THE INDIAN MINING INDUSTRY:

MARKET INFORMATION FOR CANADIAN

PARTICIPATION IN

INDIAN MINERAL EXPLORATION AND DEVELOPMENT

prepared for

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Preface

The purpose of this document is to provide a Canadian audience with market information on the exploration and development phases of the Indian mining industry. As such, it is intended to help prospective investors make informed choices about increasing their presence in India. A companion study provides similar information of interest to Canadian suppliers of goods and services to the mining industry.

These studies form an integral element of Canada's "Focus India" initiative, a cooperative program by federal, provincial, and private sector organizations to assist Canadian companies in assessing India's new economic policies and the potential they hold for Canadian entrepreneurs.

This study has been contracted by the Canadian High Commission, and prepared by Mr. Glenn Kendall while on leave of absence from his position as Director, Mineral Policy and Planning, Natural Resources Canada.

While every effort has been made to ensure accuracy, no responsibility is accepted for errors or omissions.

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Glenn Kendall
May 26 1995

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EXECUTIVE SUMMARY

The Indian Economy

The Indian economy is in transition. At time of writing (May 1995), it is in the fourth year of an economic liberalization program initiated in 1991 to respond to critical shortfalls in foreign exchange reserves. In the short history of independent India prior to that date, economic policy was guided by the Nehru vision of market socialism. Major industries, including mining, were reserved for the public sector.

The Indian economy in the 1990's is marked by major policy reforms. Among these are active promotion of private and foreign investment in major sectors of the economy, reduced trade barriers and corporate tax rates, divestiture of public enterprises, partial convertibility of the rupee, and simplification of industrial regulations.

The reforms have been very well received by international investors, though financial institutions would like the pace of reform to quicken. Indian foreign exchange assets have increased to US$19.65 billion in 1994/95 from only US$5.6 billion in 1991/92. From August 1991 to February 1994, 3,876 new foreign collaborations valued at $US4.47 billion were approved. For 1995/96, GDP growth rates are projected to be in the 6 per cent range.

The Indian Mining Industry

As a result of previous policy, about 90 per cent of Indian mining remains in public hands. As of 1993/94, the total value of mineral production (non-fuel plus coal) was Rs. 137.16 billion (about C$6.0 billion). There are nearly 4400 producing mines in India, 300 of them classed as "major mines". India is a net importer of minerals and metals, though it has production capacity in ferrous, non-ferrous and precious metals.

India produces 64 mineral commodities, and is among the top five world producers of mica, barytes, chromite, and bauxite. Based on huge reserves, it is the seventh largest producer of coal. Though most mineral production serves the domestic market, India is a major producer and exporter of aluminum/bauxite, iron ore and quality granite and related building stone. Of course, India is one of the world's largest diamond cutting and polishing centres, mostly of imported diamonds. Minerals and metals represent over 20 per cent of India's merchandise trade exports.

The majority of mineral exploration in India has been conducted by the Geological Survey of India using systematic ground and airborne survey methods. India is considered to be geologically rich, with similar rock formations to Canada's precambrian shield. The major mining states in India are Rajasthan, Madhya Pradesh, Gujarat, Orissa, Karnataka, Goa, Andhra Pradesh, Bihar and Maharashtra.

The Indian mining industry employs over one million people. It represents 75 per cent of goods traffic on Indian railways. Coal and iron ore shipments represent one-third of port traffic.

The Legal and Policy Context

Mineral resources in India are owned by the States. However, the national government has retained authority for most major minerals. The primary piece of legislation governing mineral development is the Mines and Minerals (Regulation and Development) Act, 1957, as amended to January 1994. In practice, this means that both levels of government will be involved in approving mineral exploration and/or development projects.

In 1993, as part of the economic liberalization process, the Government of India issued a new National Mineral Policy. The thrust of the policy is to encourage private investment and reduce the role of government in the industry. The following thirteen minerals have been opened up for private investment: Iron Ore, Manganese Ore, Chrome Ore, Sulphur, Gold, Diamonds, Copper, Lead, Zinc, Molybdenum, Tungsten Ores, Nickel, and the Platinum group of metals.

In addition, foreign equity investment in mining projects up to 50 per cent is automatic (larger foreign equity positions would be considered on a case by case basis). By implication, joint ventures are encouraged as the preferred mechanism for investment. Other simplifications to mining regulations related to approvals for leases and prospecting licenses were also introduced as part of the package.

The new mineral policy clearly presents opportunities. However, by western standards, some significant impediments to mineral investment remain. Among the most important of these, (1) the maximum area for prospecting is capped at 25 sq. km., (2) the level of royalty rates and their unit-based structure, and (3) the relatively slow and cumbersome process required for lease applications and renewals, and related environmental approvals.

The Government of India and state governments are aware of these investment impediments. They have been openly discussed in public fora. At time of writing, both the royalty structure and the land access cap are under review. Changes in these areas are expected within a matter of months.

Commodity Opportunities

Part D of this paper details mineral exploration and development opportunities for the commodities that have been opened for private investment.

Two general points bear emphasis. First, both industry and government observers indicate that the potential for new finds, especially using more advanced exploration methods, is excellent. In its economic plan, the Government of India is emphasizing the need for increased exploration, especially for the base and precious metals. Reserve levels for these commodities are generally not adequate to meet domestic demand.

The second point is that domestic demand for most minerals is projected to grow by 20 per cent or more over the period 1992-97. For example, the Ministry of Steel forecasts that iron ore demand will to grow by 47 per cent over the period. The demand for refined copper is expected to grow by 20.1 per cent. Of course, these projections will be a function of general market conditions. However, the market growth potential for minerals and metals in India is considerable compared to the relatively flat demand projections that typify the developed nations.

Iron Ore - Bullish demand projections indicate a need for sizable investments in new and existing mines. Recoverable reserves of iron ore are estimated at 12.7 billion tonnes.

Manganese - Upgrading of technologies and application of modern mining methods would increase productivity.

Bauxite/Aluminum - Canada can build on historical relations with India in this area. Highlighted opportunities include bauxite mining and beneficiation, secondary aluminum production, gallium recovery, commercial products from red mud, and joint ventures in third countries.

Copper - Hindustan Copper Ltd. has expressed a keen interest in joint ventures. Proposed projects include expansion of the Khetri mine and complex, and u/g mine development in Madhya Pradesh and Bihar.

Lead/Zinc - Prospects exist for joint venture collaboration in lead/zinc exploration, especially using advanced technologies to explore at depth. Hindustan Zinc Ltd. is pursuing joint ventures in base metal, gold, nickel, and potash exploration and development. There is also scope for joint venture efforts in both primary and secondary lead/zinc production.

Diamonds - More intensive exploration is required. The India Investment Centre considers that the possibility of further diamond discoveries is high, notably in Madhya Pradesh.

Gold - More intensive exploration holds potential for gold as well. Some small deposits have been identified for possible development. Technologies for extraction and refining are also needed. Offshore interest in gold is growing.

Nickel - Known nickel deposits in India are low grade, and are mixed with chromite and laterite. The Sukinda deposit in Orissa offers potential.

Coal - While the coal sector is not open for private ownership, Canada has assisted India with coal development in the past. Coal India Ltd. has issued global tenders for coal washeries, and seeks collaboration in advanced technology mining and beneficiation. Given India's environmental objectives, technological cooperation, especially in the area of clean coal technologies, also appears to offer promise.

Investment Climate - Other Features

India is a developing nation. Working conditions reflect that reality. The country suffers from chronic power shortages of the order of 7 to 8 per cent annually. In response, the Government of India is aggressively seeking foreign investment in the power sector. Response from prospective investors has been strong.

The government continues to direct economic matters to a notably greater extent than in Canada. Tax rates and trade barriers have come down from high levels during the decade, and movement is toward slowly reducing government involvement in selected sectors. Subject to a number of conditions and deductions, corporate income tax for foreign companies is set at 55 per cent of net income (as of 1994). Repatriation of dividends and earnings requires Reserve Bank of India approval, but for joint venture projects with up to 50 per cent foreign equity, this is considered automatic.

