

THE MINERAL INDUSTRY OF

INDIA

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

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

The country was fairly rich in minerals. Its deposits of bauxite, copper, iron ore, and manganese were some of the largest in the world. Most of these deposits were in the south and central highlands of the country. The total value of all minerals produced in India represented about 3% of the country's gross domestic product, estimated to be about \$225 billion² in Indian Fiscal Year (IFY) 1994-95.³

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

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

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

Government Policies and Programs

Mining in India was regulated under the Mines and Minerals (Regulation and Development) Act, 1957, as modified. Under this act, all minerals were owned by the constituent States, but were administered by the central Government. The States could issue mining licenses, but licenses for 30 minerals and metals on a prescribed list, including rare-earth minerals, base and precious metals, and coal, could be issued only with approval by the central

Government. Mining royalties and taxes, although set and revised by the central Government, were paid directly to the individual States.

The mining industry was administered by the Ministry of Mines, which was responsible for geological surveys, exploration, and administration of the Mines and Minerals Act for all minerals, except mineral fuels, which included all grades of coal, petroleum and natural gas, and nuclear materials. Coal was administered by the Department of Coal within the Ministry of Energy. The Ministry of Petroleum and Natural Gas was empowered with the responsibility for exploration and production of oil and natural gas, as well as refining, distribution, and marketing. Nuclear materials were regulated by the Department of Atomic Energy (DAE). The Geological Survey of India, the Indian Bureau of Mines, and the Controller of Mining Leases were subordinate offices within the Ministry of Mines.

The central Government raised in March 1994 the limit of foreign equity in mineral projects from 40% to 50% in an effort intended to attract private and multinational investors into the Indian minerals scene. More than a 50% equity share could be allowed on a case-by-case basis. Restrictions on private investment were removed for 13 mineral commodities previously reserved exclusively for the State sector: chromium, copper, diamond, gold, iron ore, lead, manganese, molybdenum, nickel, platinum-group metals, sulfur, tungsten, and zinc. The coal industry was being deregulated, and more than 100 projects have been identified for development during the eighth 5-year planning period (1992-97) to produce 308 million metric tons per year (Mmt/a). In November 1994, foreign companies were permitted to hold 51% equity in Indian coal mines that was previously limited to 49% under the Coal Mines Nationalization Act of 1973, as amended.

Import duties on all ores and concentrates were reduced in 1994 to a flat 10%, while import duties on steel and nonferrous metals were lowered to a flat 50%. The import duty on steaming coal was cut from 85% to 35%.

Environmental Issues

Environmental protection in India was specifically legislated under the Mines and Minerals (Regulation and Development) Act, 1957, as modified by subsequent amendments. In addition, four main environmental acts related to control of the mining industry, including the Water

(Prevention and Control of Pollution) Act of 1974; Forest Conservation Act of 1980; Air (Prevention and Control of Pollution) Act of 1981; and Environmental Protection Act of 1986, all having ensuing amendments.

Mining lease applications were required to contain an environmental management plan within the mining plan that must be approved by the central Government prior to a State Government issuing a mining license. The environmental management plan was to have an assessment of the impact of the proposed operation, plus methods for remediating and restoring any adversity. These requirements applied to both private- and public-sector endeavors.

Production

The total value of mineral production, excluding nuclear materials, was estimated to be \$8.3 billion in IFY 1994-95, an increase of about 5% compared with that of the previous IFY. Mineral fuels accounted for an estimated 84% of the total, followed by metallic minerals, 7%; and industrial minerals, 9%.

Maharashtra led the individual States by contributing an estimated 28% of the total value of mineral production, followed by Bihar, 14%; Madhya Pradesh, 12%; Gujarat, 9%; Assam, 7%; Andhra Pradesh, 6%; and the remaining States combined, 24%. (*See table 1.*)

Trade

The estimated value of mineral exports during IFY 1994-95 was \$4.8 billion. Cut and polished diamond remained India's single largest mineral commodity export, accounting for about 70% of total mineral exports, followed by alumina, emerald, and iron ore, which together accounted for about 20%. Other important mineral exports were chromite, precious and semiprecious gemstone, and dimension stone.

The value of mineral imports during IFY 1994-95 was estimated to be \$8 billion, with crude petroleum accounting for about 50%, followed by rough diamond, 30%. Coal, phosphate rock, and sulfur were other important mineral imports.

Structure of the Mineral Industry

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

Employment in the minerals industry was estimated to exceed 1 million, or about 4.5% of the employed labor force, with the public sector employing about 90% of the total. (*See table 2.*)

Commodity Review

Metals

Bauxite, Alumina, and Aluminum.—India had a sizable, integrated aluminum industry based on domestic bauxite deposits, which were estimated to comprise about 10% of the world's total. Aluminum remained the sole nonferrous metal for which India had an adequate raw material base.

National Aluminium Co. (NALCO), the largest integrated aluminum producer in Asia and India's only aluminum exporter, announced the go-ahead to expand its bauxite mines at Panchpatmali Hills from a capacity of about 2.4 Mmt/a to 4.8 Mmt/a; its Dhamanjodi alumina refinery from an 800,000-metric-ton-per-year (mt/a) capacity to 1.35 Mmt/a; and the smelting capacity at its Angul smelter from 218,000 mt/a to 345,000 mt/a. NALCO's captive powerplant, with a capacity of 600 megawatts (MW), also was to be expanded with the addition of 120 MW. All of NALCO's facilities were in Orissa State.

