

THE MINERAL INDUSTRY OF

INDIA

By Travis Q. Lyday

India, a republic consisting of 25 States and 7 union territories, is endowed with a large work force, including persons skilled in all areas of the mineral industry.

Under India's Constitution, the exploration and production of most minerals fall within the jurisdiction of the central Government. Accordingly, the mineral industry of India primarily is owned and administered by the State, either directly or through public-sector endeavors; most mining companies are nationalized.

Historically, mining and metallurgical activities in India can be traced back for about 6,000 years. Mineral resources are extensive and there is a wide variety, ranging from bauxite, copper, bituminous coal, diamond, gold, iron ore, manganese, and zinc, to a host of industrial minerals. The mining sector has had substantial growth over the past 50 years; the annual value of mineral production has risen from a meager \$25 million in the 1950's to almost \$9 billion in the Indian fiscal year 1995-96 ending on March 31, 1996 (Mining Journal, 1996a). Most of the mineral deposits are in the south and central highlands of the country.

India is a major minerals producer, ranking among the world's leading producers of bauxite, bituminous coal, iron ore, and zinc. The main mining industry is the production of steaming coal for power generation. Coal provides about 60% of the country's energy requirements. Including peat and lignite, it accounts for an estimated 40% of the value of all mineral production. Iron ore, primarily from surface operations, accounts for an estimated 40% of the value of all metallic mineral production. Approximately 50% is used domestically for steel production, with the balance exported.

Domestic production of copper, lead, and zinc satisfies less than about 45% of the country's requirements, with imports fulfilling the balance. Aluminum is the only nonferrous metal for which an adequate domestic ore (bauxite) resource is available.

Limestone for steel and cement production remains the leader in the industrial minerals sector, producing an estimated 70% of the total value of industrial minerals.

Mining in India is regulated under the Mines and Minerals (Regulation and Development) Act, 1957, as modified. Under this Act, all minerals are owned by the constituent States, but are administered by the central Government. Mining royalties and taxes, although set and revised by the central Government, are paid directly to the individual States.

The mining industry is administered by the Ministry of Mines, which is responsible for geological surveys, exploration, and administration of the Mines and Minerals Act for all minerals

except mineral fuels. Coal is administered by the Department of Coal within the Ministry of Energy. The Ministry of Petroleum and Natural Gas has responsibility for exploration and production of oil and natural gas, as well as its refining, distribution, and marketing. Nuclear materials are regulated by the Department of Atomic Energy (DAE). The Geological Survey of India, the Indian Bureau of Mines, and the Controller of Mining Leases are subordinate offices within the Ministry of Mines.

The mineral industries of India produce about 70 mineral commodities embracing various ores, metals, industrial minerals, and mineral fuels. An estimated 4,400 mines operate in the country, the vast majority of which are small surface operations using only hand-mining methods and having low output. About 300 underground mines are in production in the nonfuel minerals sector, most of which also are operated manually.

Employment in the mineral industry is estimated to exceed 1 million people, or about 4.5% of the employed labor force, with the public sector employing about 90% of the total.

On October 17, 1996, the coalition Government issued a set of guidelines regarding the granting of prospecting licenses and mining leases aimed at encouraging exploration on a broader or regional scale. Henceforth, if aerial prospecting is involved, the Government will consider requests from the State governments to grant prospecting licenses for areas greater than the previous maximum of 25 square kilometers (km²), to a maximum of 5,000 km² for a single license area. The total aggregate area that may be held by a single company has been increased by 400% to 10,000 km², but there must be a minimum expenditure commitment and the licensee must surrender areas progressively so as to retain up to 25 km² at the end of 3 years (Mining Journal, 1996a).

The Government in October decided that applications for foreign investment in the minerals industry will be given automatic approval up to a limit of 50% equity in a particular project or company. The mineral industries in which 50% automatic clearance will be given are metallic ore mining, including bauxite, chromite, copper, iron ore, lead and zinc, and manganese, but excluding uranium, and the mining of industrial minerals. However, in the case of diamond and other precious stones, and gold and silver, the existing system of considering each application on a case-by-case basis will continue. These cases were to be considered by the Foreign Investment Promotion Board (Mining Journal, 1996b).

India's Supreme Court issued a temporary order prohibiting nonforest activities in forested areas in an effort to protect the

country's forests. The order applies to companies that obtained mining licenses after 1980 that are mining in forested areas.

In an effort to curb gold smuggling, the Government liberalized its gold import policy, effective January 1, 1997, by doubling to 10 kilograms (kg) the amount of gold that may be brought into the country by nonresident Indians.

India has a large, integrated aluminum industry based on domestic bauxite deposits, which are estimated to comprise about 10% of the world's total. Aluminum remains the sole nonferrous metal for which India has an adequate raw material base.

The Government approved near yearend the longstanding plans of the Ministry of Mines to expand the bauxite and alumina production capacity of State-owned National Aluminium Co. (NALCO). The approval is for the expansion of the Panchpatmali bauxite mine to 4.8 million metric tons per year (Mt/yr), double its current level, and the Damanjodi alumina refinery to 1.58 Mt/yr, increasing from 800,000 metric tons per year (t/yr). The expansion of the facilities, at Angul in Orissa State, will take just more than 4 years and cost \$46.39 million. The expansion is to be funded commercially, with no Government funds involved. Although NALCO has its own aluminum smelter, the additional aluminum production will be exported (Mining Journal, 1997).