Environmental protection is a priority in India. Most new mining projects and expansions are subject to an environmental assessment process. Prospectors and mine lease holders are also expected to submit a detailed environmental management plan to the Controller General of Mines (Indian Bureau of Mines). Legislation also specifies a range of conditions that apply to mining operations in the name of environmental protection. National legislation pertaining to air and water effluent levels is administered at the State level by State Pollution Control Boards.

During 1993-94, the Impact Assessment Agency (IAA) had 70 mining project applications for environmental assessments (more than any other industrial sector). It approved 41 projects and sought additional information on 29 others. When applications are complete, an environmental assessment typically takes six months. Information requirements can be extensive, but the sort of information that must be provided would be familiar to the Canadian mining industry. Both state and national environmental clearance is required. Industry argues that the process should be made simpler and faster. The need for streamlining is recognized by both levels of government.

Forest conservation is particularly important in India. The strong Forest (Conservation) Act empowers the government to stop projects that would destroy forest land. Approvals in this circumstance can take years. In effect, projects on forest land are discouraged.

India has a large, skilled labour force available at low cost. An established rule of law, and widespread use of English contribute to India's attractiveness for foreign investment.

Investigating Further

The Government of Canada offers several vehicles to assist prospective investors in India. The Department of Foreign Affairs and International Trade, either in Canada or through trade offices in New Delhi or Bombay, can provide information and make contacts. The Export Development Corporation has an active and recently expanded India portfolio. The Canadian International Development Agency can assist at the feasibility study stage.

In short, there are strengths and weaknesses in the Indian investment climate for mining. Prospective investors will want to asses the situation in detail. However, India represents an emerging opportunity, and foreign investment in mining has never been more welcome since the Republic of India was created in 1947. Mineral exploration and development in India is worth a close look.

THE INDIAN MINING INDUSTRY: MARKET INFORMATION FOR CANADIAN PARTICIPATION IN INDIAN MINERAL EXPLORATION AND DEVELOPMENT

A. OVERVIEW

History

Mining has featured in the economy of South Asia since antiquity. One archaeological study indicates that zinc and copper mining near Udaipur in Rajasthan dates back over 2000 years. The American Society of Metals (ASM) has recognized the ancient zinc smelting site at Zawar in Rajasthan as one of its historical international landmarks for metallurgy. Pliny (77 AD) referred to gold mining in what is now Karnataka in South India.

More recently, mining has held a central place in the economic development strategy of independent India since 1947. As a foundation for wealth, industrialization, and manufacture, the industry has been considered "strategic" by successive national governments, and as vital to the 'national interest'.

Public mining investments were built on institutions created under British rule, for example the Geological Survey of India which was established in 1851. The Nehru vision of market socialism resulted in nationalization of once-private mining companies during the 1950s and 1960s. Coal was nationalized in the 1970's.

Until the changes brought by the 1993 National Mineral Policy, virtually the entire industry, exploration and production, rested by law in public control.

The "national interest" has been interpreted to mean "self reliance"' and public management of the economy from the "commanding heights", phrases born out of a backlash against the colonial period in Indian history and reflecting a drive for self-determination. In that light, the liberalization process begun in 1991- in response to a critical shortfall in foreign exchange reserves - can be seen for what it is, namely, a dramatic change in the way India sees itself in the world.

The Indian Economy in the 1990s

India is the world's largest democracy, and its second most populous country. India is also classified as 'developing country'. Per capita GDP is C$435. As reported by The Economist, the National Council for Applied Economic Research estimates that only 2.3 per cent of India's 895 million people have annual household incomes over Rs. 78,000 (C$3650). The problems that trouble most developing countries - poverty lack of infrastructure - are very much in evidence in India. Selected key economic indicators for India can be found in Table 1.

Table 1
PRINCIPLE ECONOMIC STATISTICS - INDIA 1994

	1991/92	1992/93	1993/94P	1194/95E
GDP (Rs. 000 Crore) (at 1980/81 prices)	214.2	223.4	233.0	245.3
Industrial production (index 1981=100)	213.9	218.9	227.8	232.8
CPI	229.0	243.0	267.0	289.0
(per cent change)	13.9	6.1	9.9	9.5
Money Supply (M3) (per	317.0	366.8	433.6	498.4
cent change)	19.4	25.7	18.2	18.6
Imports[1] (US$ million)	19411	21882	22321	22708
Exports[1] (US$ million)	17865	18537	22174	20871
Foreign Currency Assets (US$ million)	5631	6434	15068	19651
Exchange Rate (Rs/US$)	24.65	28.96	31.37	31.38
Population[2]	862.5	878.6	894.6	

Source: Government of India: Economic Survey 1994/95
P = preliminary
E = estimate
Rs. 1 Crore = Rs. 10,000,000 = C$435,000 (approx.)
Notes:
1. at current prices
2. based on annual series of the Standing Committee on Experts on Population Projections

Of course, the statistics expose some truths but mask others. Most importantly, India is widely seen to be in a period of transition and change. As a result of the liberalization process, India is moving from a managed economy to one which is notably more market oriented. Current economic policy features concepts such as 'increasing foreign investment', 'productivity', 'entrepreneurship', and 'economic efficiency'. Figure 1 provides highlights of industrial policy reforms in India since 1991.

Figure 1
SELECTED INDUSTRIAL POLICY REFORMS - 1991-95

- Number of industries reserved for the public sector reduced from 17 to 8
- Automatic approval of foreign investments up to 51 per cent
- Mining, Air transport, Power, Telecommunications actively opened for foreign investment
- Corporate tax rates reduced to 40 per cent for domestic companies, and 55 per cent for foreign companies
- Five year tax holiday for industrial investment in 'backward' areas
- Across the board reductions in tariffs, import duties, and related trade barriers

- Convertibility of the rupee on current account
- India a member of the World Trade Organization
- Regulatory simplification for several industries, including mining, by the Government of India and several state governments including Haryana, Kerala, Madhya Pradesh, Orissa, Punjab, Rajasthan, and West Bengal

It is too soon to assess the impact of the economic reform process. The Asian Development Bank forecasts GDP economic growth in 1995 of 6.1 per cent and 6.5 per cent in 1996. While solid by world standards, this performance would trail behind the South-East Asian 'tigers'. By Western standards, the government continues to intervene heavily in the economy in order to meet social objectives. It is widely agreed that public sector inefficiency is a drain on Indian growth potential. Infrastructure, notably power and communications, is not adequate to meet demand. The pace of liberalization at the State level has been uneven. Still, the reforms are well entrenched and broadly accepted by the Indian population. The offshore investor has never been more welcome in the history of independent India.

Indian Mining - Scope, Performance, and Trends

As a result of previous policy, the Indian mining industry - in terms of value - is about 90 per cent in public sector hands. For practical purposes, all coal production is government owned, as is production of lead/zinc, copper, gold and diamonds. There is significant private participation in Iron Ore, Chromite, and Manganese production. Industrial minerals fall largely in private hands. Profiles of major producers are available separately.

There are approximately 4,400 operating mines in India, though the Ministry of Mines indicates that only 300 are "major mines".

Mineral exploration, likewise, has been largely publicly funded. The majority of exploration has been conducted by the Geological Survey of India, supplemented by the State Geology Departments. Advanced exploration is also carried out by the Mineral Exploration Corporation Ltd., and some of the mineral producers. As described below, this industrial structure is now changing with the welcoming of foreign capital.

In the current five-year plan, the Government of India notes that the exploration effort in India should refocus on those commodities in short supply domestically in India, notably the base metals, gold, diamonds and tungsten.

Canadian and Indian mineral production is compared in Table 2. Examining the non-fuel plus coal sectors, the total value of production in Canada in 1993, C$14.8 billion, exceeds Indian mineral production over the similar period, which was nearly C$6.0 billion. India is the world's largest producer of mica, the second largest producer of barytes, the third largest producer of chromite, fifth largest of bauxite, seventh largest of coal and tenth largest of aluminum.

The large majority of Indian mineral production is consumed domestically. As recently as 1992/93, only four commodities made up over 90 per cent of the value of mineral exports (see Table 3). These are alumina, iron ore (largely to Japan and South Korea), diamonds (most of which are imported, cut and re-exported), and a growing trade in quality granite, limestone and related industrial minerals.