Hindalco Industries Ltd., using technology supplied by Reynolds Metals Co. of the United States, announced in December plans to expand its alumina refinery-smelter complex at Renukoot, Uttar Pradesh State. Alumina capacity was to be raised from 350,000 mt/a to 450,000 mt/a and smelting capacity was to be increased by 40,000 mt/a, to 210,000 mt/a.

Indian Aluminium Co. (INDAL), 40% owned by Canada's Alcan Aluminium Ltd., completed its feasibility study and announced at yearend it was to proceed with construction of a 1-Mmt/a, \$675 million export-oriented alumina refinery at Karaput in Orissa State. The plant was to be managed by Utkal Alumina International Pvt. Ltd., a joint venture comprised of INDAL, the Tata Group, and Norway's Norsk Hydro AS. Expected to be completed by 1999, production was to be shared by each joint-venture partner at the rate of 200,000 mt/a for independent marketing, leaving a balance of 400,000 mt/a to be sold by Utkal. The plant was to use technology supplied by Alcan and Zurich-based Swiss Aluminium Ltd., or Alusuisse.

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

Copper.—India's State-owned Hindustan Copper Ltd. (HCL) produced the majority of the country's mined copper from 10 mines. HCL also operated the country's copper smelters and refineries. Important, but smaller, mines were

operated by Sikkim Mining Corp. and Hutti Gold Mines in Karnataka State. More than 90% of India's copper ore reserves were in the three States of Bihar, Madhya Pradesh, and Rajasthan.

A consortium led by the United Kingdom-based Metdist Group and Japan's Mitsubishi Materials Corp. agreed in December to proceed with the construction of a copper smelter and refinery complex for the production of 150,000 mt/a of refined copper and 450,000 mt/a of byproduct sulfuric acid at Pipavav, Gujarat State. The project, based on imported concentrates and Mitsubishi's continuous smelting technology, was scheduled to be completed in 1998 at an estimated cost of \$500 million. The consortium consisted of Metdist, holding a 42% equity; Mitsubishi, 18%; and the Indian public, the remaining 40% share.

Reportedly, Bombay-based Sterlite Industries Ltd., which had already begun construction of its 60,000-mt/a smelter-refinery on a greenfield site at Ratnagiri, on the coast of Maharashtra State about 350 kilometers (km) south of Bombay, was pressured by environmentalists into relocating the project to Tuticorin in Tamil Nadu State. As originally formulated, the projected capacity at the complex was to be expanded incrementally to 100,000 mt/a. The project—the first in the private sector—was to use smelting and refining technology provided by Australia's MIM Holdings Ltd.'s ISA-SMELT and ISA-REFINE smelting and refining processes.

Gold.—Although India was one of the world's largest consumers of gold, spurred by the Government's 1992 decision to permit nonresident Indians to bring into the country up to 5 kilograms (kg) of gold per person for a nominal duty [22 rupees (Rs) or about \$0.70 per gram (g)], domestic production has waned profoundly in recent years, and the country was only producing about 2 mt/a. About one-half was produced by the activities of numerous small-scale miners, mainly unorganized independent prospectors.

Government-owned Bharat Gold Mines Ltd. mined gold from a number of mines in the Kolar goldfields, Karnataka State, one of the oldest gold mining areas in the world. Modern production from the Kolar fields began in 1882. A small amount of gold also was produced as a byproduct of copper refining.

Hindustan Zinc Ltd. (HZL), a State-owned corporation, signed in August a joint-venture agreement with Papua New Guinea's Niugini Mining Ltd. to explore and jointly develop identified gold prospects in India. Niugini Mining held a 60% interest, the first such joint venture since the Government earlier in the year lifted the amount of equity a foreign company could hold, while HZL held the remaining 40%.

The Government-owned Minerals and Metals Trading Corp. Ltd. (MMTC) commenced in December gold sales to expatriate Indians, enabling those who remain abroad for at least 6 months to buy up to 5 kg of gold from MMTC's shops at international prices, after paying the import duty of Rs22/g. This program was established to ease the rules

governing gold imports by allowing travelers to purchase gold on Indian soil. Previously, returning travelers had to bring the gold with them. Initially, three MMTC-operated shops were in the cities of Bombay, Delhi, and Trivandrum.

Iron and Steel.—India was a major producer of iron ore, which was 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. Numerous iron ore mines in the country had an estimated combined capacity of 60 Mmt/a.

The country had abundant deposits of hematite and magnetite iron ores. Hematite occurred mostly in the States of Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, and Orissa. Magnetite deposits, most of them of metallurgical grade, occurred in Andhra Pradesh, Goa, Karnataka, and Kerala States. Madhya Pradesh was the leading producing State, replacing Goa, which dropped to second place in 1994, with Karnataka, Bihar, Orissa, and Maharashtra following in order.