Indian bauxite miner Saurashtra Calcine Bauxite and Allied Industries Ltd. (SCBL) is planning to invest in raw material processing equipment at two of its sites in a bid to increase output and cost effectiveness. SCBL will install a 36,000-t/yr rotary kiln at its mine site at Jamnager and a 11,640-t/yr grinding and crushing unit at the Gujarat Industrial Development Corp.'s industrial estate at Porbandar. SCBL has the capacity to mine 50,000 t/yr of bauxite and produce about 5,000 t/yr of calcined bauxite. The company's current grinding capacity is only 1,650 t/yr. The demand for calcined bauxite in India is increasing because of a strong refractory demand from the steel industry (Industrial Minerals, 1996).

Hindalco Industries Ltd., India's largest private aluminum company that implemented two expansions at its Renukoot Smelter in Uttar Pradesh in 1995, is implementing another increase that will boost capacity at the 210,000-t/yr facility by 32,000 t/yr. Hindalco also is studying the possibility of constructing a new 250,000 t/yr aluminum smelter in Orissa State (Mining Magazine, 1996a).

Indian Aluminium Co. Ltd., which is having chronic power shortages at its Belgaum smelter in Karnataka State, entered into an agreement with Coastal Power Co. of the United States, to build a 100-megawatt (MW) captive powerplant on a build-own-operate-transfer basis. The project is based on using naphtha as the main fuel.

More than one-half of India's chrome ore mines are in the Districts of Cuttack, Dhenkanal, and Keonjhar in Orissa State, while the others are distributed relatively evenly among the States of Andhra Pradesh, Bihar, Karnataka, Maharashtra, and Manipur. The major chromite mining companies are Tata Iron and Steel Co. Ltd. (TISCO), Orissa Mining Corp. Ltd. (OMC), Ferro Alloys Corp. Ltd., Mysore Minerals Ltd., and Indian Metals and Ferro Alloys Ltd.

TISCO lost its petition to India's Supreme Court to reverse the decision of Orissa State's High Court that cut TISCO's Sukinda Valley chrome mining lease by more than two-thirds, down to 406 hectares compared with the 1,261 it formerly leased, and awarding the remainder to OMC (Metal Bulletin, 1996b).

India's State-owned Hindustan Copper Ltd. (HCL) produces the majority of the country's mined copper from 10 mines. HCL also operates the country's copper smelters and refineries. Important but smaller mines are operated by Sikkim Mining Corp. and Hutti Gold Mines in Karnataka State. More than 90% of India's copper ore reserves are in the States of Bihar, Madhya Pradesh, and Rajasthan.

HCL anxiously awaited as the year ended for approval from the Government to expand its Khetri copper smelting and refining facility in Rajasthan State. HCL proposes to expand to 100,000 t/yr of copper from the current capacity of 45,000 t/yr. HCL, although it has its own copper mines, will feed the expansion at least partly with imported concentrates. The expansion is expected to take 22 months following Government approval (Mining Journal, 1997).

HCL is planning to close its unprofitable copper mines at Kendadih and Rakha in the Singhbhum District of Bihar State in the east of the country. The two mines were opened in 1924 and are being mined at a depth of 1,230 meters below the surface, making them the second deepest mines in the country, after the Kolar gold mines in Karnataka State. The cost of producing 1 ton of metal in concentrate at the Kendadih and Rakha Mines has risen to \$3,887, compared with \$1,437 at HCL's Malanjhand Complex in Madhya Pradesh State and \$2,028 at the Khetri Complex in Rajasthan (Financial Times, 1996).

Although India is one of the world's largest consumers of gold, domestic production has waned profoundly in recent years, and the country is producing only about 2 to 3 t/yr. About one-half is produced by the activities of numerous small-scale miners, mainly unorganized independent prospectors. More than 80% of the gold used in India is for jewelry.

Government-owned Bharat Gold Mines Ltd. produces gold from a number of mines in the Kolar Goldfields, Karnataka State, one of the oldest gold mining areas in the world. Production from the Kolar Fields began in 1882. A small amount of gold also is produced as a byproduct of copper refining.

India is a major producer of iron ore, which is used to produce steel for domestic use as well as for export by two State-owned enterprises, the National Mineral Development Corp. Ltd. (NMDC) and the Kudremukh Iron Ore Co. Ltd. (KIOCL). The numerous iron ore mines in the country have an estimated combined capacity of 60 Mt/yr.

The country has abundant deposits of hematite and magnetite iron ores. Hematite occurs mostly in the States of Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, and Orissa. Magnetite deposits, most of which are metallurgical in grade, occur in Andhra Pradesh, Goa, Karnataka, and Kerala States.

NMDC operates the country's largest mechanized iron mines at Bailadila, Madhya Pradesh State, and at Donimalai,

Karnataka State. Output from the two mines is about 13 Mt/yr, but output is scheduled to increase to 18 Mt/yr by March 1997. KIOCL operates the country's largest single mine, the Kudremukh, 110 kilometers east of the southern port city of Mangalore in Karnataka State. Both KIOCL and NMDC suffered severe shortfalls in iron ore production as a result of the Supreme Court's temporary ruling that prevented nonforest activities in forested areas.

