plants with a total capacity of 3.5 Mt/yr. The company also was modernizing its steel-melting shop at Raigarh with a 400,000-t/yr electric-arc furnace that produced slabs and billets (Metal Bulletin, 1999d).

Aditya Birla Industrial Group was seeking a buyer for its 750,000-t/yr sponge iron plant near Mumbai. Ispat Industries was reported to be interested in buying the plant because the company had a local 1.2-Mt/yr direct reduction plant that met the needs of its steel plant at Dolvi (Metal Bulletin, 1999a).

The Export and Import Bank of Japan approved a 10-year \$57.6 million loan for Tisco's cold rolling mill at Jamshedpur. The scheme required Tisco to buy at least 30% of the equipment for the project from Hitachi and Nissho Iwai, both of Japan. The company also sought a loan of \$126.7 million from the Industrial Development Bank of India. The mill would have a capacity of 1.2 Mt/yr and was expected to cost \$369 million and to start commercial production by June 2000. Tisco also planned to acquire the 150,000-t/yr cold rolling mill of Tata Special Steels at Tarapur, in which it held a 41% stake (Metal Bulletin, 1999i).

Tata Ryerson Ltd., which was the joint-venture company of Ryerson International of the United States and Tisco, planned to build a third service center at Jamshedpur for processing cold rolled products. The first phase would cost \$5.8 million and should be completed by the first half of 2000 when Tisco's new 1.2-Mt/yr cold rolling mill was due to go on-stream. A second greenfield service center was set up at Ranjangao, Pune, in March 1999 (Metal Bulletin, 1999f).

SBI Capital Markets was able to arrange a \$17.5 million loan for Neelachal Ispat Nigam Ltd. to help fund its \$348 million greenfield integrated steelworks project at Jaipur, Orissa. The project's blast furnace was scheduled for startup by early 2000, and the plant would have a capacity of 1 Mt/yr of long products. Other new long-product capacities included Malavika Steel and Usha Ispat with 600,000 t/yr each and Bellary Steel & Alloys and Siscoil with 500,000 t/yr each.

Jindal Strips Ltd. was India's largest producer of stainless steel with nearly 38% of the 650,000-t/yr market. The company spent \$17.7 million in upgrading its existing 30,000-t/yr cold rolling capacity and added another 60,000 t/yr. Jindal Strips formed a joint venture with SB International of the United States to acquire a cold rolling and finishing mill at Massillon, Ohio, from Bethlehem Steel Corp. of the United States. The mill would produce 63,500 t/yr of stainless sheet. In another development, Sail was trying to bring an outside partner into Salem Steel's stainless steel plant at Salem, Tamil Nadu; Salem Steel was Sail's subsidiary. The company also sought a foreign partner for a joint venture to upgrade the production of rails at its Bhilai works, which produced 400,000 t/yr.

Jindal Strips showed an interest in taking over Salem Steel's plant. In addition to stainless steel, Salem Steel had a 150,000-t/yr-capacity hot rolling mill and a 70,000-t/yr-capacity cold rolling facility. Jindal Strips had a stainless steelmaking capacity of 250,00 t/yr and its own ferrochrome facility, as well as a captive powerplant. Salem Steel could source its slabs from Jindal Strips.

Naresh and Rakesh Rawat, which were stainless steel traders, moved into stainless steel production when they acquired Haryana Steel & Alloys in northern India by buying 50.7% of the equity and offering to buy another 20%. Haryana had a 40,000-t/yr-capacity mill that made ingots/billets and a 40,000-t/yr-capacity rolling mill that made mostly flat bars. Shah Alloys Ltd. increased its melting capacity to 14,000 t/mo by adding a new 20-t converter. The company inaugurated a 70,000-t/yr plate mill in September.

Carpenter Technology of the United States and Kalyani

Steels of India formed Kalyani Carpenter Special Steels, which was a joint venture for new special steels manufacturing and distribution in Pune. Carpenter made an initial investment of \$10 million for a 26% stake in the new company, and Kalyani had the other 74% interest. Carpenter was expected to spend \$8 million in joint facilities during the next 4 years to produce stainless, valve, and tool steels. Investment by both parties during the next few years could total \$25 million. Carpenter also held a 51% stake in the newly formed Kalyani Carpenter Metal Centres Ltd., which was the distributor of the joint venture's output.

Mahindra Ugine Steel Co. in the State of Maharashtra and Sidenor of Spain formed a 50-50 joint venture to double the special steels capacity at Khopoli and to build a new and larger plant. The investment could amount to \$12 million during the next 2 to 3 years and would be used to double the present capacity of 75,000 t/yr. The plant's forging capacity would increase to 18,000 t/yr from 12,000 t/yr. There was a preliminary plan to build a new 300,000-t/yr steel plant to make lower alloy steels, such as wire rod and forged products.