NMDC operated the country's largest iron mines at Bailadila, Madhya Pradesh State, and at Donimalai, Karnataka State. Output from the two mines was about 9 Mmt/a, but output was scheduled to be doubled by IFY 1996-97.

The country had seven integrated steel plants (ISP) and numerous scrap-based minimills with a combined capacity of about 24 Mmt/a. The Government's Steel Authority of India Ltd. (SAIL) owned 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., was commissioned near yearend 1989. The only privately owned ISP in India, the steelworks at Jamshedpur, Bihar State, was operated by TISCO.

Nippon Denro Ispat Ltd. (NDIL) commissioned in December its 1-Mmt/a direct-reduced iron plant at Dolvi, West Bengal State. NDIL's plant was the world's first to use commercially the Midrex "Megamod" Series 1000 Module developed by the Midrex Corp. of the United States.

Lead and Zinc.—Substantial quantities of lead and zinc were produced from the same mines in the State of Rajasthan by 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.

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

HZL signed in November a joint-venture agreement with Australia's BHP Minerals Ltd. to conduct grassroots exploration and develop viable base and precious metal deposits in Rajasthan State. BHP was to finance the entire expenditure, estimated at between \$3.2 million and \$4.8 million, up to completion of the prefeasibility stage. In the event of identifying an economic deposit, HZL and BHP would enter into a new joint-venture agreement to develop the project.

Titanium Minerals.—The central Government's NMDC formed a joint venture with Indian Rare Earths Ltd. (IRE), also a central Government enterprise, and the State-owned Andhra Pradesh Mineral Development Corp. to mine mineral sands at Bhimunipatnam, near Visakhapatnam, Andhra Pradesh State. The venture initially was to produce only ilmenite and rutile, but also was planning to integrate later the production of downstream products, such as titanium slag, pig iron, and titanium dioxide (TiO₂), from the ilmenite.

Kilburn Chemicals Ltd. commissioned in April a pigment plant to produce almost 4,000 mt/a of TiO₂ pigment at Tuticorin, Tamil Nadu State. The plant was producing anatase-grade TiO₂ using the sulfide process from ilmenite supplied by IRE. The plant also was designed with the flexibility to produce rutile-grade TiO₂ pigment at a future date.

Uranium.—The Atomic Minerals Div. (AMD) within the DAE was entrusted with conducting radiometric and geological surveys and the exploration and development of various mineral resources necessary for the country's nuclear power program. AMD completed in March its exploratory mining program at Tummalapalle, Andhra Pradesh State, and commenced an experimental mining program at Jajawal, Madhya Pradesh.

The Uranium Corp. of India Ltd. (UCIL) within the DAE operated 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 had the capability of recovering other metals and minerals as byproducts, such as copper, magnetite, and molybdenite.

Industrial Minerals

Diamond.—The Government-owned NMDC produced most of the country's modest diamond output from its diamondiferous kimberlite mines at Wajrakarur, Andhra Pradesh. A small quantity of diamond also was produced in Orissa State.

India's diamond industry, the world's largest in terms of employment, quantity, and value, primarily was dependent on imported materials for processing and reexport. India processed an estimated 65% of the world's rough diamonds and had about 45% of the world trade in finished diamonds. The majority of the cutting and polishing plants were in Bombay, Maharashtra State; and Surat, Gujarat State.

The Government of the State of Madhya Pradesh in central India invited in early 1994 international tenders for the exploration and mining of diamonds. Diamond deposits occurred in Raipur District, near to the eastern State of Orissa. Alluvial diamonds thought to be derived from kimberlite-lamproite pipes in Madhya Pradesh have been mined in Orissa State. Australia's Ashton Mining Ltd. and CRA Ltd., and De Beers of South Africa were among the notable international companies vying, along with India's Reliance Industries Ltd., for the exploration rights.

Mineral Fuels

Coal.—Coal was India's principal energy source, producing an estimated 60% of the country's requirements. The Government-owned Coal India Ltd. (CIL) was the country's largest producer, with about 90% of output. Coal mining in the private sector was permitted only for captive consumption by steel plants. However, the coking properties of Indian coals were poor because of a very high ash content; therefore, metallurgical-grade coals were imported, primarily from Australia.

The World Bank agreed in December to fund a \$1.6 billion loan for the modernization and development of 15 coal mining projects having a combined capacity of 20 Mmt/a of steaming coal. The projects, all owned by South Eastern Coalfields Ltd., a subsidiary of CIL, consisted of seven new mines, although their development was already in progress, and eight existing mines targeted for upgrading. The funding was subject to proper rehabilitation of lands after mining ceased and environmental protection during mining. Reportedly, the World Bank declined to finance similar projects with Eastern Coalfields Ltd. and Bharat Coking Coal Ltd., both also subsidiaries of CIL.

About 80% of the country's known lignite occurred 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) was the country's sole producer, operating two mines with a total capacity of 17 Mmt/a. In addition to the mines, the NLC integrated complex consisted of two thermal power stations, a fertilizer plant, and a briquetting and carbonization plant.