In December, Mineral Sales Private Ltd. became India's first private sector iron ore miner to conduct a direct export shipment since 1962. Previously, all iron ore shipments, with the exception of those from miners in Goa State, were channeled through the State-owned trading house Minerals and Metals Trading Corp. Ltd. Mineral Sales shipped 24,000 metric tons (t) of iron ore fines to China on December 18 from the port of Chennai in Madras State (Metal Bulletin, 1997a).

Sociedade de Fomento Industrial, a major supplier of iron ore in Goa State, and Marubeni Corp., a Japanese trading company, agreed early in December to develop two iron ore mines in the Bellary-Hospet areas of Karnataka State. Mine development is scheduled to begin in June 1997, with annual shipments of about 1.5 million metric tons (Mt) of iron ore, beginning in October 1999, to Japan as well as other Asian countries and the Middle East (The Tex Report, 1996). Fomento and Marubeni will form a 50-50 joint-venture company, Fomar Ltd., to oversee, among other responsibilities, development of the two new mines, called Fosa and Lad. Fosa and Lad are believed to have combined reserves of about 50 Mt of ore.

The country has seven integrated steel plants (ISP) with a capacity of about 24 Mt/yr. The Government's Steel Authority of India Ltd. (SAIL) owns five ISP, namely Bhilai ISP, Madhya Pradesh State; Bokaro ISP, Bihar State; Durgapur ISP, West Bengal State; Rourkela ISP, Orissa State; and Burnpur ISP, West Bengal State, the steelworks operated since 1979 by Indian Iron and Steel Co. Ltd., a wholly owned subsidiary of SAIL. The Visakhapatnam ISP, Andhra Pradesh State, owned and operated by the public-sector corporation Rashtriya Ispat Nigam Ltd. (Vizag), was commissioned near yearend 1989. In addition to the ISP, there are more than 180 electric arc furnaces having a total capacity of 8.5 Mt/yr; however, many are closed or only partially operating owing to power shortages, a paucity of steel scrap, and/or financial problems.

Ipitata Sponge Iron Ltd. is doubling the capacity, to 240,000 t/yr, of its coal-based sponge iron plant at Kendujhar in Orissa State. Ipitata also is studying downstream investment in a 250,000 t/yr stainless steel plant and a 150,000 t/yr specialty steel plant (Metal Bulletin, 1996a).

KIOCL, in joint venture with another public sector corporation, Metallurgical and Engineering Consultants (India) Ltd., is establishing a 230,000-t/yr pig iron plant at the port of Mangalore. The facility also will produce ductile iron spun pipes.

The Russian engineering firm Tyazhpromexport will lead the revitalization of Indian Iron and Steel Co. Ltd.'s Burnpur steel plant in West Bengal by acquiring a 39% equity stake in the company. The Burnpur plant produces about 300,000 t/yr of structural steels, pig iron, and other products, although its

nominal capacity is more than 1 Mt/yr. The plant is regarded as technically obsolete, needing extensive modernization (Metal Bulletin, 1997b).

Substantial quantities of lead and zinc were produced from the same mines in the State of Rajasthan by Hindustan Zinc Ltd. (HZL), the country's sole producer of both metals. HZL also mined lead without zinc in the States of Andhra Pradesh and Orissa. HZL operated the country's three primary lead and three of the four primary zinc smelter-refinery complexes; the remaining primary smelter-refinery was operated by Binani Zinc Ltd., producing zinc from imported concentrates.

To overcome chronic power shortages, HZL is planning a 100-MW powerplant near Udaipur for its Debrari zinc smelter in Rajasthan State, at a cost of \$92 million. HZL also is proposing to build a \$160 million, 60,000-t/yr zinc smelter, possibly to use the increased output that will result from the expansion of its Rampura-Agucha Mine from 900,000 t/yr to 1.3 Mt/yr.

The private-sector Indian Lead Pvt. Ltd. produced secondary lead from indigenous and imported lead scrap and lead concentrates at plants at Phane, Maharashtra State, and Kalipara, West Bengal State.

India has the world's fourth largest cement industry and is entirely self-sufficient in meeting its cement demand; it does not normally import either clinker or cement. Since the liberalization of the country's economy began in mid-1991, output from India's cement factories has risen steadily. Cement currently is produced in 106 large plants, each with capacities of more than 0.2 Mt/yr, managed by 54 cement companies with an installed capacity of almost 77 Mt/yr, as well numerous mini-cement plants; total installed capacity of the country's cement industry is about 83 Mt/yr (World Cement, 1996). Most of the capacity, about 88%, is owned by the private sector, with the public sector accounting for only about 9.5 Mt/yr of production capacity (Global Cement Report, 1996).

The NMDC produces most of the country's modest diamond output from its diamondiferous kimberlite mines at Wajrakarur, Andhra Pradesh. A small quantity of diamond also is produced in Orissa State. India's diamond industry, the world's largest in terms of employment, quantity, and value, primarily is dependent on imported materials for processing and reexport. India processes an estimated 65% of the world's rough diamonds and has about 45% of the world trade in finished diamonds, mainly small stones for use in lower priced jewelry. The majority of the cutting and polishing plants are in Mumbai (formerly Bombay), Maharashtra State, and Surat, Gujarat State, receiving their imported material predominantly from De Beers' Central Selling Organization in the United Kingdom.