Indian steel tube production was less than 2.5 Mt/yr against an installed capacity of 4.5 Mt/yr. Producers of pipe and tube asked the Government to impose custom duties on imports from Nepal. No duties have been collected on Indian imports from Nepal except for alcohol and cosmetics. Nepal has six tube producers that export cheap products to India.

Kalyani Seamless Tubes Ltd. (KSTL) and Indian Seamless Metal Tubes Ltd. (ISMTL), both of which are in Maharashtra, planned to merge. KSTL specialized in large-diameter tubes for the oil and gas sector, and ISMTL made tubes for use in the automobile and bearing industries. KSTL had a 60,000-t/yr-capacity plant at Baramati, and ISMTL had a 50,000-t/yr-capacity plant at Ahmednagar. Their combined output accounted for two-thirds of Indian seamless tube production.

Usha Martin Group took over the 80,000-t/yr alloy steel plant that was owned by Bihar Alloys Ltd. at Patratu, Bihar, invested \$3 million to revive it, and planned to restart production before yearend. The plant, which had been closed for nearly 2 years, would produce 60,000 t of steel in 2000; 40% of the output would be used by its wire rod mill. The company's two-strand billet caster at Jamshedpur, Bihar, was restarted, and output was increased by 25%.

India's ferroalloys industry, which was operating at 60% of its capacity, expected to create an additional capacity of 250,000 to 300,000 t/yr in a few years. The industry's capacity was much higher than the domestic demand for ferroalloys. The Government was considering schemes to supply electricity to the ferroalloys producers at concessional rates to boost the industry's export competitiveness. The industry, however, faced the problem of inadequate domestic availability of the required quality of raw materials and would be forced to depend on imports of ferrograde ores.

In Maharashtra, the 100,000-t/yr Universal Ferro & Allied Chemicals and the 40,000-t/yr Khandelvar Ferro, which were two ferromanganese producers, were closed because of the high cost of power after the State Government withdrew all power concessions. Maharashtra Elektros melt, which was the largest ferromanganese producer with a capacity of 120,000 t/yr, was

incurring heavy losses at its operations.

Lead and Zinc.—HZL's 22,000-t/yr lead smelter at Vizag faced closure for exceeding the pollution levels. The plant would be shut down until the lead and lime sludge had been dredged from the drain and the company set up a safe landfill. The plant would need at least 6 months to meet the pollution regulations.

HZL went ahead with its \$188 million 100,000-t/yr-capacity greenfield zinc smelter at Kapasan, Rajasthan. The additional capacity would increase the company's total output capacity to 269,000 t/yr. In 1999, India's demand for zinc rose by 5.8%. By 2002, the domestic production could exceed demand by 70,000 t. Expansion of the company's Debari and Vizag zinc smelters by 10,000 t/yr each was on schedule and reached 59,000 and 40,000 t/yr, respectively. The company spent \$40.5 million in developing the Rampura-Agucha lead-zinc mines in Rajasthan.

By 2001-02, the country's shortage of secondary lead and zinc may reach 41,700 and 124,900 t, respectively. The recovery of secondary materials contributed only 5% of the total zinc production. Five zinc scrap consumers had been granted permission to import zinc ash. The Government would coordinate the collection of lead-acid batteries and consider allowing imports of lead scrap. About 50,000 t/yr of lead scrap was likely to be available for recycling. Five recycling facilities in the secondary lead sector were capable of using imported lead battery scrap (Metal Bulletin, 1999b). These could boost the country's lead production by 40,000 t/yr. Indian Lead Co.'s lead smelter in West Bengal was operating at 60% of its capacity owing to restrictions on imports of lead scrap and reduced availability of locally generated scrap. The company was looking for a strategic partner for equity participation to expand the plant to 60,000 t/yr from 35,000 t/yr.

Industrial Minerals

Fertilizer.—Rashtriya Chemicals & Fertilizers was considering three options to establish two diammonium phosphate (DAP) plants. The first was to build a 1,000-metric-ton-per-day plant alone at Thal where ammonia was available. The second was to join HZL, which would supply sulfuric acid, and Rajasthan State Mines & Minerals Ltd., which would supply phosphate rock. The third was a joint operation with Indo Gulf Fertilizers, which could supply phosphoric acid, to build a plant in Gujarat.

Godavari Fertilizers & Chemicals planned to step up its DAP production at Kakinada, State of Andhra Pradesh, with a \$6.1 million retrofit. The revamp work would increase production capacity to 700,000 t/yr from 472,000 t/yr. The unit would be able to switch to manufacturing NPK grades (Phosphorus and Potassium, 1998).