Petroleum and Natural Gas.—The central Government administered the petroleum and natural gas industry of the country from exploration to the marketing of refined petroleum products. Two companies, Oil and Natural Gas Corp. Ltd. (ONGC), formerly Oil and Natural Gas Commission, and Oil India Ltd., conducted exploration for hydrocarbons and developed suitable discoveries for production. Six Government-owned companies operated the country's petroleum refineries. Imports and exports of crude oil and refined petroleum products were managed by Indian Oil Corp., the largest of the refining companies.

The Government began selling in October to private interests what, after three selling episodes, would eventually total a 20% equity interest in ONGC. The first round,

consisting of a 2% interest in ONGC, began in October and was used to test the market and establish a benchmark price for the next two phases, scheduled to be conducted in January and July 1995, with each offering a 9% interest.

Reserves

The country's mineral resources have not been fully delineated, and large deposits of bauxite, coal, iron ore, limestone, and oil and gas still were likely to be found in many areas. Bauxite deposits mainly were in the States of Andhra Pradesh and Orissa, but also occurred in Bihar, Gujarat, Maharashtra, and Tamil Nadu. Iron ore deposits, mainly in the form of hematite or magnetite, occurred in Bihar, Karnataka, Madhya Pradesh, Orissa, and Tamil Nadu States. Low-grade copper deposits were in Andhra Pradesh, Bihar, Madhya Pradesh, and Rajasthan. Lead and zinc deposits mainly were in Bihar and Rajasthan. Chromium and nickel ore reserves existed in Orissa. Diamond was produced in Madhya Pradesh, and gold was mined in small amounts in Karnataka. The ilmenite sands at the extreme southern tip of India in Kerala and Tamil Nadu States contained large amounts of thorium. (See table 3.)

Infrastructure

Just about all modes, including aerial ropeways, were used for mineral transport in India. Over short distances, aerial ropeways were used in preference to conveyor belts, which were used over stretches of uneven terrain at mining operations.

The Indian road network, one of the largest in the world, consisted of 1,970,000 km of roads, including 960,000 km that were paved and 1,010,000 km that were comprised of gravel, crushed stone, or unimproved earth.

Inland waterways, of which there were 16,180 km usable by all craft and 3,631 km navigable by large vessels, were of little importance to the minerals industry. Sea transport, however, was the only method used for importing and exporting minerals to and from the country's ports, of which the major ones included Bombay, Calcutta-Haldia, Cochin, Kandla, Madras, Mormugao, New Mangalore, Paradip, Tuticorin, and Vishakapatnam, and Port Blair in the Andaman and Nicobar Islands Territory.⁴ The merchant marine fleet included 111 bulk ore freighters; 66 petroleum, oils, and lubricant tankers; 9 chemical tankers; 7 combination ore-oil tankers; 6 liquefied gas tankers; and 2 combination bulk ore freighters.

The Indian railway system, Asia's largest and the world's fourth largest, consisted of 61,850 km of track, 33,553 km of which was 1.676-meter (m) broad gauge, 24,051 km of 1.000-m gauge, and 4,246 km of 0.762-m or 0.610-m narrow gauge. Included in the total was 6,500 km of electrified rail. The mixed gauges of track created difficulties, such as loss of time in transshipment and the requirement for multiple stocking of spare parts. In addition, the rail system had a profusion of obsolete equipment that

was unreliable and expensive to maintain.

There were 208 principal airports with permanent-surface runways out of an aggregate of 288 in the country.

Pipelines included 3,497 km for crude oil; 1,703 km for refined oil products; and 902 km for natural gas.⁵

Electric generating capacity in 1992 was 82 gigawatts (GW). Some of the major industrial on-site capacity was dedicated to specific plants, particularly in the aluminum and copper sectors. India was planning to have an installed capacity of 10 GW of nuclear power by 2000. Total production of electrical power in IFY 1993-94 was 323 billion kilowatt-hours.

Outlook

With the country continuing to exhibit indications of political stability, the Government's introduction in the past 4 years of reforms in an attempt to open up the country's economy, and enactment in 1994 of a national minerals policy to attract new foreign investment, India seemed to continue progressing, albeit slowly, considering its potential toward minerals self-sufficiency.

The national minerals policy opened mineral extraction to the private sector, except for mineral fuels and nuclear materials. This, along with the relaxation of restrictions on foreign equity participation in the minerals industry, should enable broader participation in exploration and development of mineral leases that formerly were reserved exclusively for the Government. This additional expertise in mineral exploration should enable the country to locate and assess its vast mineral resources more consistently and efficiently.

¹Text prepared Aug. 1995.

²Where necessary, values have been converted from Indian rupees (Rs) to U.S. dollars at the yearend rate of Rs31.37=US\$1.00.

³The Indian fiscal year begins on Apr. 1 and ends on Mar. 31.

⁴World Bank, Washington, DC: India Port Sector Strategy Report, Mar. 3, 1995, 46 pp.

⁵U.S. Central Intelligence Agency, Washington, DC: The World Factbook 1994, pp. 184-186.

Major Sources of Information

Geological Survey of India
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Major Publications

Ministry of Steel and Mines, Indian Bureau of Mines, Nagpur: Monthly Statistics of Mineral Production, Indian Minerals Yearbook.

Ministry of Planning, Department of Statistics, Central Statistical Organization, New Delhi: Monthly Abstract of Statistics.