India is a net importer of minerals and metals. As Table 4 indicates, imports are required to meet domestic demand for most of the major base metals, coking coal, asbestos, rock phosphates, potash, and sulphur.

Minerals and metals represented 22.5 per cent of total merchandise exports and 18.8 per cent of total imports during 1992/93. As such, mining features importantly in the formulation of Indian trade policy

Table 2
MINERAL PRODUCTION IN CANADA AND INDIA 1993-94

Commodity (unit)	Canada		India	
	Value (C$000)	Volume	Value[1] (C$000)	Volume
Coal (MT)	1,783,000	68.6	4.058,767	245.4
Iron Ore (MT)	1,036,587	31.7	338,082	56.4
Gold (kg.)	2,258,007	152,578	37,353	1,938
Diamonds (cts.)	nil	nil	3,959	19,607
Bauxite (Th. T)	nil	nil	32,207	5028.5
Copper (t)	1,759,675	698,799	91,263	52,243
Nickel (t)	1,215,994	180,673	nil	nil
Lead(t)	96,215	181,000	19,409	61,426
Zinc conc. (t)	1,228,826	998.234	71,383	325,022
Manganese (Th.T)	nil	nil	66,398	1781.1
Chromite (Th.T)	nil	nil	90,201	1094.1
Potash (MT)	901,539	6.85	nil	nil
Asbestos (t)	215,076	509,000	879	46,961
Total Value[2]	14,865,621		5,966,359	

Sources: Indian Bureau of Mines, Indian Minerals Yearbook
Natural Resources Canada, Canadian Minerals Yearbook
Notes:
1. Values are calculated as pit head values
2. Non-fuel minerals plus coal and lignite

Table 3

INDIAN MINERAL TRADE - EXPORTS[1]

	91/92		92/93		93/94(P)	
	Vol.	Value (Rs. Million)	Vol.	Value (Rs. Millon)	Vol.	Value (Rs. Millon)
Alumina (Th.T)	3924	1428	338.68	1621	539.9	2724
Bauxite (Th.T)	121.62	4	na	na	na	na
Chromite (Th.T)	398	936	354	789	396.3	735
Coal (Th.T)	135	152	331	421	515	658
Diamonds	na	57618	na	77851	na	112082
Iron ore (Th.T)	29513	14354	21949	11023	26857	13737
Manganese (Th.T)	265	375	209	296	286	380
Stone (Th.T)	822	3905	1223.32	5040	922.9	6697
TotalValue[3]		83426		102110		142665

Source: Ministry of Mines, Annual Report, 1993/94
Notes:
1 Major traded minerals only
2 includes granite only for 92/93
3 non fuel plus coal
Values in Rs Million (current); Rs. 10 Million C$435,000 (approx.)

Table 4
INDIAN MINERAL AND METAL TRADE - IMPORTS[1]

	91/92		92/93		93/94(P)	
	Vol.	Value (Rs. Million)	Vol.	Value (Rs. Millon)	Vol.	Value (Rs. Millon)
Asbestos (t)	66171	849.4	44317	824.7	70342	na
Coal (Th. t)	5276	9006	6489.0	13094	7730.0	14156
Copper (Th. t)	na	na	142.9	9965	232.7	12250
Diamonds	na	46958	na	68929	na	81015
Iron and Steel (Th. T)	na	na	4077	33900	2448	30630
Lead (t)	19340	108	15538	208	49040	485
Limestone (Th. t)	na	149	544	2952	424.2	214
Manganese (t)	3087	31	1004	13	na	na
Nickel Ore/Conc.(t)	4964	8505	6022	1440	7645	1396
Phosphates (Th. t)	2428	4546	2147.7	4477	1903.2	3826
Potash (Th. t)	2040	6613	1760	6599	1470.0	na
Sulphur (Th.T)	1082	3071	1272	3477	1264.9	2293
Zinc Ore/Conc (t)	15073	1643	20455	782	25377	822
Total Value[2].		69940		97137		107817

Source: Ministry of Mines, Annual Report, 1993/94; Indian Bureau of Mines; Ministry of Fertilizers
Notes:
1. Major traded minerals and metals only
2. Non-fuel minerals plus coal (excludes metals/alloys)
Values in Rs. Million (current); Rs. 10 Million = C$435,000 (approx.)

Over the period 1987-92, mineral production grew at an annual average rate of 5.6 per cent. According to the Eighth Five-year Plan, output over the period 1992-97 is targeted to grow by a greater rate for most metals. For illustrative purposes, iron ore output is projected to grow by 41 per cent, aluminum by 27.4 per cent, and refined copper by 20.1 per cent.

Mineral Producing Regions of India

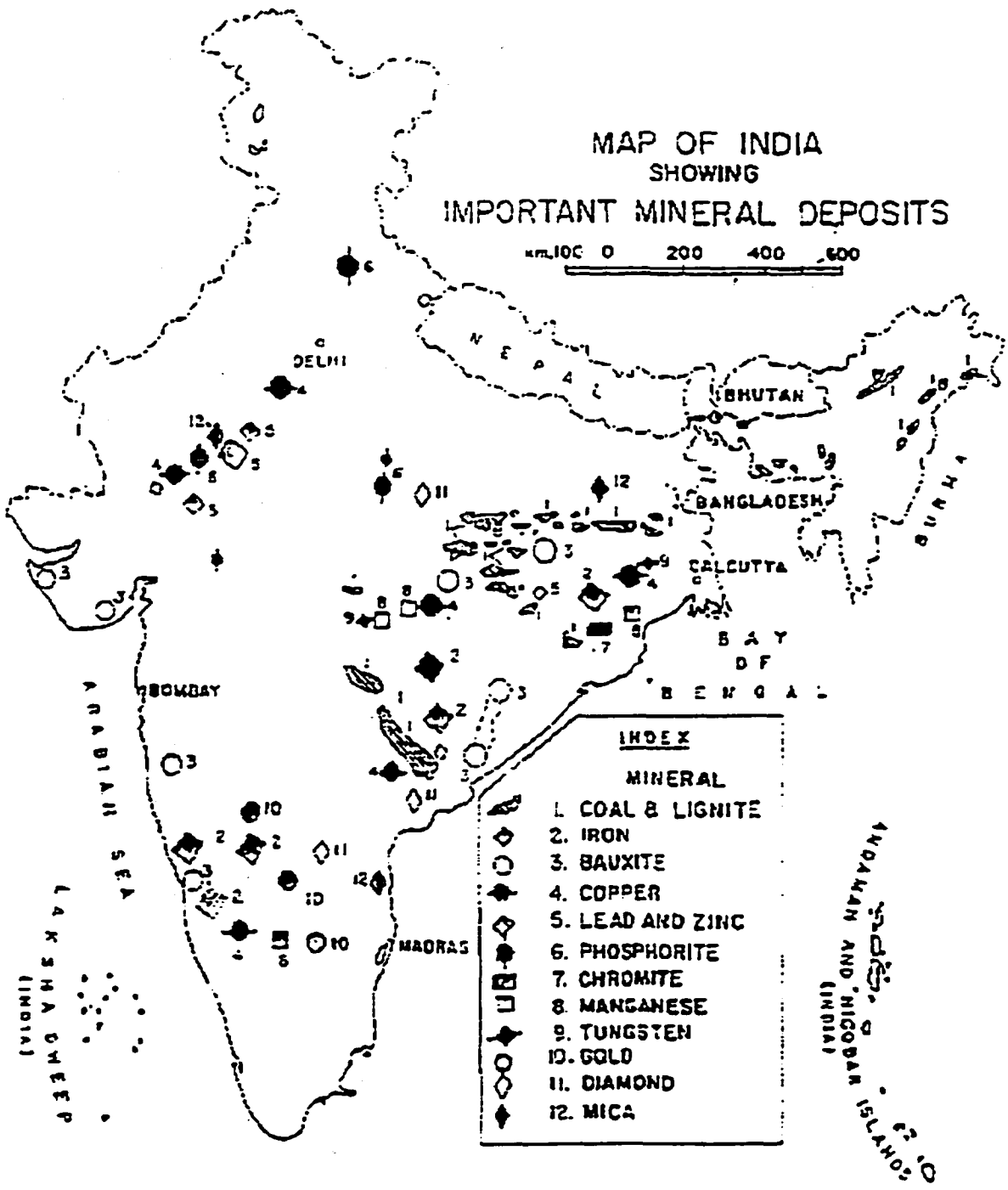
Mineral bearing rock in commercial quantities is widely distributed across India (see Map 1). Mineralization is concentrated in a wide belt cutting across the sub-continent from the south-west to the north-east, and in Rajasthan in the north-west. Figure 2 summarizes the state-wise location of major commodities produced in India.