Granite.—The State Government of Karnataka moved to lift the ban on mining granite and other minerals in the cattle-grazing areas. The granite industry in the State expected to be granted at least 500 new leases and license renewals by the Department of Mines and Geology. The State's market share

had been nearly 40% in production and exports. The notification issued by the Government on June 1 stated that the maximum period for which a lease can be granted or renewed should not exceed 30 years, and the minimum period cannot be less than 20 years. It also specified that no license can be granted or renewed for mining of an area of less than 1 hectare (ha) or greater than 50 ha (International Bulk Journal, 1999).

Rare Earths.—Indian Rare Earths operated three mineral separation and beneficiation plants. The company's production was steady at 3,500 t/yr of rare-earth compounds. About 10% to 15% of output was consumed in India, and the rest was exported to Japan. Its Chavara plant in Kerala State was closed because it could not exploit the beach sands owing to sea erosion and its inland dredging facility was inoperative owing to surrounding dense human habitation. The plant at Manavalakurichi, Tamil Nadu, continued its operation, but land also was in short supply. The Orissa Sands Complex operated a mineral sand separation plant and a 100,000-t/yr synthetic rutile plant.

Salt.—Tamil Nadu Salt Corp. planned some major expansion programs for the next 3 years at its Valinokkam salt complex in Ramanathapuram district, Tamil Nadu. The company intended to set up a refined iodized salt plant and a bromine plant and to increase its salt production. The salt plant would have an initial production capacities of 36,000 t/yr of iodized salt and 3,000 t/yr of salt fines.

Mineral Fuels

Coal.—With a lignite resource of 1,400 Mt, Rajasthan ranked second to Tamil Nadu in the Indian lignite industry (Mining Magazine, 1999c). Six lignite deposits with a total resource of 59 Mt were earmarked for powerplant fuel. The State Government encouraged the development of captive power generation projects, such as the 100-MW unit jointly set up by Rajasthan State Mines & Minerals and HZL. Other potential uses of lignite included energy-intensive cement production, textile processing, and brick manufacturing.

Central Coalfields Ltd. was looking for joint-venture partners to develop three new mines with a combined capacity of 8 Mt/yr. The company planned to build two steaming coal mines, the North Urimari in South Karanpur and the Konar in East Bokaro, each with a capacity of 3.0 Mt/yr, and a coking coal mine, the 2.5-Mt/yr Kedia in West Bokaro (Mining Magazine, 1999e).

The Indian National Mine Workers' Federation demanded the withdrawal of Eastern Coalfields Ltd.'s decision to close 64 coal mines and lay off 72,000 miners (Coal Age, 1999). The Federation opposed the Government's attempts to privatize the coal mining and lignite industry. The Federation resolved to oppose the contract system in the prohibited category of jobs in the mining industry in violation of the norms of the Contract Labor Act of 1970.

VBC Group of India and Roberts & Schaefer of the United States entered into a joint venture to build two new coal washing plants, one with 8 Mt/yr of run-of-mine coal capacity

at the Kalinga opencast mines at Talcher, Orissa, and the other with 6 Mt/yr at the Dipka Mines near Korba, Madhya Pradesh. These two plants were expected to be operational by the end of 2001. The World Bank would loan \$10 million to the equity of the project (Mining Magazine, 1999d).

The Maharashtra State Electricity Board planned to develop coal mines in the Vidarbha region through a joint venture for captive consumption and intended to hold minority stake of 26% in the mining company. The Board would have to acquire a license from the central Government to develop the mines. The decision was prompted by partial deregulation of the coal sector. The West Bengal State Electricity Board had a coal mine for captive consumption at Raniganj.

Natural Gas and Petroleum.—The Government sought joint ventures with foreign companies in crude oil and gas exploration, product storage, and marketing facilities and invited exploration bids for 48 onshore and offshore blocks. Successful bidders would receive financial incentives and be able to sell their production in the domestic market. Enron Oil and Gas Ltd. was considering investing about \$1 billion in India's oil and gas sector in the next 3 or 4 years (Journal of Commerce, 1999). Unocal Corp. of the United States also was expected to bid for the blocks.

State-owned Oil and Natural Gas Corp. (ONGC) produced 90% of India's domestic crude oil and was the largest Indian oil and gas exploration company. ONGC's gas production was 55 million cubic meters per day (Mm³/d).

India was likely to become a major importer of natural gas, and its projected demand was expected to rise threefold in 5 years. Gas Authority of India Ltd. (GAIL) forecasted the demand to be 183 Mm³/d by 2005 with domestic production of only 68 Mm³/d. GAIL was considering imports of natural gas from Bangladesh and Iran through pipelines. Qatar agreed to export 7.5 Mt/yr of liquefied natural gas (LNG) to India in January 2003. The Qatari gas would be supplied by a consortium of RasLaffan Liquefied Natural Gas and Mobil LNG & Power Inc. to India's Petronet LNG Ltd.