Mining Engineers' Association of India, Bombay: The Indian Mining and Engineering Journal, monthly.

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

(Metric tons unless otherwise specified)

| Commodity 3/ | 1990 | 1991 | 1992 | 1993 | 1994 e/ | |
|--|---------------|--------------|------------|--------------|--------------|------------|
| METALS | | | | | | |
| Aluminum: | | | | | | |
| Bauxite, gross weight | thousand tons | 4,850 | 4,740 | 4,900 | 5,220 | 5,400 |
| Alumina, Al ₂ O ₃ equivalent e/ | do. | 1,600 4/ | 1,700 | 1,700 | 1,800 | 2,000 |
| Metal, primary | | 433,000 | 504,000 | 496,000 r/ | 466,000 r/ | 441,000 4/ |
| Cadmium metal | | 277 | 271 r/ | 313 r/ | 255 r/ | 201 4/ |
| Chromium: Chromite, gross weight | | 1,050,000 r/ | 940,000 r/ | 1,150,000 r/ | 1,000,000 r/ | 909,000 4/ |
| Copper: | | | | | | |
| Mine output, Cu content | | 58,200 e/ | 55,400 | 55,000 | 58,200 | 50,700 |
| Metal, primary: | | | | | | |
| Smelter | | 40,700 | 45,500 r/ | 47,700 r/ | 37,400 r/ | 50,300 4/ |
| Refinery | | | | | | |
| Electrolytic (cathode) | | 40,600 | 46,200 r/ | 44,300 r/ | 36,300 r/ | 48,300 4/ |
| Fire refined e/ | | 1,000 | 1,000 | 1,000 | 500 | 500 |
| Total e/ | | 41,600 | 47,200 r/ | 45,300 r/ | 36,800 r/ | 48,800 |
| Gold metal, smelter | kilograms | 1,980 | 1,970 | 1,760 r/ | 2,000 r/ | 2,150 4/ |
| Iron and steel: | | | | | | |
| Iron ore and concentrate: | | | | | | |
| Gross weight | thousand tons | 53,700 r/ | 56,900 r/ | 54,900 r/ | 55,800 r/ | 57,000 |
| Fe content | do. | 34,400 r/ | 36,400 r/ | 35,100 r/ | 35,700 r/ | 36,500 |
| Metal: | | | | | | |
| Pig iron | do. | 12,600 | 14,200 | 15,100 r/ | 15,700 r/ | 17,300 4/ |
| Direct-reduced iron | do. | 750 e/ | 1,180 e/ | 1,440 | 2,210 r/ | 3,120 4/ |
| Ferroalloys: | | | | | | |
| Ferrochromium (including charge chrome) | | 169,000 r/ | 229,000 r/ | 257,000 r/ | 235,000 r/ | 251,000 4/ |
| Ferromanganese | | 201,000 | 211,000 e/ | 198,000 e/ | 137,000 r/ | 150,000 |
| Ferrochromium-silicon | | 7,000 | 8,800 | 9,000 | 8,000 | 8,000 |
| Ferrosilicon | | 91,600 r/ | 85,300 r/ | 90,000 r/ | 67,600 r/ | 85,000 |
| Silicomanganese | | 57,400 | 70,000 e/ | 93,000 e/ | 85,000 r/ | 90,000 |
| Other e/ | | 400 | 6,770 4/ | 6,500 | 8,600 | 8,500 |
| Steel, crude: | thousand tons | 15,000 | 17,100 | 18,100 | 18,200 r/ | 18,200 4/ |
| Semimanufactures e/ 5/ | do. | 10,500 | 11,600 | 12,000 | 9,000 | 11,000 |
| Lead: | | | | | | |
| Mine output, Pb content | | 23,200 | 25,100 | 30,500 r/ | 26,000 r/ | 23,300 4/ |
| Metal, refined: | | | | | | |
| Primary e/ | | 29,900 4/ | 30,600 r/ | 40,800 r/ | 43,200 r/ | 29,400 |
| Secondary e/ | | 16,800 4/ | 17,200 r/ | 22,900 r/ | 24,200 r/ | 16,500 |
| Total | | 46,700 | 47,800 4/ | 63,700 4/ | 67,400 4/ | 45,900 4/ |
| Manganese: | | | | | | |
| Ore and concentrate, gross weight | thousand tons | 1,390 | 1,400 | 1,810 r/ | 1,660 r/ | 1,600 |
| Mn content e/ | do. | 525 | 532 | 687 r/ | 628 r/ | 607 |
| Rare-earth metals: Monazite concentrate, gross weight e/ | | 4,500 | 4,000 | 4,000 | 4,600 | 4,600 |
| Selenium e/ | kilograms | 3,840 4/ | 4,000 | 9,700 r/ | 13,500 r/ | 14,000 |
| Silver, mine and smelter output | do. | 33,200 | 31,800 | 47,400 r/ | 51,200 r/ | 52,000 |
| Titanium concentrates, gross weight: | | | | | | |
| Ilmenite e/ | | 280,000 | 312,000 4/ | 300,000 | 320,000 | 300,000 |
| Rutile e/ | | 11,000 | 13,600 4/ | 10,000 | 13,900 | 14,000 |
| Tungsten, mine output, W content | | 10 e/ | 11 | 11 e/ | 1 r/ | 1 |
| Zinc: | | | | | | |
| Mine output, concentrate: | | | | | | |
| Gross weight | | 138,000 | 163,000 | 170,000 | 307,000 r/ | 235,000 |
| Zn content | | 74,000 | 105,000 r/ | 153,000 r/ | 156,000 r/ | 144,000 4/ |
| Metal: | | | | | | |
| Primary | | 79,100 | 85,800 | 128,000 r/ | 142,000 r/ | 143,000 4/ |
| Secondary e/ | | 200 | 200 | 200 | 200 | 500 |
| Total e/ | | 79,300 | 86,000 | 128,000 r/ | 142,000 r/ | 144,000 |
| Zirconium concentrate: Zircon, gross weight e/ | | 17,500 | 18,200 | 18,000 | 17,000 r/ | 18,000 |
| INDUSTRIAL MINERALS | | | | | | |
| Abrasives, natural, n.e.s.: | | | | | | |
| Corundum, natural | | 410 | 64 | 70 | 10 | |
| Garnet | | 4,420 | 8,980 | 9,000 e/ | 46,700 r/ | 15,000 |
| Jasper e/ | | 4,650 | 5,010 4/ | 5,000 | 7,000 | 7,000 |
| Asbestos | | 26,100 | 24,100 | 43,700 r/ | 43,600 r/ | 44,000 |