Bituminous coal is India's principal source of commercial energy, producing 60% of the country's requirements, almost all of which is produced domestically (Coal Age, 1996b). India is the world's third largest coal producer. The Government-owned Coal India Ltd. (CIL) is the country's largest producer, with about 90% of output, and also is responsible for administering all coal exploration and distribution programs. The bulk of production is from opencast mines; underground mines provide for less than 30% of production, but account for more than 65%

of CIL personnel involved in mining. However, the coking properties of Indian coals are poor because of a very high ash content and low calorific value; therefore, metallurgical-grade coals are imported, primarily from Australia. India's coal industry is the third largest in the world; in 1996, India overtook Russia to become the third largest consumer of coal after China and the United States (Mining Magazine, 1996b).

Until early 1996, coal mining in the private sector was permitted only for captive consumption by iron and steel producers. In liberalizing its rules governing the coal industry, the Government is allowing cement producers also to mine coal for their own use, with the stipulation that the cement firm has at least a 26% equity stake in the coal mining company.

Indian coals are ranked as either bituminous or lignite, the country having no anthracite deposits. The main bituminous coalfields are in the central and eastern States of Bihar, Madhya Pradesh, Orissa, and West Bengal. The lignite deposits are predominantly in the southern part of the country. About 80% of the country's known lignite occurs in Tamil Nadu State, with deposits also known in the States of Gujarat, Kerala, Rajasthan, and Jammu and Kashmir. The central Government-owned Neyveli Lignite Corp. (NLC) is the country's sole producer. In addition to its two mines, the NLC integrated complex consists of two thermal power stations, a fertilizer plant, and a briquetting and carbonization plant.

The Union Ministry of Environment and Forests mandated in September that all thermal powerplants in India use coal with less than 30% ash content by July 2000, though plants commissioned after July 1, 1996, will be granted a 4-year grace period to reduce their ash content (Coal Age, 1996a).

The central Government administered the petroleum and natural gas industry of the country from exploration to the marketing of refined petroleum products until 1994 when the industry began to open up as part of the country's economic reforms initiated in 1991. Two State-owned companies, Oil and Natural Gas Corp. and Oil India Ltd., conducted exploration for hydrocarbons and developed suitable discoveries for production until the Indian Cabinet in 1995 cleared the way for foreign companies to conduct joint oil and gas exploration programs, both onshore and offshore, with the two Government enterprises. Six fundamentally Government-owned companies operate the country's petroleum refineries; they were all wholly owned Government entities until joint ventures were allowed to forge in 1994. Imports and exports of crude oil and refined petroleum products are managed by Indian Oil Corp., the largest of the refining companies. Crude petroleum provides about 30% of the country's energy needs, with about 60% of this derived from imported stocks.

The Atomic Minerals Div. (AMD) within the DAE is responsible for conducting radiometric and geological surveys and for the exploration and development of various mineral resources necessary for the country's nuclear power program. The AMD located uranium deposits containing significant concentrations (0.55% uranium oxide) in the northern parts of the Cuddapah Basin in Andhra Pradesh.

The Uranium Corp. of India Ltd. (UCIL) within the DAE operates uranium mines at Jaduguda and Bhatin; a uranium mill

at Jaduguda; and uranium recovery plants at Mosaboni, Rakha, and Surda, all in Bihar State. UCIL also has the capability of recovering other metals and minerals as byproducts, such as copper, magnetite, and molybdenite.

The Nuclear Power Corp. of India Ltd., under the auspices of the DAE, operates nuclear power stations at five sites within India, as follows: Tarapur Atomic Power Station Units I and II, each having the capacity of generating 160 MW, at Tarapur, Maharashtra State; Rajasthan Atomic Power Station Unit I having a capacity of 100 MW and Unit II with a capacity 200 MW, at Rawatbhata, near Kota in Rajasthan State; Madras Atomic Power Station Units I and II, each having the capacity of generating 220 MW, at Kalpakkam near Madras in Tamil Nadu State; Narora Atomic Power Station Units I and II, each having the capacity of generating 220 MW, at Narora in Uttar Pradesh State; and Kakrapar Atomic Power Station Unit I and II, each having a capacity of 220 MW, at Kakrapar in Gujarat State.

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27 Jawaharlal Nehru Road
Calcutta 700 016, India
Telephone: +91 33 2496976
Fax: +91 33 2496956

Indian Bureau of Mines
New Secretariat Building
Nagpur 440 001, India
Telephone: +91 712 534642, 523934
Fax: +91 712 533041

National Mineral Development Corp. Ltd.
Khanij Bhawan, 10-3-311/A, Castle Hills
Masab Tank, Hyderabad 500 028, India
Telephone: +91 40 222071, 222072
Fax: +91 40 222236

Oil and Natural Gas Corp.
Bombay Offshore Project
12 Floor, Express Towers, Nariman Point
Bombay 400 021, India
Telephone: +91 22 2026446, 2022559
Fax: +91 22 2027938

Oil India Limited
Allahabad Bank Building
17 Parliament Street
New Delhi 110 001, India