Petronas of Malaysia planned to invest in gas import, exploration, production, refining, and power generation in India. Petronas also was looking into the possibilities of new LNG and liquefied petroleum gas terminals at Madras, Tamil Nadu, and at Kakinada, Andhra Pradesh. The company had long-term plans for a gas pipeline from Burma to India via Bangladesh.

Indian Oil Corp.'s seventh refinery, which is in Panipat in northern India, went into full production in March. The 6-Mt/yr refinery produced gasoline, diesel, and cooking gas for the northern Indian States. The other six refineries had a total capacity of 25.7 Mt/yr. The company planned to invest \$17.6 million in an eighth refinery with a capacity of 9 Mt/yr at Paradip on the east coast.

In October, Reliance Petroleum Ltd. commissioned its first refinery with a capacity of 18 Mt/yr at Jamnagar, Gujarat. The company planned to boost the refining capacity to 27 Mt/yr. When fully operational, it would provide one-quarter of the country's refining capacity.

Essar Oil Ltd. was considering expanding its planned 10.5-

Mt/yr refinery in Gujarat to 24 Mt/yr. A public sector refinery with a capacity of 3 Mt/yr was commissioned at Numaligarh, Assam State. In 1999, about 41 Mt/yr of new refining capacity was to be added to the existing 67.55 Mt/yr. The country's refining capacity could reach 113.95 Mt/yr by 2002 (Oil & Gas Journal, 1999).

Infrastructure

The 500-MW Pench power project, which was developed by ABB, National Power, and Soros Fund Management, was awarded a 1.86-Mt/yr coal contract from Western Coalfields. In another development, Cogentrix Energy of the United States and CLP Holdings of Hong Kong scrapped plans to build a \$1.3 billion powerplant in Karnataka; they cited bureaucratic delays and legal problems.

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TABLE 1
INDIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/ METALS	1995	1996	1997	1998	1999 e/
Aluminum:					
Bauxite, gross weight thousand tons	5,240	5,757	6,019	6,102	6,200
Alumina, Al ₂ O ₃ equivalent e/ do.	1,650 4/	1,780	1,860	1,890	1,900
Metal, primary	536,500	530,600	484,200	541,800	550,000
Cadmium metal	254	271	298	300 e/	300
Chromium, chromite, gross weight	1,536,386	1,363,205	1,363,049	1,311,310	1,473,000 4/
Copper:					
Mine output, Cu content	46,975	47,800	37,200 r/	39,900 r/	34,100 4/
Metal, primary:					
Smelter	39,496	45,300	51,400 r/	107,600 r/	224,400 4/
Refinery					
Electrolytic (cathode)	33,900	29,100	30,200 e/	100,000 r/ e/	200,000
Fire refined e/	5,700	10,200	6,000	7,000	8,000
Total	39,600	39,300	36,200	107,000 r/ e/	208,000
Gold metal, smelter kilograms	2,203	2,449	2,750	2,383	2,400
Iron and steel:					
Iron ore and concentrate:					
Gross weight thousand tons	65,173	66,657	69,453	72,532	68,000
Fe content do.	41,710	42,660	44,400	48,000 e/	43,500
Metal:					
Pig iron do.	18,626	19,864	20,000 e/	19,000 r/ e/	18,000
Direct-reduced iron do.	4,280	4,830	5,250	5,500 e/	5,300
Ferroalloys:					
Ferrochromium (including charge chrome)	303,537	261,666	286,973	345,125	350,000
Ferromanganesium e/	9,000	9,000	10,000	10,000	10,000
Ferromanganese e/	180,000	190,000	166,000	165,000 r/	160,000
Ferrosilicon e/	75,000 r/	78,000 r/	74,000 r/	65,000 r/	55,000
Silicomanganese e/	190,000	170,000	198,000	193,000 r/	190,000
Other e/	8,500	8,500	9,000	9,000	9,000
Steel, crude thousand tons	22,800	23,753	23,748	23,480 r/	24,269 4/
Semimanufactures e/ 5/ do.	11,000	11,000	11,000	12,000	12,000
Lead:					
Mine output, Pb content	34,000	35,000	32,000	39,300	40,000
Metal, refined:					
Primary e/	62,000	67,000	69,000	70,000	72,000
Secondary e/	28,000	27,000	24,000	25,000	20,000
Total e/	90,000	94,000	93,000	95,000	98,000
Manganese:					
Ore and concentrate, gross weight thousand tons	1,764	1,797	1,596	1,557	1,500
Mn content e/ do.	670	680	680	610	600
Rare-earth metals, monazite concentrate, gross weight e/	5,000	5,000	5,000	5,000	5,000
Selenium e/ kilograms	11,449 4/	11,500	11,500	11,500	11,500
Silver, mine and smelter output do.	38,064	35,601	49,736	52,310	54,000
Titanium concentrates, gross weight:					
Ilmenite e/	290,000	330,000	300,000	378,000 r/	378,000
Rutile e/	14,000	15,000	14,000	16,000 r/	16,000
Tungsten, mine output, W content	4	2	1	--	--
Zinc:					
Mine output, concentrate:					
Gross weight	279,757	286,226	263,270	261,467	265,000
Zn content	154,500	148,200	142,000	143,000 e/	145,000
Metal:					
Primary	146,500	143,600	159,000	171,900	175,000
Secondary e/	24,000	24,000	24,000	25,000	25,000
Total e/	170,500	167,600	183,000	196,900	200,000
Zirconium concentrate, zircon, gross weight e/	18,000	19,000	19,000	19,000	19,000
INDUSTRIAL MINERALS					
Abrasives, natural, n.e.s.:					
Corundum, natural kilograms	1,412	1,408	867	1,230	1,300
Garnet	58,937	47,382	55,374	138,678	135,000