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

| Commodity 3/ | 1990 | 1991 | 1992 | 1993 | 1994 e/ |
|---|------------|------------|--------------|---------------|--------------|
| INDUSTRIAL MINERALS--Continued | | | | | |
| Barite | 633,000 | 615,000 | 458,000 r/ | 507,000 r/ | 510,000 |
| Bromine, elemental e/ | 1,300 | 1,300 | 1,300 e/ | 1,400 e/ | 1,400 |
| Cement, hydraulic thousand tons | 49,000 | 51,000 | 50,000 e/ | 53,800 r/ | 54,000 |
| Chalk | 128,000 | 128,000 | 129,000 e/ | 103,000 r/ | 110,000 |
| Clays: | | | | | |
| Ball clay | 245,000 | 317,000 | 228,000 r/ | 337,000 r/ | 340,000 |
| Diaspore | 7,700 | 9,250 | 9,300 e/ | 12,200 r/ | 13,000 |
| Fire clay | 522,000 | 403,000 | 410,000 e/ | 434,000 r/ | 435,000 |
| Kaolin: | | | | | |
| Salable crude thousand tons | 631 | 628 | 625 e/ | 519 r/ | 550 |
| Processed do. | 104 | 113 | 110 e/ | 129 r/ | 150 |
| Total do. | 735 | 741 | 735 e/ | 648 r/ | 700 |
| Other e/ do. | 100 | 14 | 15 | 110 | 100 |
| Diamond: e/ | | | | | |
| Gem thousand carats | 15 | 15 | 15 | 7 r/ | 15 |
| Industrial do. | 3 | 3 | 3 | 4 r/ | 3 |
| Total do. | 18 | 18 | 18 | 11 r/ | 18 |
| Feldspar | 54,100 | 65,100 | 67,700 r/ | 66,400 r/ | 67,000 |
| Fluorspar: | | | | | |
| Concentrates: | | | | | |
| Acid-grade | 10,400 | 9,700 | 7,060 r/ | 7,800 r/ | 8,000 |
| Metallurgical-grade | 13,000 | 14,400 | 13,600 r/ | 13,800 r/ | 14,000 |
| Total | 23,400 | 24,100 | 20,600 r/ | 21,600 r/ | 22,000 |
| Other fluorspar materials, graded | 5,720 | 8,220 | 2,670 r/ | 4,790 r/ | 5,000 |
| Gemstones excluding diamond: | | | | | |
| Agate including chalcedony pebble | 631 | 549 | 600 e/ | 680 r/ | 700 |
| Garnet kilograms | 2,010 | 1,190 | 1,400 e/ | 1,060 r/ | 105 |
| Graphite 6/ | 61,000 | 69,900 | 73,000 r/ | 74,700 r/ | 75,000 |
| Gypsum | 1,660,000 | 1,550,000 | 1,300,000 r/ | 1,800,000 r/ | 1,900,000 |
| Kyanite and related materials: | | | | | |
| Kyanite | 38,900 | 30,000 | 10,100 r/ | 11,400 r/ | 12,000 |
| Sillimanite | 18,200 | 11,600 | 18,800 r/ | 14,900 r/ | 15,000 |
| Lime e/ | 800,000 | 820,000 | 850,000 e/ | 860,000 e/ | 860,000 |
| Magnesite | 544,000 | 539,000 | 603,000 r/ | 409,000 r/ | 500,000 |
| Mica: 7/ | | | | | |
| Crude | 3,860 | 3,610 | 3,500 e/ | 2,080 r/ | 3,000 |
| Scrap and waste | 2,820 | 1,920 | 2,000 e/ | 1,600 e/ | 1,600 |
| Total | 6,680 | 5,530 | 5,500 e/ | 3,680 r/ e/ | 4,600 |
| Nitrogen: N content of ammonia 8/ thousand tons | 7,010 | 7,130 | 7,450 4/ | 7,350 | 7,400 |
| Phosphate rock including apatite | 674,000 | 610,000 r/ | 188,000 r/ | 967,000 r/ | 1,180,000 4/ |
| Pigments, mineral: Natural: Ocher | 126,000 | 156,000 | 160,000 e/ | 175,000 e/ | 175,000 |
| Pyrites, gross weight | 94,000 | 128,000 | 100,000 e/ | 117,000 r/ | 117,000 |
| Salt: e/ | | | | | |
| Rock salt thousand tons | 3 | 3 | 3 | 3 r/ | 3 |
| Other do. | 9,500 | 9,500 | 9,500 | 9,500 | 9,500 |
| Total do. | 9,500 | 9,500 | 9,500 | 9,500 r/ | 9,500 |
| Sodium carbonate | 1,400,000 | 1,500,000 | 1,500,000 | 1,500,000 | |
| Stone, sand and gravel: 9/ | | | | | |
| Calcite | 55,000 | 98,200 | 100,000 e/ | 100,000 r/ e/ | 100,000 |
| Dolomite thousand tons | 2,620 | 2,570 | 2,500 e/ | 3,500 r/ | 3,500 |
| Limestone do. | 67,200 | 71,000 | 70,000 e/ | 81,700 r/ | 80,000 |
| Quartz and quartzite do. | 285 | 251 | 250 e/ | 260 e/ | 250 |
| Sand: | | | | | |
| Calcareous do. | 218 | 117 | 120 e/ | 272 r/ | 275 |
| Silica do. | 1,140 | 1,920 | 1,320 r/ | 1,290 r/ | 1,300 |
| Other do. | 1,300 e/ | 1,650 | 1,700 e/ | 2,400 e/ | 2,400 |
| Slate | 30,600 | 23,600 | 24,000 e/ | 3,720 e/ | 3,700 |
| Sulfur: | | | | | |
| Content of pyrites | 41,000 r/ | 30,000 r/ | 30,000 r/ | 36,000 r/ | 38,000 |
| Byproduct: | | | | | |
| From metallurgical plants e/ | 85,000 r/ | 92,000 r/ | 116,000 r/ | 123,000 r/ | 17,700 |
| From oil refineries | 21,000 r/ | 26,000 r/ | 26,000 r/ | 31,000 r/ | 36,000 |
| Total e/ | 147,000 r/ | 148,000 r/ | 172,000 r/ | 190,000 r/ | 91,700 |