Figure 2
INDIAN MINING GEOGRAPHY

Commodity	State	Region
Copper/lead/zinc	Rajasthan	Khetri
		Zawar-Rajpura
	Madhya Pradesh	Malanjkhand
	Orissa	Sargipalli
	Karnataka	Kalyadi
	Andhra Pradesh	Agnigundala
	Bihar	Mosabani
Gold	Karnataka	Kolar
		Raichur
Diamonds	Madhya Pradesh	Raipur
	Andhra Pradesh	Vajrakakur
Iron Ore	Goa	
	Karnataka	Bellary
		Chickmagalur
	Madhya Pradesh	Bastar
		Durg
	Orissa	Kendujhar
	Bihar	Singhbhum
Coal	Bihar	Singrrauli
		Karanpura
		Bokaro
		Jharia
	Madhya Pradesh	Hasdo-Rampur
		Pench-Kanhan
	Andhra Pradesh	Singareni
	Orissa	Talcher
	Maharashtra	Chanda-Wardha
	Tamil Nadu	Neyveli (Lignite)

Commodity	State	Region
	Northeast States	
Manganese	Orissa	Sundargarh
		Kendhujar
		Koraput
	Andhra Pradesh	Vizianagaram
	Goa	
	Karnataka	Shimoga
		Uttar Kanada
		Bellary
	Maharashtra	Balaghat
		Bhandara
	Madhya Pradesh	Nagpur
Chromite	Orissa	Cuttack
		Dhenkanal
		Kendhujar
	Karnataka	Hassan
Bauxite	Madhya Pradesh	Mandla
		Bilaspur
		Satna
		Surguja
		Bastar
		Jabalpur
		Shahdol
	Orissa	Koraput
	Maharashtra	Kolhapur
	Bihar	Lohardaga
		Gumla
	Gujarat	Jamnagar
		Kachchh
Soapstone	Rajasthan	Udaipur
		Jaipur
Mineral Sands	Kerala	

Sources: Indian Investment Centre, Mining Opportunities in India. Mining, Geological, and Metallurgical Institute of India, Indian Mining Directory 1993. Parker, F. "Australia's Role in Indian Mineral Resource Development", printed papers from International seminar on Minerals and Mineral-Based Industries in ESCAP region: Trade and Technology Cooperation, Vol.1., FIMI, Dec.1994.



Source: Gopalkrishna, M. "Opportunities for Joint Ventures in the Mineral sector in India Government of India

B. POLICY AND LEGAL CONTEXT

Mining Jurisdiction in India

The division of powers between the federal government of India (the "centre") and the states is defined in the Constitution of India, 1950. A key feature of the constitution is the vesting in the centre of a much greater range of powers than is the case in Canada. This relates in part to the much greater fiscal capacity of the national government, and its role in nation-building.

The national government exercises direct control over industrial development and management of the economy. Infrastructure such as ports and transportation, as well as the development of "basic industries" including steel, electricity, and heavy machinery, have all been vested with the central government. This is changing with the economic reform program.

The large role reserved for the 'centre' extends to mining. The Government of India exercises control over most mineral development by virtue of the Mines and Minerals (Regulation and Development) Act, 1957 (MMRD Act), as amended up to January 1994. Except for Coal mining and Atomic minerals, this Act and related statutes define the respective roles and responsibilities of the two levels of government. Environmental and labour legislation pertaining to mining also rests with the central government.

Despite this legislative framework, mineral resources (except offshore minerals) are owned by the states. Moreover, states exercise significant control over land use within their boundaries. In the mining context, this reality is reaffirmed in the MMRD Act. Specifically, States have authority to issue prospecting licenses and mining leases pursuant to rules set centrally under the Mineral Concession Rules, 1960, as amended to March 1994. Royalties are also payable to the State governments, though at rates which are set by the central government.

For the investor, this structure means that consultation with, and approval from, both levels of government would be required in advance of most mining projects. Though potentially cumbersome, streamlining of approvals is a priority of the Government of India as well as several state governments. In recent years, some states have been pressing for increased powers generally. Some devolution to the states is reflected in the 1993 mineral policy and subsequent amendments to the MMRD Act. (see below)

The 1993 National Mineral Policy

In the short space of four years, India has reduced the number of industries restricted to the public sector from 17 to less than eight. One of the most important steps in this deregulation process, from an Indian public policy perspective, was the opening of major parts of the mining industry to private investment. These changes were given effect in the 1993 National Mineral Policy, and subsequent legislative changes.

At the April 1994 International Round Table Conference on Foreign Investment in Exploration and Mining in India, the Additional Secretary of Mines highlighted the purpose of the new mineral policy:

> "The economic reforms aim to quickly transform the regulated economy to an open market economy to attain higher growth and competitive edge in the world markets. To achieve this goal, massive injections of capital and technology are needed in the Indian mineral sector in all spheres of activity from exploration to extraction, beneficiation, metallurgy and shaping. The new Industrial Policy recognises that globalization of the Indian economy calls for a more dynamic relationship between domestic and foreign industry when it says 'Foreign investment would bring attendant advantages of technology transfer, marketing expertise, introduction of modern managerial techniques and new possibilities for promotion of exports. This is particularly necessary in the changing global scenario of industrial and economic cooperation marked by mobility of capital. The Government accordingly welcomes foreign investment". India's economic isolation is thus over."
>
> M. Gopalakrishna, Ministry of Mines,
> Government of India, April 1994.

The key features of the new mining policy framework are the following:

(1) Thirteen previously restricted minerals are now open to private investment. Those minerals are Iron Ore, Manganese Ore, Chrome Ore, Sulphur, Gold, Diamonds, Copper, Lead, Zinc, Molybdenum, Tungsten Ores, Nickel, and the Platinum group of metals, (Coal and lignite, atomic minerals, and mineral oils continue to be reserved for the public sector.)

(2) Foreign equity investment in mining by way of Joint Ventures is both permitted and encouraged. Investing companies must be registered in India under the Companies Act;

(3) Approval of foreign equity participation of up to 50 per cent is automatic. Equity holdings in excess of 50 per cent will be considered on a case by case basis by the Foreign Investment Promotion Board (FIPB).

(4) Foreign investment in mineral processing is encouraged. Captive mines for mineral processing industries (e.g coal for thermal power stations) would not be subject to the 50 per cent equity cap.

(5) The Government of India has begun the process of disinvestment by selling minority portions of its equity in Hindustan Zinc, Hindustan Copper, and the National Aluminum Company to Indian shareholders. Disinvestment of equity in Bharat Aluminum (BALCO) is also planned.

(6) The number of minerals for which the State governments must obtain prior Government of India approval before issuing mining leases or prospecting licenses has been reduced from 26 to 11 (fuel and atomic minerals excepted). Minerals that no longer require this approval from the centre are apatite and phosphatic ores, barytes, dolomite, gypsum, vanadium, kyanite, magnesite, molybdenum, nickel, platinum, sillimanite, silver, sulphur, tin, tungsten, and vanadium ore. The 11 minerals for which leases remain conditional on approval from the centre include most of India major minerals. They are asbestos, bauxite, chrome ore, copper ore, gold, iron ore, lead, limestone, manganese ore, precious stones, and zinc.

(7) Some rules on prospecting licenses and mining leases have been relaxed. Specifically, prospecting licenses can be granted for three years (increased from two years). Mining leases are granted for a minimum of 20 years, and a maximum of 30 years, with the possibility of renewals for 20 years if approved. Finally, work on a lease must begin within two years, not one year as was the case previously.

Mining Legislation and How It Works

For legislative and administrative purposes, mining in India is divided into four categories: coal, atomic minerals, major metallic and non-metallic minerals, and others (the "minor' minerals). The States have independent authority over minor minerals: Central government legislation applies to the rest.