See footnotes at end of table.

TABLE 1--Continued
INDIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/	1995	1996	1997	1998	1999 e/	
INDUSTRIAL MINERALS--Continued:						
Abrasives, natural, n.e.s.--Continued:						
Jasper	5,342	4,740	5,312	6,581	7,000	
Asbestos	25,065	23,215	25,051	18,751	20,000	
Barite	421,867	369,500	409,498	749,412	600,000	
Bromine, elemental e/	1,500	1,500	1,500	1,500	1,500	
Cement, hydraulic e/	thousand tons	62,000	75,000	80,000	85,000	90,000
Chalk	144,124	122,318	117,869	114,109	115,000	
Clays:						
Ball clay	413,722	396,472	373,104	381,479	380,000	
Diaspore	10,086	14,192	14,874	10,148	12,000	
Fireclay	406,901	346,599	355,331	331,729	340,000	
Kaolin:						
Salable crude	thousand tons	552	578	402	540	520
Processed	do.	161	183	175	148	150
Total	do.	713	761	577	688	670
Other	do.	73	55	53	60	65
Diamond:						
Gem e/	thousand carats	21	19	20	20	22
Industrial e/	do.	11	10	10	11	12
Total e/	do.	32	29	30	31	34
Feldspar	99,618	85,213	95,455	104,509	105,000	
Fluorspar:						
Concentrates:						
Acid-grade	6,359	5,115	6,937	--	--	
Metallurgical-grade	17,887	14,263	9,877	785	800	
Total	24,246	19,378	16,814	785	800	
Other fluorspar materials, graded	5,762	3,292	5,008	5,507	5,600	
Gemstones excluding diamond:						
Agate including chalcedony pebble	518	467	244	190	200	
Garnet	kilograms	484	627	653	829	900
Graphite 6/	129,368	115,233	102,143	143,333	145,000	
Gypsum	1,744,331	2,442,156	2,031,049	2,191,784	2,200,000	
Kyanite and related materials:						
Kyanite	6,772	6,715	6,035	5,169	5,000	
Sillimanite	9,687	7,521	12,299	11,936	12,000	
Lime	94,734	202,437	378,087	298,131	300,000	
Magnesite	335,189	373,306	362,929	355,033	360,000	
Mica:						
Crude	1,728	1,894	1,794	1,489	1,500	
Scrap and waste	1,013	1,413	1,128	966	1,000	
Total	2,741	3,307	2,922	2,455	2,500	
Nitrogen, N content of ammonia	thousand tons	8,287	8,549	9,328 r/	10,239 r/	10,376 4/
Phosphate rock including apatite	1,331,829	1,432,321	1,043,386	1,730,334	1,750,000	
Pigments, mineral, natural, ocher	254,166	284,546	347,429	351,704	360,000	
Pyrites, gross weight	135,547	145,922	128,571	97,163	100,000	
Salt:						
Rock salt	thousand tons	2	2	3	2	3
Other e/	do.	9,500	9,500	9,500	9,500	9,500
Total e/	do.	9,500 r/	9,500 r/	9,500 r/	9,500 r/	9,500
Sodium carbonate e/	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	
Stone, sand and gravel:						
Calcite	71,073	64,866	49,429	50,668	50,000	
Dolomite	thousand tons	3,570	3,132	2,930	2,800	2,700
Limestone	do.	91,612	100,328	104,755	108,920	110,000
Quartz and quartzite	do.	257	257	258	266	265
Sand:						
Calcareous	thousand tons	228	225 e/	225 e/	230 e/	235
Silica	do.	1,222	1,534	1,400	1,265	1,300
Other	do.	1,654	1,379	2,688	2,879	2,900
Slate	6,744	9,451	7,590	10,029	10,000	

See footnotes at end of table.