Telephone: +91 11 310841, 310844, 310675
Fax: +91 11 310962

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TABLE 1
INDIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

| Commodity 2/ METALS | 1992 | 1993 | 1994 | 1995 | 1996 e/ |
|--|--------------|--------------|------------|--------------|--------------|
| Aluminum: | | | | | |
| Bauxite, gross weight thousand tons | 4,898 | 5,227 | 4,809 | 5,163 r/ | 5,100 |
| Alumina, Al ₂ O ₃ equivalent do. | 1,484 r/ | 1,490 r/ | 1,456 r/ | 1,650 r/ | 1,700 |
| Metal, primary | 496,300 | 466,423 | 472,000 | 528,000 r/ | 501,800 3/ |
| Cadmium metal | 313 | 255 | 216 | 254 r/ | 269 3/ |
| Chromium: Chromite, gross weight | 1,151,661 r/ | 1,000,073 r/ | 909,076 r/ | 1,536,386 r/ | 1,363,205 3/ |
| Copper: | | | | | |
| Mine output, Cu content | 49,036 | 49,416 | 45,944 | 46,975 r/ | 35,800 3/ |
| Metal, primary: | | | | | |
| Smelter | 47,712 | 37,372 | 51,232 | 39,496 r/ | 28,286 3/ |
| Refinery | | | | | |
| Electrolytic (cathode) | 38,300 | 30,100 | 40,100 | 33,900 r/ | 29,100 3/ |
| Fire refined | 8,500 | 6,700 | 8,900 | 7,300 | 6,500 3/ |
| Total | 46,800 | 36,800 | 49,000 | 41,200 r/ | 35,600 3/ |
| Gold metal, smelter kilograms | 1,762 | 2,003 | 2,244 | 2,205 r/ | 2,500 |
| Iron and steel: | | | | | |
| Iron ore and concentrate: | | | | | |
| Gross weight thousand tons | 54,870 | 57,375 | 60,473 r/ | 66,751 r/ | 67,000 |
| Fe content do. | 35,117 | 36,720 | 37,368 | 42,720 r/ | 42,900 |
| Metal: | | | | | |
| Pig iron do. | 15,126 | 15,674 | 17,808 | 18,626 3/ | 20,000 |
| Direct-reduced iron do. | 1,437 | 2,208 | 3,122 | 4,280 3/ | 4,500 |
| Ferroalloys: | | | | | |
| Ferrochromium (including charge chrome) | 246,147 r/ | 234,500 | 251,459 | 300,567 r/ | 261,666 3/ |
| Ferrochromiumsilicon e/ | 9,000 | 8,000 | 8,000 | 9,000 | 9,000 |
| Ferromanganese e/ | 198,000 | 137,291 3/ | 150,000 | 150,000 | 150,000 |
| Ferrosilicon | 90,000 | 67,600 | 85,000 e/ | 85,000 e/ | 85,000 |
| Silicomanganese e/ | 93,000 | 85,000 3/ | 140,000 | 120,000 | 120,000 |
| Other e/ | 6,500 | 8,600 | 8,500 | 8,500 | 8,500 |
| Steel, crude thousand tons | 18,117 | 18,155 | 19,285 | 20,291 3/ | 20,000 |
| Semimanufactures e/ 4/ do. | 12,000 | 9,000 | 11,000 | 11,000 | 11,000 |
| Lead: | | | | | |
| Mine output, Pb content | 30,500 | 26,000 | 30,500 | 28,600 r/ | 31,000 3/ |
| Metal, refined: | | | | | |
| Primary e/ | 40,800 | 32,500 | 38,600 | 34,000 r/ | 32,500 |
| Secondary e/ | 22,900 | 18,200 | 21,700 | 28,000 r/ | 27,000 |
| Total | 63,700 | 50,700 | 60,300 | 62,000 r/ | 59,500 |
| Manganese: | | | | | |
| Ore and concentrate, gross weight thousand tons | 1,810 | 1,655 | 1,632 | 1,764 r/ | 1,735 |
| Mn content e/ do. | 687 | 628 | 620 | 670 r/ | 659 |
| Rare-earth metals: Monazite concentrate, gross weight e/ | 4,000 | 4,600 | 4,600 | 5,000 | 5,000 |
| Selenium e/ kilograms | 9,628 r/ | 11,116 r/ | 11,582 r/ | 11,449 r/ | 11,500 |
| Silver, mine and smelter output do. | 47,371 | 51,228 | 50,207 r/ | 38,064 r/ | 45,000 |
| Titanium concentrates, gross weight: | | | | | |
| Ilmenite e/ | 300,000 | 320,000 | 300,000 | 300,000 | 300,000 |
| Rutile e/ | 10,000 | 13,900 | 14,000 | 14,000 | 14,000 |
| Tungsten, mine output, W content | 2 | 1 | 2 | 2 | 2 |
| Zinc: | | | | | |
| Mine output, concentrate: | | | | | |
| Gross weight | 300,140 | 300,736 | 270,382 | 297,300 | 285,200 |
| Zn content | 152,800 | 156,300 | 147,300 | 154,500 | 148,200 3/ |
| Metal: | | | | | |
| Primary | 128,100 | 141,700 | 156,400 | 146,500 | 143,600 3/ |
| Secondary e/ | 200 | 200 | 500 | 500 | 500 |
| Total e/ | 128,300 | 141,900 | 156,900 | 147,000 | 144,100 |
| Zirconium concentrate: Zircon, gross weight e/ | 18,000 | 17,000 | 18,000 | 18,000 | 18,000 |
| INDUSTRIAL MINERALS | | | | | |
| Abrasives, natural, n.e.s.: | | | | | |
| Corundum, natural | 22 | 15 | 14 r/ | 14 r/ | 15 |
| Garnet | 16,573 | 47,785 | 56,196 r/ | 54,484 r/ | 55,000 |
| Jasper | 4,422 | 5,627 | 4,577 | 5,000 | 5,000 |