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

| Commodity 3/ | 1990 | 1991 | 1992 | 1993 | 1994 e/ | |
|--|----------------------------|------------|------------|------------|------------|---------|
| INDUSTRIAL MINERALS--Continued | | | | | | |
| Talc and related materials: | | | | | | |
| Pyrophyllite | 80,000 | 84,600 | 85,000 e/ | 81,600 r/ | 82,000 | |
| Steatite (soapstone) | 406,000 | 424,000 | 425,000 e/ | 360,000 r/ | 360,000 | |
| Vermiculite | 1,770 | 1,770 | 1,610 r/ | 1,410 r/ | 1,500 | |
| Wollastonite | 61,400 | 61,400 | 62,000 e/ | 80,400 r/ | 80,000 | |
| MINERAL FUELS AND RELATED MATERIALS | | | | | | |
| Coal: | | | | | | |
| Bituminous | thousand tons | 212,000 | 229,000 | 210,000 e/ | 220,000 e/ | 245,000 |
| Lignite | do. | 14,100 | 16,000 | 15,000 e/ | 15,000 e/ | 18,000 |
| Total | do. | 226,000 | 245,000 | 225,000 e/ | 235,000 e/ | 263,000 |
| Coke: e/ | | | | | | |
| Coke oven and beehive | do. | 13,000 | 13,000 | 13,000 e/ | 13,000 e/ | 14,000 |
| Gashouse | do. | 100 | 100 | 100 e/ | 100 e/ | 100 |
| Other, soft | do. | 200 | 200 | 200 e/ | 200 e/ | 200 |
| Total | do. | 13,300 | 13,300 | 13,300 e/ | 13,300 e/ | 14,000 |
| Gas, natural: | | | | | | |
| Gross | million cubic meters | 10,200 | 11,500 | 15,900 r/ | 14,500 r/ | 15,000 |
| Marketable e/ 10/ | do. | 6,560 | 7,500 | 7,500 e/ | 10,900 e/ | 11,000 |
| Petroleum: | | | | | | |
| Crude | thousand 42-gallon barrels | 250,000 r/ | 235,000 r/ | 208,000 r/ | 197,000 r/ | 197,000 |
| Refinery products: e/ | | | | | | |
| Liquefied petroleum gas | do. | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Gasoline | do. | 23,000 | 23,000 | 23,000 | 23,000 | 23,000 |
| Kerosene and jet fuel | do. | 53,000 | 53,000 | 53,000 | 53,000 | 53,000 |
| Distillate fuel oil | do. | 122,000 | 122,000 | 122,000 | 122,000 | 122,000 |
| Residual fuel oil | do. | 56,000 | 56,000 | 56,000 | 56,000 | 56,000 |
| Lubricants | do. | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 |
| Other | do. | 67,000 | 67,000 | 67,000 | 67,000 | 67,000 |
| Total | do. | 345,000 | 345,000 | 345,000 | 345,000 | 345,000 |

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ Table includes data available through Sept. 1, 1995.