TABLE 1--Continued
INDIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/	1995	1996	1997	1998	1999 e/
INDUSTRIAL MINERALS--Continued					
Sulfur, byproduct from fertilizer plants	22,308	9,316	9,600 e/	10,000 e/	10,500
Talc and related materials:					
Pyrophyllite	131,137	143,172	121,566	79,951	85,000
Steatite (soapstone)	469,692	472,001	417,613	447,550	450,000
Vermiculite	1,696	2,405	4,405	4,080	4,000
Wollastonite	90,128	76,204	97,223	95,746	96,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous thousand tons	267,959	287,935	295,195	298,116	277,493 4/
Lignite do.	22,052	22,282	23,027	23,164	24,000
Total do.	290,011	310,217	318,222	321,280	301,493 4/
Gas, natural:					
Gross million cubic meters	17,800	19,700	20,000 e/	25,000 r/ e/	31,400 4/
Marketable do.	16,610	18,489	19,047	23,500 r/ e/	29,500
Petroleum:					
Crude thousand 42-gallon barrels	257,600	240,114	246,989	244,854	241,119 4/
Refinery products:					
Liquefied petroleum gas do.	38,325	39,785	40,000 e/	40,500 e/	41,000
Gasoline do.	37,960	40,150	39,000 e/	39,500 e/	40,000
Kerosene and jet fuel do.	57,670	64,970	59,000 e/	58,000 e/	58,500
Distillate fuel oil do.	164,250	174,835	166,000 e/	167,000 e/	168,000
Residual fuel oil do.	69,715	74,460	71,000 e/	70,000 e/	69,000
Other do.	87,965	91,615	89,000 e/	90,000 e/	91,000
Total do.	455,885	485,815	464,000 e/	465,000 e/	468,000

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through July 7, 2000.

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

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

4/ Reported figure.

5/ Excludes production from steel miniplants.

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

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(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	290
Do.	National Aluminium Co. Ltd., Indian Government, 100%	Dhamanjodi refinery, Orissa	870
Do.	Bharat Aluminium Co. Ltd., Indian Government, 100%	Korba refinery, Madhya Pradesh	200
Do.	Utkal Alumina International. Norsk Hydro SA (Norway), 40%; Alcan Aluminium Co. Ltd. (Canada), Indian Aluminium Co. Ltd., and Tata Industries, 20% each	Korapat refinery, Orissa	1,000 1/
Do.	Madras Aluminium Co. Ltd. Alumix SpA (Italian Government), 27%; R. Prabhu and Associates, 24%; Tamil Nadu Industrial Investment Corp., 11%; and others, 38%	Mettur refinery, Tamil Nadu	60
Do.	Indian Aluminium Co. Ltd. Indian interests, 60.4%; and Alcan Aluminium Ltd. (Canada), 39.6%	Muri refinery, Bihar	82
Do.	Hindalco Industries Ltd. Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; and financial institutions, 18%	Renukoot refinery, Uttar Pradesh	210
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	230

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity e/
Alumina--Continued:	Indian Aluminium Co. Ltd. Indian interests, 60.4%; and Alcan Aluminium Ltd. (Canada), 39.6%	Belgaum smelter, Karnataka	70
Do.	do.	Hirakud smelter, Orissa	30
Do.	Bharat Aluminium Co. Ltd., Indian Government, 100%	Korba smelter, Madhya Pradesh	100
Do.	Madras Aluminium Co. Ltd. Alumix SpA (Italian Government), 27%; R. Prabhu and Associates, 24%; Tamil Nadu Industrial Investment Corp., 11%; and others, 38%	Mettur smelter, Tamil Nadu	25
Do.	Hindalco Industries Ltd. Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; and financial institutions, 18%	Renukoot smelter, Uttar Pradesh	350
Bauxite	Bharat Aluminium Co. Ltd., Indian Government, 100%	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 Industries Ltd. Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; and financial institutions, 18%	Lohardaga District mines, Bihar	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	2,400
Do.	Minerals & Minerals Ltd., Indian Government, 100%	Richuguta, Palamu District mines, Bihar	200
Barite	Andhra Pradesh Mineral Development Corp. Ltd., Andhra Pradesh State Government, 100%	Cuddapah District mines, Andhra Pradesh	350
Do.	Associated Mineral Corp., 100%	do.	75
Do.	Pragathi Minerals, 100%	do.	50
Do.	Shri C. M. Ram nath Reddy, 100%	do.	75
Do.	Vijaylaxmi Minerals Trading Co., 100%	do.	50
Cement	Larsen and Toubro Ltd., 100%	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.	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%; and 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, Madhya Pradesh	1,250
Do.	Narmada Cement Co. Ltd., Chowgule and Co. Ltd., 34%; Gujarat State Government, 17.33%; and 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., 100%	Morak plant, Rajasthan	1,000
Do.	Mysore Cements Ltd., Government institutions and banks, 41.13%; Corporate Trust holdings, 21.70%; and others, 37.17%	Narasingarh plant, Madhya Pradesh	1,089
Do.	Cement Corp. of India Ltd., Indian Government, 100%	Nayagaon plant, Madhya Pradesh	1,330
Do.	J.K. 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%; and 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., 100%	Shreeniwas plant, Maharashtra	1,060
Do.	Lakshmi Cement, a division of Straw Products Ltd., JK Singhanian, principal shareholder	Sirohi plant, Rajasthan	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