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

| Commodity 2/ | 1992 | 1993 | 1994 | 1995 | 1996 e/ | |
|---------------------------------------|-----------------|-----------|--------------|--------------|-----------|--------|
| INDUSTRIAL MINERALS--Continued | | | | | | |
| Asbestos | 43,683 | 44,080 | 29,824 r/ | 24,984 r/ | 30,000 | |
| Barite | 458,436 | 547,875 | 497,971 r/ | 420,704 r/ | 500,000 | |
| Bromine, elemental e/ | 1,300 | 1,400 | 1,400 | 1,500 | 1,500 | |
| Cement, hydraulic e/ | thousand tons | 50,000 | 53,812 3/ | 60,000 r/ | 70,000 r/ | 80,000 |
| Chalk | 104,833 | 98,966 | 139,300 r/ | 136,090 r/ | 137,000 | |
| Clays: | | | | | | |
| Ball clay | 227,585 | 336,880 | 347,741 r/ | 408,308 r/ | 400,000 | |
| Diaspore | 10,393 | 12,197 | 9,463 | 10,086 r/ | 10,000 | |
| Fireclay | 458,674 | 439,950 | 397,435 | 407,673 r/ | 400,000 | |
| Kaolin: | | | | | | |
| Salable crude | thousand tons | 514 | 519 | 548 | 552 r/ | 550 |
| Processed | do. | 124 | 129 | 134 | 160 r/ | 160 |
| Total | do. | 638 | 648 | 682 | 712 r/ | 710 |
| Other | do. | 42 | 40 | 50 | 73 r/ | 70 |
| Diamond: | | | | | | |
| Gem e/ | thousand carats | 15 | 13 | 15 | 14 r/ | 21 |
| Industrial e/ | do. | 3 | 7 | 3 | 8 r/ | 11 |
| Total | do. | 18 | 20 | 18 | 22 r/ | 32 3/ |
| Feldspar | 67,743 | 66,792 | 64,693 r/ | 98,683 r/ | 90,000 | |
| Fluorspar: | | | | | | |
| Concentrates: | | | | | | |
| Acid-grade | 7,062 | 7,798 | 6,231 r/ | 4,895 r/ | 6,000 | |
| Metallurgical-grade | 13,572 | 13,846 | 16,360 r/ | 17,604 r/ | 17,000 | |
| Total | 20,634 | 21,644 | 22,591 r/ | 22,499 r/ | 23,000 | |
| Other fluorspar materials, graded | 2,666 | 4,782 | 3,415 r/ | 4,909 r/ | 5,000 | |
| Gemstones excluding diamond: | | | | | | |
| Agate including chalcedony pebble | 674 | 680 | 639 r/ | 518 r/ | 550 | |
| Garnet | kilograms | 616 | 1,058 | 533 | 519 r/ | 550 |
| Graphite 5/ | 72,996 | 82,398 | 93,597 r/ | 114,959 r/ | 120,000 | |
| Gypsum | 1,300,868 | 1,804,661 | 1,729,775 r/ | 1,739,210 r/ | 1,700,000 | |
| Kyanite and related materials: | | | | | | |
| Kyanite | 10,101 | 11,600 | 6,265 r/ | 6,705 r/ | 7,000 | |
| Sillimanite | 18,837 | 15,563 | 10,378 r/ | 9,705 r/ | 10,000 | |
| Lime e/ | 850,000 | 860,000 | 860,000 | 900,000 | 900,000 | |
| Magnesite | 602,506 | 408,971 | 336,735 r/ | 334,710 r/ | 335,000 | |
| Mica: 6/ | | | | | | |
| Crude | 2,742 | 2,082 | 2,055 r/ | 1,721 r/ | 2,000 | |
| Scrap and waste | 1,522 | 1,187 | 719 r/ | 767 r/ | 750 | |
| Total | 4,264 | 3,269 | 2,774 r/ | 2,488 r/ | 2,750 | |
| Nitrogen, N content of ammonia | thousand tons | 7,452 | 7,176 | 7,334 | 7,713 | 7,800 |
| Phosphate rock including apatite | 487,824 | 969,385 | 1,300,493 r/ | 1,235,914 r/ | 1,200,000 | |
| Pigments, mineral: Natural: Ocher | 142,478 | 138,210 | 170,761 r/ | 234,098 r/ | 225,000 | |
| Pyrites, gross weight | 134,522 | 116,930 | 117,033 | 134,754 r/ | 135,000 | |
| Salt: e/ | | | | | | |
| Rock salt | thousand tons | 3 3/ | 3 3/ | 3 | 3 | 3 |
| Other | do. | 9,500 | 9,500 | 9,500 | 9,500 | 9,500 |
| Total | do. | 9,503 | 9,503 | 9,503 | 9,503 | 9,503 |
| Sodium carbonate e/ | 1,500,000 | 1,500,000 | 1,500,000 | 1,500,000 | 1,500,000 | |
| Stone, sand and gravel: | | | | | | |
| Calcite | 67,185 | 69,804 | 67,631 r/ | 69,111 r/ | 70,000 | |
| Dolomite | thousand tons | 2,905 | 3,498 | 3,123 r/ | 3,570 r/ | 35,000 |
| Limestone | do. | 75,173 | 82,095 | 8,576 r/ | 91,793 r/ | 90,000 |
| Quartz and quartzite | do. | 290 | 248 | 222 r/ | 257 r/ | 260 |
| Sand: | | | | | | |
| Calcareous | do. | 71 | 272 | 183 | 228 r/ | 225 |
| Silica | do. | 1,316 | 1,148 | 1,252 r/ | 1,220 r/ | 1,250 |
| Other | do. | 1,316 | 1,540 | 1,700 | 1,654 r/ | 1,700 |
| Slate | 15,282 | 12,134 | 7,004 r/ | 5,471 r/ | 6,000 | |
| Sulfur: | | | | | | |
| Content of pyrites e/ | 30,000 | 36,000 | 38,000 | 40,000 | 40,000 | |
| Byproduct: | | | | | | |
| From metallurgical plants e/ | 116,000 | 123,000 | 177,000 | 200,000 | 200,000 | |
| From oil refineries | 26,000 | 31,000 | 36,000 e/ | 35,000 e/ | 25,000 | |
| Total e/ | 172,000 | 190,000 | 251,000 | 275,000 e/ | 265,000 | |