Development of coal and atomic minerals remain restricted to the Indian public sector. Therefore, this section will focus on the large section of the industry that has been opened to foreign investment: namely the metallic and non-metallic minerals.

The structure of mining legislation is quite straightforward. The overriding Act is the Mines and Minerals (Regulation and Development) Act. 1957 (as amended in January 1994). Pursuant to this Act are two sets of regulations, the Mineral Concession Rules, 1960 (as amended to January 1994) and the Mineral Conservation and Development Rules, 1988 (as amended to January 1994). These laws are the responsibility of the Ministry of Mines of the Government of India, and its subsidiary organizations, the Indian Bureau of Mines and the Geological Survey of India. Most administration is delegated to the States.

The relevant environmental legislation is the Environment (Protection) Act, 1986, Acts for the prevention of Water and Air Pollution, and the Forest (Conservation) Act, 1980, as amended to 1988. Administration falls under the Ministry of Environment and Forests. These Acts are discussed separately elsewhere in this report (refer to Section G).

Labour and mine safety issues are government by the Mines Act, 1952 and related regulations. This Act prescribes the role of the Chief Inspectors of Mines, as well as general working conditions, such as hours or work and minimum wages (refer to Section I).

Key requirements of major Indian mining legislation are summarized in Figure 3. Exploration cannot proceed without a prospecting license, and if commercial quantities of minerals are found, a miring lease is required. For both prospecting and development, operating plans are required, and for the 11 minerals noted above, these plans must be approved by the Central government. The overall objective of the prospecting and mining plans are to ensure that mineral development proceeds in a professional manner, consistent with mineral policy, environmental, and social objectives. Production, not profit or revenue based, royalties are payable to State governments.

Figure 3
INDIAN MINING LEGISLATION AT A GLANCE

I. Mines and Minerals (Regulation and Development) Act, 1957, amended 1994

- Defines Centre/State responsibilities, including Geological Survey of India
  - Coal, atomic minerals and 11 others in federal jurisdiction
  - Minor minerals under State authority
  - Management of all prospecting licenses and mining leases by the States
  - Central responsibility for mineral development and mineral conservation; joint Centre/State administration
- Enables rules for Prospecting Licenses and Mining Leases
  - Indian-registered companies under the Companies Act
  - twenty-five square kilometre cap on prospecting licenses
  - three years for prospecting licence: 30 years for lease
  - premature termination of leases/licenses by the Central government in the interest of mineral development, safety, or environmental protection
- Specifies royalties payable to State governments
- Establishes Offenses and Penalties
  - Liability of Directors

1a. Mineral Concession Rules, 1960, amended 1994

- Specifies conditions and procedures for obtaining prospecting licenses and mining leases, including forms to be used and information to be provided

Prospecting Licenses

- nominal application fees
- safety/security of property
- State government information requirements
- reforestation of two times the number of trees destroyed
- employment of Indian nationals, except with Central gov't approval possible compensation of private holders of surface rights

Mining Leases

- submission of Mining Plan for approval by Indian Bureau of Mines
- mining method(s), geology, impact on environment and mitigation measures
- government information requirements
- small yearly 'dead rent' fees
- employment of Indian nationals, and especially displaced persons, except with Central gov't approval
- operations to commence within one year of the start of the lease
- "pre-emption" of minerals by State gov't on payment of fair market price
- safety/security of the property
- adherence to Mineral Conservation and Development Rules, 1988
- replanting of at least two times the number of trees destroyed

lb. Mineral Conservation and Development Rules, 1988

- holders of prospecting licenses to provide prospecting plan to Indian Bureau of Mines
  - include details of prospecting operations and environmental management plan
- mining plans subject to approval by Indian Bureau of Mines, within 90 days of receipt of the plan
- prospecting and mining conducted "to ensure systematic development of mineral deposits. conservation of minerals and protection of environment"
  - basic rules for mine operation and management of tailings
  - notice of abandonment plans to IBM
  - approval of IBM prior to stoping
  - extensive information to be kept by lessee on mining property and activities
- environmental protection
  - conservation of top soil
  - treatment of tailings to minimize leaching, stabilization of overburden, secure from flooding/land degradation
  - reclamation prior to abandonment
  - air/water pollution standards as per the Air and Water (Pollution and Control) Acts. 1981 and the Environment (Protection) Act, 1986
  - precautions to keep liquid, toxic effluents to a minimum
  - reforestation of at least twice the number of trees destroyed

The basic tenets of Indian mining legislation should be familiar to a North American prospector or mine developer. The laws enable the Central government to exercise close control over mineral development. In function, this is not different than the role of provincial/territorial governments in Canada, though in practice bureaucratic regulatory intervention is greater. The information requirements of the government are also relatively onerous.

Foreign Investment Issues

The well established rule of law, and common usage of the English language contribute to India's attractiveness as an investment destination. The legal system differs from that of Canada, despite common British influence. Proceedings can be slow. The Indian Constitution protects the independence of the Supreme Court. The system is held in high repute and is a cornerstone of Indian society.

It is widely agreed that the policy and legal context for mining is more conducive to investment by non-Indians than at any time since 1947. For the major minerals, joint ventures with foreign equity up to 50 per cent are now straight forward.

Foreign sales of technologies and services to Indian mining companies are actively encouraged. Indian and foreign firms are free to collaborate for technology transfer, subject to (1) a maximum know-how fee of Rs 10 million; and royalty payments not in excess of 5 per cent of domestic sales and 8 per cent of exports. The approval process for purchase of foreign technologies is described as 'automatic'.

The Reserve Bank of India (RBI), the country's Central bank, is responsible for all currency and exchange control matters. The unit of exchange, the Rupee, is now partially convertible. Foreign nationals are permitted to repatriate earnings from India on approval by the RBI. Likewise, repatriation of dividends requires central bank approval. These rules apply across all industries. For joint ventures of up to 50 per cent foreign equity, the process is normally automatic.

There has been a large flow of investment capital into India since liberalization. According to the Government of India, over the period August 1991 - February 1994, 3,876 foreign collaborations have been approved with a total foreign direct investment of $US 4,472 million. Some 2064 of the collaborations are technical while 1812 are financial. U.S., German and U.K. firms make up almost half the total number of approved proposals.

In light of the mining policy reforms, the Government of India is reviewing its mining legislation and rules to address further impediments to foreign investment. By all indications, it is a serious effort. Over the period July - October 1994, the Ministry of Mines and the Ministry of Environment and Forests jointly held a series of regional seminars with industry and State governments. The purpose of these meetings was to identify existing impediments in mining legislation, and to agree on steps to address them.

Seminar participants were candid in their evaluation of Indian mining law. The major concerns raised include the following:

(1) the 25 sq. km. cap on the maximum area for prospecting;
(2) the need for central government approval for base and precious metal development projects;
(3) the royalty rates and processes by which they are set;
(4) delays in processing of lease applications and renewals by both levels of government, and the need for single-window approval systems;
(5) the power of the government to prematurely terminate prospecting licenses and mining leases;
(6) simplification of mining plan requirements;
(7) inflexibility in reforestation requirements;
(8) the five hectare trigger for environmental assessments of mining projects; and
(9) excessive environmental assessment and monitoring requirements for small mines.

This open process of self-evaluation of the mining regime is itself healthy and an indication of a desire to attract foreign capital. For each issue identified during the seminars, organizations were publicly identified to take action. Already, steps have been taken in at least four areas - land access, royalty rates, and modest easing of rules pertaining to environmental clearances and reforestation. The land access, royalty and environmental regimes are evaluated in their respective chapters below.

C. LAND ACCESS

The total geographical area of India is just over 328 million hectares. The Indian Bureau of Mines reports that some 53 per cent of this area is subject to "serious environmental degradation". As of 1991, total mining lease area (excluding fuel and atomic minerals) was 806,422 hectares, or 0.25 per cent of total land area.

Protection of forests is accorded special attention in India. Of the 75 million hectares officially defined by the Government as forest, only 64 million ha. sustains actual forest cover, and of this only 35 million ha., or 11 per cent of the total land area, has adequate cover. The objective of national Forest Policy is to maintain one-third of the country under forest cover. Forests in India are a vital source of firewood and fodder, and are integral to the village lifestyle. Reforestation is accorded very high priority.