3/ 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. Reported production of sand and gravel and stone are clearly only partial figures and exclude a number of types of stone.

4/ Reported figure.

5/ Excludes production from steel miniplants.

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

7/ 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.

8/ Data are for fiscal years beginning Apr. 1 of that stated.

9/ Partial figures; for details, see footnote 3.

10/ Includes reinjected gas.

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994 1/

(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 | 73 |
| Do. | do. | Hirakud Smelter, Orissa | 24 |
| 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 | 170 |
| 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, 35.17% | Narasingarh Plant, Madhya Pradesh | 1,090 |
| Do. | Cement Corp. of India Ltd., Indian Government, 100% | Nayagaon Plant, Madhya Pradesh | 1,330 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994 1/

(Thousand metric tons unless otherwise specified)

| Commodity | | Major operating companies and major equity owners | Location of main facilities | Annual capacity e/ |
|---------------------|--------------|---|---|-----------------------|
| Cement--Continued | | J.K. Cement Works, a division of JK Synthetics Ltd., 100% | Nimbahera Plant, Rajasthan | 1,460 |
| 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 |
| 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% | Chavara, Kerala | 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. | | Steel Authority of India Ltd., Indian Government, 100% | 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 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994 1/

(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 | 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. | Mini-steel plants, privately owned | Located throughout India, approximately 160 | 4,700 |
| Iron ore | Steel Authority of India Ltd., Indian Government, 100% | Bastar and Durg District, Madhya Pradesh | 7,000 |
| Do. | National Mineral Development Corp. Ltd., Indian Government, 100% | Bellary District, Karnataka | 3,000 |
| Do. | Kudremukh Iron Ore Co. Ltd., Indian Government, 100% | Chikmagalur District, Karnataka | 7,500 |
| 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% | Kendujhar District, Orissa | 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% | Singhbhum District, Bihar | 3,500 |
| Do. | Tata Iron and Steel Co. Ltd., 100% | Singhbhum District, Bihar | 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. | 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 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% | Balaghat, Madhya Pradesh | 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% | North Kanara, Karnataka | 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 | Cochin Refineries Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Ambalamugal Refinery, Kerala | 93,400 |
| thousand 42-gallon barrels per day | do. | 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 | 27,100 |
| do. | Indian Oil Corp., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Digboi Refinery, Assam | 11,700 |

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994 1/

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity e/ |
|------------------------------------|--|---|-----------------------|
| Petroleum--Continued | Indian Oil Corp., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Guwahati Refinery, Assam | 19,900 |
| thousand 42-gallon barrels per day | | | |
| 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, 100% | Madras Refinery, Tamil Nadu | 131,000 |
| do. | Bharat Petroleum Co. Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Mahul Refinery, Bombay, Maharashtra | 135,000 |
| do. | Industan Petroleum Co. Ltd., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Mahul Refinery, Bombay, Maharashtra | 110,000 |
| do. | do. | Visakhapatnam (Vizag) Refinery, Andhra | 90,400 |
| do. | Indian Oil Corp., a subsidiary of Oil and Natural Gas Corp., Indian Government, 100% | Mathura Refinery, Uttar Pradesh | 156,000 |
| 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 | Cominco Binani Zinc Ltd., 100% | Binanipuram Smelter, Kerala | 20 |
| Do. | Hindustan Zinc Ltd., Indian Government, 100% | Debari Smelter, Rajasthan | 49 |
| Do. | Hindustan Zinc Ltd., Indian Government, 100% | Visakhapatnam (Vizag) Smelter, Andhra Pradesh | 30 |

e/ Estimated.

1/ Data are rounded by the U.S. Bureau of Mines to three significant digits.

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

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

TABLE 3
INDIA: ESTIMATED RESERVES OF MAJOR MINERAL
COMMODITIES FOR 1994

(Thousand metric tons unless otherwise specified)

| Commodity | Reserves |
|---------------------------|-------------|
| Bauxite | 2,333,000 |
| Barite | 35,000 |
| Chromite | 108,000 |
| Coal: | |
| Bituminous | 186,044,000 |
| Lignite | 5,813,000 |
| Copper, in ore | 4,000 |
| Gold | 55,000 |
| kilograms | |
| Graphite | 4,648 |
| Iron, in ore | 11,000,000 |
| Kyanite group | 15,000 |
| Lead, in ore | 160,000 |
| Limestone | 60,000,000 |
| Magnesite | 222,000 |
| Manganese in ore | 154,000 |
| Natural gas | 648 |
| billion cubic meters | |
| Petroleum, crude | 726 |
| million metric tons | |
| Phosphate rock | 102,000 |
| Salt | (1/) |
| Talc and related minerals | 15,000 |
| Titanium | 62,000 |
| Zinc | 7,488 |
| Zircon | 1,420 |

1/ Essentially all from seawater.