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

| Commodity 2/ | 1992 | 1993 | 1994 | 1995 | 1996 e/ | |
|-------------------------------------|----------------------------|-----------|------------|------------|------------|---------|
| INDUSTRIAL MINERALS--Continued | | | | | | |
| Talc and related materials: | | | | | | |
| Pyrophyllite | 79,197 | 82,269 | 85,335 r/ | 131,137 r/ | 130,000 | |
| Steatite (soapstone) | 368,003 | 385,121 | 398,006 r/ | 439,509 r/ | 450,000 | |
| Vermiculite | 1,609 | 1,485 | 1,903 r/ | 1,688 r/ | 1,750 | |
| Wollastonite | 57,998 | 80,748 | 68,269 r/ | 90,128 r/ | 90,000 | |
| MINERAL FUELS AND RELATED MATERIALS | | | | | | |
| Coal: | | | | | | |
| Bituminous | thousand tons | 233,883 | 246,041 | 254,050 | 264,216 r/ | 265,000 |
| Lignite | do. | 16,114 | 17,086 | 19,197 r/ | 22,108 r/ | 20,000 |
| Total | do. | 249,997 | 263,127 | 273,247 r/ | 286,324 r/ | 285,000 |
| Coke: e/ | | | | | | |
| Coke oven and beehive | do. | 13,000 | 13,000 | 14,000 | 14,000 | 14,000 |
| Gashouse | do. | 100 | 100 | 100 | 100 | 100 |
| Other, soft | do. | 200 | 200 | 200 | 200 | 200 |
| Total | do. | 13,300 | 13,300 | 14,300 | 14,300 | 14,300 |
| Gas, natural: | | | | | | |
| Gross | million cubic meters | 15,917 | 16,283 | 14,685 r/ | 19,612 r/ | 18,000 |
| Marketable e/ 7/ | do. | 7,500 | 10,900 | 11,000 | 14,700 r/ | 13,500 |
| Petroleum: | | | | | | |
| Crude | thousand 42-gallon barrels | 208,400 | 201,461 | 234,536 r/ | 263,013 r/ | 265,000 |
| Refinery products: e/ | | | | | | |
| Liquefied petroleum gas | do. | 20,000 | 31,800 | 32,040 r/ | 32,000 r/ | 32,000 |
| Gasoline | do. | 23,000 | 30,300 | 34,560 r/ | 35,000 r/ | 35,000 |
| Kerosene and jet fuel | do. | 53,000 | 55,100 | 55,080 r/ | 55,000 r/ | 55,000 |
| Distillate fuel oil | do. | 122,000 | 136,150 | 144,720 r/ | 145,000 r/ | 145,000 |
| Residual fuel oil | do. | 56,000 | 74,800 | 71,280 r/ | 71,000 r/ | 71,000 |
| Other | do. | 71,000 r/ | 88,300 r/ | 92,880 r/ | 93,000 r/ | 93,000 |
| Total | do. | 345,000 | 416,450 | 430,560 r/ | 431,000 r/ | 431,000 |

e/ Estimated. r/ Revised.

1/ Table includes data available through June 19, 1997.

2/ In addition to commodities listed, other clays (bentonite, common clays, and fuller's earth), 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 levels.

3/ Reported figure.

4/ Excludes production from steel miniplants.

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

6/ The disparity between amounts of mica produced versus amounts exported is based on (a) stockpile, (b) illicit mines, and (c) occasional mining by others seeking additions to income nominally derived from other sources.