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity e/
Cement--Continued:		Vikram Cement., Grasim Industries Ltd., a subsidiary of the Birla Group, 100%	Vikram Plant, Madhya Pradesh	1,000
Do.		Raasi Cement Ltd., Andhra Pradesh 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., 100%	Cuttack District, Orissa	120
Do.		Orissa Mining Corp. Ltd., Orissa Industries Ltd., 100%	do.	300
Do.		Tata Iron & Steel Co. Ltd., 100%	do.	100
Do.		Ferro Alloys Corp. Ltd., 100%	Dhenkanal District, Orissa	75
Do.		Orissa Mining Corp. Ltd., Orissa Industries Ltd., 100%	do.	200
Do.		Mysore Minerals Ltd., 100%	Hassan District, Karnataka	125
Do.		Ferro Alloys Corp. Ltd., 100%	Kendujhar District, Orissa	75
Do.		Orissa Mining Corp. Ltd., Orissa Industries Ltd., 100%	do.	100
Do.		Ferro Alloys Corp. Ltd., 100%	Khammam District, Andhra Pradesh	100
Coal, bituminous	million 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
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		Indo-Gulf Fertilizers and Chemicals Corp., 100%	Birla Copper Complex smelter, Dahej, Gujarat	100
Do.		Hindustan Copper Co. Ltd., Indian Government, 100%	Indian Copper Complex mines, Ghatsila District, Bihar	31
Do.		do.	Indian Copper Complex smelter-refinery, Ghatsila District, Bihar	16
Do.		do.	Khetri Copper Complex mines, Khetrinagar Rajasthan	15
Do.		do.	Khetri Copper Complex smelter-refinery, Khetrinagar District, Rajasthan	45
Do.		do.	Malanjkhand Copper Complex mines, Balaghar District, Madhya Pradesh	22
Do.		Sterlite Industries Ltd., 100%	Tuticorin Smelter, Tamil Nadu	100
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
Iron and steel:				
Crude steel		Visvesvaraya Iron and Steel Ltd., Karnataka State, 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, Madhya Pradesh	4,000
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., 100%	Jamshedpur steel plant, Bihar	3,200