Approval for mineral development in forested areas is considered difficult to obtain by the Indian mining industry. The Forest Conservation Act, 1988 restricts deforestation for non-forest purposes without approval from the Ministry of Environment and Forests. This Act is something akin to the Canadian fisheries legislation in that it alone can be sufficient to prevent a project from proceeding.

The second major land access issue is the provision in the Minerals and Metals (Regulation and Development) Act which states (Section 6(1)) that:

> "no person shall acquire in respect of any mineral or prescribed group of minerals (a) one or more prospecting licences covering a total area of more than 25 square kilometres; or (b) one or more mining leases covering a total area of more than 10 square kilometres: provided that if the Central Government is of opinion that in the interests of the development of any mineral, it is necessary so to do, it may, for reasons to be recorded by it, in writing, permit any person to acquire one or more kilometres, or (b) one or more mining leases covering a total area of more than 10 square kilometres: provided that if the Central Government is of opinion that in the interests of the development of any mineral, it is necessary 50 to do, it may, for reasons to be recorded by it, in writing, permit any person to acquire one or more prospecting licenses or mining leases covering an area in excess of the aforesaid area".

These caps on prospecting and lease areas are low by international standards. They reflect the realities of a densely populated country where industrial and mineral development has the potential to disrupt large numbers of people. However. this restriction has proven to be a significant impediment to implementation of the 1993 mining reforms.

The Government of India is well aware of this issue. It featured in the regional seminars held in 1994, and has been an issue in bilateral discussions with prospective investors. As an outcome of the seminars, the Ministry of Mines established a Working Group, involving the Federation of Indian Mineral Industries, with a mandate to develop new regulations governing the maximum permissible area of land for prospecting.

At the time of writing (May 1995), the Working Group looking at land area for prospecting has completed its work, and recommendations have been made to the government. Preliminary indications are that new regulations, substantially increasing the maximum permissible area available for prospecting, are to be released shortly.

D. MAJOR COMMODITY OPPORTUNITIES

India is a geologically rich nation. Occurrences of virtually all ferrous and non-ferrous minerals have been identified. Reserves of industrial minerals are extensive. Indeed, despite work extending over 144 years by the Geological Survey of India, informed observers state that there remains much more to be found using advanced exploration techniques including geochemical and geophysical exploration as well as remote sensing techniques. Interestingly for Canadians, in geological terms, large parts of the Indian sub-continent are very similar to Canada's pre-cambrian shield.

Indian mineral wealth is summarized in table 5. India is particularly well-endowed with non-coking coal, iron ore, bauxite, and a wide range of industrial minerals. Reserves of most base and precious metals are not yet sufficient to meet domestic demand, although the country's zinc production is considered adequate.

This section of the report is intended to give readers some insight into exploration and production of the major minerals which have been opened to private investment. The minerals discussed are Iron Ore, Chrome ore, Manganese, Bauxite/Aluminum, Copper, Lead, Zinc, Diamonds, Gold, Nickel, Molybdenum, and the Platinum group of metals. Because of its potential for future collaboration, coal is also considered.

Table 5
INDIAN MINERAL WEALTH - RESERVES AND RESOURCES

Commodity (M tonnes)	Reserves/Resources Proved	Probable	Possible	Total
Coal				
Coking Coal	13733		14179	27912
Non-Coking Coal	32681		97872	130553
Iron Ore				
Hematite	4689	2824	2088	9602
Magnetite	1766	782	595	3143
Manganese Ore				
Resources	64.6	102.1	203.0	369.8
Recoverable Reserves	28.6	41.8	106.1	176.5
Conditional Resources	0	0.4	1.8	2.2
Copper Ore				
Resources	156.2	145.4	120.6	422.2
Recoverable Reserves	138.3	101.9	84.5	324.8
Conditional Resources	122.3	106.8	609.5	838.1
Lead/Zinc				
Ore Resources	81.8	43.1	90.1	215.0
Lead metal	1.7	1.1	2.3	5.0
Zinc metal	7.3	3.3	4.6	15.2
Recoverable Ore Reserves	67.0	34.0	66.5	167.6
Lead metal	0.8	0.5	1.0	2.4
Zinc metal	3.9	1.7	2.2	7.9
Conditional Ore Resources	5.2	106.7	65.6	177.5
Lead metal	neg.	0.8	0.6	1.4
Zinc metal	neg.	2.1	1.2	3.4
Gold Ore[1]				
Resources	8.25	7.65	4.56	20.46
Recoverable Reserves	8.25	7.65	4.56	20.46
Conditional Resources	2.35	1.98	4.42	8.76
Diamonds (Carats)				
Resources	1065795	0	130359	1196154
Recoverable Reserves	1605795	0	130359	1196154
Conditional Resources	0	0	79022	79022
Motybdenum				
Resources	0	neg.	8.0	8.0
Recoverable Reserves	0	neg.	8.0	8.0
Conditional Resources	0	0.6	1.9	2.5
Nickel				
Conditional Resources[2]	50	119	125	294

Sources: Indian Bureau of Mines Handbook on National Mineral Inventory. Nagpur, 1993.; Bandopadhyay, P. "The Role of Coal in the Indian Economy", 1994.

Notes: Resources are classified according to degree of geological certainty - proved, probable, and possible. Proved resources are estimated based on "intensive exploration". Reserves are classified into two economic criteria - recoverable reserves and conditional resources - as of April 1, 1990. Conditional resources are not currently mineable due to ore grade location, or other factors which increase production costs.

1. Excludes placer gold mining
2. Occurrences without resource estimation have also been reported in Karnataka, Rajasthan, Kerala, and Nagaland.
3. Depth from surface of 0-1200 m. and seam thickness greater than 0.5 m.

Iron Ore

Major Producers

The Steel Authority of India (SAIL) (Government of India)
National Mineral Development Corporation (NMDC) (Government of India)
Tata Iron and Steel Co. Ltd. (TISCO) (Private)
Kudremukh Iron ore Co. Ltd. (Government of India)
Orissa Mining Development Corporation (State government owned)

Output/Trade

The 1992 Report of the Task Force on Iron Ore projects rapid growth in the domestic demand for iron ore from 53.3 million tonnes in 1996/97 to 75.2 million tonnes in 2001/02. Currently, recoverable reserves are estimated at about 12.7 billion tonnes, of which 10.3 billion tonnes are haematite. The major producing states are Bihar, Maharashtra, Karnataka (magnetite), and Goa.

About 90 per cent of domestic demand is from the integrated steel plants. However the sponge iron industry is projected to grow rapidly.

Iron ore is a major export commodity and foreign exchange earner. About 60 per cent of production is exported, though this may decrease if domestic demand projections are realized.

Prospects

The Iron Ore Task Force observes that "fairly sizable" investments in new mines, as well as expansion of existing ones, will be required to meet projected demand. Constraints to development may include restrictions on mining on forested land, and capacity limits on transportation infrastructure. The Task Force also notes that "large investments may be required so as to upgrade mining equipment, use cleaner technologies, and introduce a higher degree of mechanization."

According to the Ministry of Steel, foreign investors have expressed interest in Indian iron ore projects, especially for export markets.

Chrome Ore

Major Producers

Orissa Mining Corporation Ltd. (State government owned)
Tata Iron and Steel (Tisco) (Private)
Ferro Alloys Corporation Ltd. (Government of India)
Mysore Minerals Ltd. (State government owned)
Misrilall Mines (Pvt.) Ltd. (Private)

Output/Trade

Indian production of Chromite was 1.088 million tonnes in 1992/93, from mines located in Orissa, Bihar, and Karnataka. India has Chrome Ore reserves of 139 million tonnes, estimated to represent 4 per cent of the world total. The private sector accounts for about 70 per cent of production. Exports of chromite in recent years have ranged between 350-400 thousand tonnes, making the commodity among the most important mineral exports.

Recent Exploration Activity

The Geological Survey of India has established reserves of 145 million tonnes in the Sukinda area of Orissa based on work over the 1987-92 period. India's most important occurrence of nickel has also been identified in this geological area.