7/ Includes reinjected gas.

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(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 | 220 |
| Do. | National Aluminium Co. Ltd., Indian Government, 100% | Dhamanjodi Refinery, Orissa | 800 |
| Do. | Bharat Aluminium Co. Ltd., Indian Government, 100% | Korba Refinery, Madhya Pradesh | 200 |
| 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 | 72 |
| Do. | Hindalco Industries Ltd. Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; and financial institutions, 18% | Renukoot Refinery, Uttar Pradesh | 350 |
| 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 | 218 |
| Do. | 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 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity e/ |
|----------------------|--|--|--------------------|
| Aluminum--Continued: | 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 | 210 |
| 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 Singhania, 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 Singhania, 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 |
| 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 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 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

| Commodity | | Major operating companies and major equity owners | Location of main facilities | Annual capacity e/ |
|------------------------|--------------|---|---|--------------------|
| Chromite | | Ferro Alloys Corp. Ltd., 100% | Cuttack District, Orissa | 100 |
| Do. | | The Orissa Mining Corp. Ltd., Orissa State Government, 100% | do. | 200 |
| Do. | | Tata Iron & Steel Co. Ltd., 100% | do. | 100 |
| Do. | | Ferro Alloys Corp. Ltd., 100% | Dhenkanal District, Orissa | 75 |
| Do. | | The Orissa Mining Corp. Ltd., Orissa State Government, 100% | do. | 200 |
| Do. | | Mysore Minerals Ltd., 100% | Hassan District, Karnataka | 125 |
| Do. | | Ferro Alloys Corp. Ltd., 100% | Kendujhar District, Orissa | 75 |
| Do. | | The Orissa Mining Corp. Ltd., Orissa State Government, 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. | | North Eastern Coalfields Ltd., a subsidiary of Coal India Ltd., Indian Government, 100% | Assam | 640 |
| Do. | million tons | Northern Coalfields Ltd., a subsidiary of Coal India Ltd., Indian Government, 100% | Madhya Pradesh and Uttar Pradesh | 24 |
| Do. | do. | Singareni Collieries Co. Ltd., Andhra Pradesh State Government, 50% and Indian Government, 50% | Andhra Pradesh | 18 |
| Do. | do. | South Eastern Coalfields Ltd., a subsidiary of Coal India Ltd., Indian Government, 100% | Madhya Pradesh | 36 |
| Do. | do. | Western Coalfields Ltd., a subsidiary of Coal India Ltd., Indian Government, 100% | Madhya Pradesh and Maharashtra | 18 |
| Coal, lignite | do. | Neyveli Lignite Corp. Ltd., Indian Government, 100% | Tamil Nadu | 17 |
| Copper | | Hindustan Copper 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 |
| 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 | | 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 |
| Do. | | 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 | Located throughout India, approximately 160 | 4,700 |
| Iron ore | | National Mineral Development Corp. Ltd., Indian Government, 100% | Bailadila, Madhya Pradesh | 6,500 |
| 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% | Chikmagalur District, Karnataka | 7,500 |
| Do. | | National Mineral Development Corp. Ltd., Indian Government, 100% | Donimalai, Karnataka | 6,500 |
| 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 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity e/ |
|---|---|---|--------------------|
| 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. | Tundoo Smelter, Bihar | 8 |
| Do. | do. | Visakhapatnam (Vizag) Smelter, Andhra Pradesh | 22 |
| Lead-zinc ore | do. | Rajpura-Dariba Mine, Rajasthan | 900 |
| 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 1/ | 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 & 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% | do. | 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 |
| Petroleum 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 | 93,400 |
| do. | Indian Oil Corp., a subsidiary of Oil and Natural Gas Corp., Indian Government, 91% and private interests, 9% | Barauni Refinery, Bihar | 65,800 |
| do. | Bongaigaon Refinery and Petrochemicals Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Bongaigaon Refinery, Assam | 27,110 |
| do. | Indian Oil Corp., a subsidiary of Oil and Natural Gas Corp., Indian Government, 91% and private interests, 9% | Digboi Refinery, Assam | 11,700 |
| do. | do. | Guwahati Refinery, Assam | 19,920 |
| do. | do. | Haldai Refinery, West Bengal | 61,000 |
| do. | do. | Koyali Refinery, Gujarat | 185,100 |
| do. | Madras Refineries Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 52% and private interests, 48% | Madras Refinery, Tamil Nadu | 130,660 |
| 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 | 134,860 |
| do. | Industan Petroleum Corp. Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 51% and private interests, 49% | do. | 110,452 |
| do. | do. | Vizag Refinery, Andhra Pradesh | 90,369 |
| 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 |
| Phosphate rock 2/ | 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 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity e/ |
|-------------------------------|--|--|--------------------|
| Phosphate rock 2/--Continued: | 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 | Cominco Binani Zinc Ltd., 100% | Binanipuram Smelter, Kerala | 20 |
| Do. | Hindustan Zinc Ltd., Indian Government, 100% | Debari Smelter, Rajasthan | 49 |
| Do. | do. | Visakhapatnam (Vizag) Smelter, Andhra Pradesh | 30 |

e/ Estimated. NA Not available.

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

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