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity e/
Iron and Steel--Continued:			
Crude steel--Continued:	Steel Authority of India Ltd., Indian Government, 100%	Rourkela steel plant, Orissa	1,800
Do.	Rashtriya Ispat Nigam Ltd., 100%	Visakhapatnam steel plant, Andhra Pradesh	3,200
Do.	Ministeel plants, privately owned	About 180 plants located throughout India	4,700
Iron ore	National Mineral Development Corp. Ltd., Indian Government, 100%	Bailadila, Madhya Pradesh	9,000
Do.	Steel Authority of India Ltd., Indian Government, 100%	Bastar and Durg District, Madhya Pradesh	7,000
Do.	Kudremukh Iron Ore Co. Ltd., Indian Government, 100%	Kudremukh, Chikmagalur District, Karnataka	9,500
Do.	National Mineral Development Corp. Ltd., Indian Government, 100%	Donimalai, Karnataka	9,000
Do.	Chowgule & Co. Pvt. Ltd., 100%	Goa	2,500
Do.	Dempo Mining Corp. Ltd., 100%	Goa	2,500
Do.	V.M. Salgaocar & Bros. Pvt. Ltd., 100%	Goa	2,500
Do.	Steel Authority of India Ltd., Indian Government, 100%	Kendujhar District, Orissa	3,000
Do.	Tata Iron and Steel Co. Ltd., 100%	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., 100%	do.	3,500
Kyanite	Associated Mining Co., 100%	Bhandara District, Maharashtra	10
Do.	Maharashtra Mineral Corp. Ltd., 100%	do.	10
Do.	Bihar State Mineral Development Corp. Ltd., Bihar State Government, 100%	Singhbhum District, Bihar	10
Do.	Hindustan Copper Ltd., Indian Government, 100%	do.	22
Lead ore	Hindustan Zinc Ltd., Indian Government, 100%	Agnigundala Mine, Andhra Pradesh	72
Do.	do.	Sargipalli Mine, Orissa	150
Lead, primary	do.	Chanderiya Smelter, Rajasthan	35
Do.	do.	Tundoo Smelter, Bihar	8
Do.	do.	Visakhapatnam (Vizag) Smelter, Andhra Pradesh	22
Lead, secondary	Indian Lead Co., 100%	Thane Refinery, Mumbai, Maharashtra	25
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., 100%	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, 100%	Andhra Pradesh	NA
Do.	Manganese Ore India Ltd., Indian Government, 100%	Balaghat, Madhya Pradesh	NA
Do.	J.A. Trivedi Bros., 100%	do.	NA
Do.	Sandur Manganese and Iron Ores Ltd., 100%	Bellary, Karnataka	NA
Do.	Manganese Ore India Ltd., Indian Government, 100%	Bhandara, Maharashtra	NA
Do.	Eastern Mining Co., 100%	North Kanara, Karnataka	NA
Do.	Mysore Minerals Ltd., 100%	do.	NA
Do.	Manganese Ore India Ltd., Indian Government, 100%	Keonjhar, Orissa	NA
Do.	Mangilah, Rungta (Pvt.) Ltd., 100%	do.	NA
Do.	Orissa Mining Corp. Ltd., 100%	do.	NA
Do.	Rungta Mines (Pvt.) Ltd., 100%	do.	NA
Do.	Serajuddin & Co., 100%	do.	NA
Do.	S. Lall & Co., 100%	do.	NA
Do.	Tata Iron and Steel Co. Ltd., 100%	do.	NA
Do.	Orissa Mineral Development Co. Ltd., 100%	Koraput, Orissa	NA
Do.	Orissa Mining Corp. Ltd., 100%	do.	NA
Do.	Mysore Minerals Ltd., 100%	Shimoga, Karnataka	NA
Do.	Aryan Mining & Trading Corp., 100%	Sundargarh, Orissa	NA
Do.	Orissa Manganese & Minerals (Pvt.) Ltd., 100%	Sundargarh, Orissa	NA
Do.	Tata Iron and Steel Co. Ltd., 100%	do.	NA
Do.	R.B.S. Shreeram Durga Prasad and Falechand Marsingdas, 100%	Vizianagaram, Andhra Pradesh	NA

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(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.	Indian Oil Corp., a subsidiary of Oil and Natural Gas Corp., Indian Government, 91% and private interests, 9%	Barauni Refinery, Bihar	66,000
Do.	Bongaigaon Refinery and Petrochemicals Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100%	Bongaigaon Refinery, Assam	27,000
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.	Guwahati Refinery, Assam	20,000
Do.	do.	Haldai Refinery, West Bengal	61,000
Do.	do.	Koyali Refinery, Gujarat	185,000
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.	Bharat Petroleum Corp. Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 67%, and private interests, 33%	Mahul Refinery, Mumbai (Bombay), Maharashtra	135,000
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.	Visakhapatnam Refinery, Andhra Pradesh	90,000
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.	Panipat Refinery, Uttar Pradesh	120,000
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., 100%	Durmala and Maldeota underground mines, Uttar Pradesh	NA
Do.	Madhya Pradesh State Mining Corp. Ltd., Pradesh State Government, 100%	Hirapur and Khatamba Mines, Madhya Pradesh	NA
Do.	Rajasthan State Mines and Minerals Ltd., Rajasthan State Government, 100%	Jhamarkotra Mine, Rajasthan	NA
Do.	Hindustan Zinc Ltd., Indian Government, 100%	Maton Mine, Rajasthan	NA
Zinc	Binani Zinc Ltd., 100%	Binanipuram Smelter, Kerala	30
Do.	Hindustan Zinc Ltd., Indian Government, 100%	Chanderiya Smelter, Rajasthan	70
Do.	do.	Debari Smelter, Rajasthan	49
Do.	do.	Visakhapatnam (Vizag) Smelter, Andhra Pradesh	30

e/ Estimated. NA Not available.

1/ Scheduled for startup in 2002.

2/ Capacity of clusters of surface mines varies extremely, depending on demand. Estimated total capacity is 1.5 million metric tons per year.

3/ Estimated total annual phosphate rock capacity is 800,000 metric tons.