Prospects

In the Chrome Ore context, the India Investment Centre makes the general observation that "Investments for mining and transfer of cost-effective beneficiation technology and for production of value-added products could be beneficial."

Manganese

Major Producers

Manganese Ore (India) Ltd. (Government of India)
Orissa Manganese and Minerals (Pvt.) Ltd. (Private)
Tata Iron and Steel Ltd. (Tisco) (Private)
Sandur Manganese and Iron Ores Ltd. (Private)
Orissa Mining Corp. Ltd. (State government owned)
Mysore Minerals Ltd. (State government owned)
Orissa Mineral Development Corp.(State government owned)
RBSSD & F.N. Das (Private)
S.K Sarawagi & Co. Ltd. (Private)

Output/Trade

Manganese occurs widely in India, notably in Madhya Pradesh, Andhra Pradesh, Orissa, Karnatkka and Goa. Ore resources (proved, probable and possible) are estimated at 370 million tonnes. Production in 1992/93 totalled 1858 thousand tonnes, slightly over half in the private sector. According to Banergee, 1992, there are 173 manganese mines in India, the majority of the production from which supplies seven ferromanganese plants. Manganese is currently considered to be in oversupply.

Exploration Activity

Recently, the Geological Survey of India has increased reserve estimates in the State of Orissa, bring total reserves there to 15.48 million tonnes at a cut-off grade of 20% Mn. Exploration is planned for the Balaghat district of Madhya Pradesh, and the Nagpur district in Maharashtra.

Prospects

Most manganese mines in India are worked manually. In general, upgrading of mineral technologies, and use of modem mining methods to increase productivity is given high priority by the Government of India.

Bauxite/Aluminum

Major Producers

National Aluminum Co. Ltd. (Government of India)
Indian Aluminum Co. Ltd. (Private)
Hindalco Industries Ltd. (Private)
Bharat Aluminum Co. Ltd. (Government of India)
Madras Aluminum Co. Ltd. (Private)
Bombay Mineral Supply Co. Ltd. (Private)
Orient Abrasives Ltd. (Private)
Gujarat Mineral Development Corp. (State government owned)
Madhya Pradesh State Mining Corp. (State government owned)
Minerals and Metals Ltd.(Private)
Saurashtra Calcined Bauxite & Allied Industries (Private)

Output/Trade

Bauxite is found extensively in India, notably in the states of Orissa, Andhra Pradesh, Madhya Pradesh, Maharashtra, Gujarat, and Bihar. Reserves are estimated by the Indian Bureau of Mines to total 2333.4 million tonnes, of which 598 million tonnes are proved and 462 probable.

India is self-sufficient in bauxite and aluminum production, and is a major exporter of both bauxite and alumina. In 1991/92, exports of bauxite reached 121,618 tonnes and of alumina 392,398 tonnes. Two companies, National Aluminum (NALCO) and Bharat Aluminum (BALCO), both public sector companies, account for two-thirds of aluminum production.

In addition to work done in-house, research and development related to aluminum is conducted at the newly created Jawaharlal Nehru Aluminum Research, Development and Design Centre in Nagpur. The Nehru Centre will focus on new uses of aluminum and its alloys.

Over the period from 1991-92 to 1996-97, aluminum production is targetted to grow from 514 thousand tones to 656 thousand tonnes, an increase of nearly 28 per cent.

Prospects

Indian aluminum producers have long-standing experience in technical collaboration with offshore investors. All five major companies have imported smelter technology from abroad. Alcan (Canada) has provided technical and financial assistance to the Indian Aluminum Company (INDALCO) dating back to the 1940s, and retains a minority equity position.

The Ministry of Mines has identified the following prospects for foreign cooperation: bauxite mining, beneficiation of bauxite, alumina plants, secondary aluminum production,joint ventures for smelting facilities in third countries, Gallium recovery, and commercial products from red mud.

Copper

Major Producers

Hindustan Copper Ltd. (HCL) (Government of India)
(HCL is the sole producer of primary copper; a small number of other companies supply copper concentrate to the HCL smelters.)

Output/Trade

India is a net importer of copper, and meets an estimated 34 per cent of domestic demand indigenously. Production of copper ore in 1993/94 was 52,243 tonnes. Assuming a GNP growth rate of six per cent, the Working Group on Non-Ferrous Metals estimated that demand for primary copper would grow from 204 thousand tonnes in 1994/95 to 292 thousand tonnes by 1999/2000. As the GSI points out, "a conspicuous domestic market for copper lead-zinc exists".

Copper is currently mined in Madhya Pradesh, Rajasthan and Bihar, and to a lesser degree in Karnataka and Sikkim. All mines are underground, except the large Malanjkhand open pit mine in Madhya Pradesh. Total insitu reserves of copper ore are estimated at 422 million tonnes. Copper ore resources as at March 31, 1993 are estimated at 732 million tonnes. However, Indian deposits are generally considered to be of low grade; the average ore grade of HCL mines is 1.21% copper.

HCL operates ten mines and two smelter complexes, the Khetri Copper Complex in Rajasthan (capacity 31000 tpa) and the Indian Copper Complex in Bihar (capacity 16500 tpa). During 1993/94, both smelters achieved very close to production targets. Recent, large reductions in customs duties for raw materials (from 90 percent to 10 per cent) may increase the viability of smelter expansion to treat imported concentrates.

Exploration Activity

As directed by the Eighth Five-year Plan, the GSI is giving priority to base metals exploration. GSI reports an increase in the reserve estimate of the low grade copper ore deposit at Akola, Rajasthan from 2.94 million tonnes to 4.0 million tonnes.

Prospects

HCL has expressed "keen interest" in foreign collaboration, not only in India but in other Third World Countries. HCL has put forward the following proposals for collaboration in a recent corporate publication:

1) expansion of the Khetri smelter and refinery complex at an estimated cost of $US90 million;
2) underground mine development in Madhya Pradesh at an estimated cost of $US330 million;
3) extension of existing Khetri mines at an estimated cost of $US 16 million; and
4) development of the Chapri-Sidheswar underground mine in Bihar at an estimated cost of $US93 million.

The Ministry of Mines also cites potential for exploration, hydro-metallurgy, and bioleaching technology.

Lead/Zinc

Major Producers

Hindustan Zinc Ltd. (HZL) (Government of India)
Sikkim Mining Corp. (Government of India)
Binani Zinc Ltd. (Private)
Indian Lead Ltd. (Private)

Output Trade

Occurrences of lead/zinc have been identified in Andhra Pradesh, Orissa, and Gujarat, but almost 90 per cent of resources are found in the Precambrian rocks of Rajasthan, specifically the Zawar-Rajpura-Dariba-Bamnikalan-Rampura-Agucha belt. Total estimated resources of lead/zinc are 383 million tonnes, of which 167 million tonnes are mineable reserves.

Lead-zinc mining and smelting is dominated by Hindustan Zinc Ltd. which currently operates five lead/zinc mines and four smelters. Total capacity of the smelters is 149,000 TPA zinc metal, and 65,000 TPA lead metal. Indian production during 1992/93 was 293,000 tonnes zinc concentrate and 60,000 tonnes lead concentrate.

Binani Zinc, which was originally established as an investment of Cominco Ltd. in the 1940's, operates a 20,000 TPA zinc smelter in Kerala using entirely imported concentrate.

India is almost self-sufficient in zinc, and meets an estimated 84 per cent of domestic demand for lead indigenously. Over the period 1992-97, Indian demand for zinc is expected to grow by 4 per cent, and lead by 5.5 per cent, on an annual basis.

Exploration Activity

Exploration for lead/zinc was given priority under the Eighth Plan. The GSI reports significantly increased reserves in the North Sindesar Ridge(S) Block, and the Tikhi Extension Block in Rajasthan, as well as in the Kayar-Ghugra Block. HZL has conducted advanced exploration near Ajmer, Rajasthan, and at the Dhukonda Lead prospect in Andhra Pradesh. Private exploration in Rajasthan has also increased since the 1993 policy reforms.

Prospects

HZL and the large Australian firm BHP have reportedly created a joint venture for base metal exploration and development. HZL is also pursuing joint venture projects for exploration and development of other base and precious metals (notably nickel, tungsten and tin) as well as industrial minerals (potash, mineral sands, etc.)

The Ministry of Mines indicates scope for collaboration in lead/zinc exploration, and joint ventures for primary lead production, as well as primary and secondary zinc production.

The Indian Investment centre notes that depth exploration (below 300 metres), and economical methods to exploit low-grade deposits, are needed. It adds that "there still remains good possibility of locating ...concealed ore bodies in other lead- zinc belts."

Diamonds

Major Producers

National Mineral Development Corp. Ltd. (Government of India)
Government of Madhya Pradesh, Directorate of Mines and Geology

Output/Trade

India is among the world's leading diamond-cutting centres (83 per cent of all diamonds by one account). Virtually all rough diamonds are imported, and the output exported. The country has one producing diamond mine at Panna in Madhya Pradesh. Other kimberlite formations have been identified in the Ramkherisa- Hirappur belt in Andhra, Pradesh. Total production in 1993/94 was 19,607 carats, of both gemstone and industrial quality.

Exploration Activity

The GSI maintains an active diamond exploration program. In 1993/94, they report (1) processing of Venkatampelle pipe in Andha pradesh yielded 177 diamonds weighing 16.63 carats, and 183 diamonds weighing 36.83 carats. (2) discovery of three pipes near Raipur, Madhya Pradesh, and (3) proposed diamond investigations in western Orissa and eastern Maharashtra.

Prospects

The Indian Investment Centre considers that the scope for further discovery of diamond pipes is high. The Ministry of Mines, and the President of the Federation of Mineral Industries (FIMI), cite prospects, both in more intensive exploration, as well as mining. Upgrading and automation of diamond finishing also holds scope for investment.

Gold

Major Producers

Bharat Gold Mines Ltd. (BGM) (Government of India) Hutti Gold Mines Co. Ltd. (State government owned)

Output/Trade

Currently, gold is mined in two regions of India, the well-known Kolar gold fields in Karnataka, and the Hutti gold field near Raichur also in Karnataka. Several other smaller gold-bearing areas have been known since ancient times, notably near Ramagiri in Andhra Pradesh. Total estimated recoverable reserves of gold ore in India are 15.9 thousand tonnes.

The Kolar gold fields are largely mined out. Bharat Gold Mines Ltd. has been a money loser for several years as veins were mined out and grades deteriorated. Recently, the decision was taken to privatize Bharat Gold Mines, a process which continues at time of writing. Reprocessing of old tailings using improved extraction technologies may yield significant quantities.

Production of gold bullion in 1992/93 was 1723 kg., low by historical standards. However, demand for gold is strong in India, and is likely to increase with the prosperity that accompanies the liberalization process.

Exploration Activity

BGM conducted "exploratory development" at the Yeppamana mine at Ramagiri Andhra Pradesh, and at Chigargunta in the same state. The Geological Survey has exploration programmes underway in no less than fifteen states. Positive results are reported in the Hutti, Tumkur, and Chinmulgund districts of Karnataka, as well as in three districts of Andhra Pradesh, and two districts of Rajasthan. The Mineral Exploration Corporation Ltd. also has a gold exploration program, with current efforts concentrated in Karnataka (Gadag) and Maruda.

Prospects

There are a number of mostly small gold-bearing areas, which according to the President of FIMI, warrant more intensive exploration. Advanced exploration methods, including remote sensing, airborne geophysics, geochemical surveys and computer- based data processing have been applied only to a very limited extent. The Ministry of Mines also sees scope for cooperation in advanced exploration, as well as improved extraction technologies, smelting and refining.

The India Investment Centre notes that "there are about 10 small primary gold deposits with 0.3 to 2 Mt. of ore reserves with 3-4 gms/tonne of gold which are ideally suited for open cast mining".

Nickel

Major Producers

none

Output/Trade

All the Indian demand for nickel is currently met from imports. In 1992/93, imports of nickel concentrate totalled 6022 tonnes,and in 1993/94, 7645 tonnes.

The most important occurrences of nickel are at Sukinda in the Cuttack district of Orissa, and Simlipal in the Mayurbhanj district in the same state. Total reserves at Sukinda are estimated at 219.7 million tonnes, of which the proved reserve is 23 million tonnes (0.9 per cent nickel). Probable reserves are 60 million tonnes. Other nickel occurrences has been identified is association with copper ores in Rajasthan and Bihar.

Exploration Activity

The Government of India identified nickel as one of the few minerals for which extensive exploration programs should be mounted.

Prospects

The Sukinda deposit is considered promising, and may be a good candidate for foreign collaboration. Technologies for extraction of the low-grade ore are however required.

Coal

Major Producers

Coal India Ltd. (Government of India)
Sigareni Collieries Co. Ltd. (State government owned)
Neyveli Lignite Corp. Ltd. (Government of India)
Tata Iron and Steel Co. Ltd. (TISCO) (Private)

Output/Trade

India is the world's fourth largest coal producer. Major coalfields are located in southern Bihar, the north-east, and in the centre of the country in Madhya Pradesh, Maharashtra. and Andhra Pradesh. Virtually all coal output serves the domestic market.

Total reserves are estimated at 158.5 billion tonnes, though only 17 per cent of that amount, or 5,470 million tonnes, is coking coal. With its high ash content, the poor quality Indian coals have had to be supplemented by imported coking coal for use in steel-making.

Coal represents slightly over 2/3 of overall commercial energy consumption in India. Consumption of coal, the lifeblood of Indian infrastructure, has grown steadily over the last 10 years. It increased by 5.5 per cent over the period 1982-87, and by 7.4 per cent over the period 1987-92. Annual growth of 6.3 per cent is forecast for the period 1992-97. Largely to meet targets for rapid (private sector) expansion in thermal power generation, the target for coal production in 1996/97 is 308 million tonnes (as compared to 246 MT in 1991/92). For the long term, coal demand is expected to grow to 460 million tonnes by 2006-07.

Except in the case of captive mines, coal is not one of the minerals opened to private investment in the 1993 mineral policy. Virtually all coal in India continues to be mined by the public sector company, Coal India Ltd., which employs about 700,000 people in over 450 mines. While productivity at Coal India, according to the company, has increased from 0.58 tonnes per manshift in the mid- 1970s to 1.46 tonnes per manshift in 1992/93, it remains low.

Prospects

At least one Canadian company - Met-Chem Ltd. - enjoys a successful relationship with Coal India Ltd. in the development and management of coal projects, notably the Rajmahal coal mine. Other countries have embarked on similar cooperative arrangements with the Indian coal industry. Similar prospects may arise in the future.

Coal India indicates it will continue to offer 'build-own- operate' contracts to private (foreign and domestic) companies for coal washeries. It also seeks partnerships in the application of specialized technologies for mining and beneficiation.

Parker reports that Indian coal mines tend to use sub-par mining equipment, suggesting a scope for greater technology transfer in the future. Clean coal technologies should grow in importance as international pressures grow to reduce greenhouse gas emissions form coal-burning power plants.

E. INFRASTRUCTURE

Power

The Indian power situation is characterized by chronic shortages, particularly in peak demand times. Over the period 1988/89 to 1993/94 demand exceeded supply by between 7.3 per cent and 8.4 per cent annually. These shortages are known to have resulted in delays in high energy-intensive industrial projects, notably including aluminum and base metal smelters. The severity of the situation also varies quite widely from state to state.

Total power generating capacity in India, as of April 1994, was 76,718 megawatts, of which 70.8 per cent is from thermal sources 26.6 from hydropower, and 2.6 from nuclear. Total generation increased by 7.5 per cent during 1993/94, and is projected to grow by 8.4 per cent in 1994/95. Most power plants are owned and operated by State Electricity Boards.

To address the shortfalls in Indian power supply, the Government of India has been aggressively seeking private and foreign investment in the power sector. In some cases, exchange rates and counter-guarantees have been granted. The response is striking. In the period mid-1991 to April 1995, 138 proposals, representing additional capacity of 58,745 megawatts (i.e. 75 per cent of current capacity) have been received. While there are significant delays between the proposal stage and actual increased capacity, the planned investment is a very positive sign.

Transportation

India has one of the largest rail networks in the world with lines extending over 62,462 kms. It is vital to the national economy. Indian Railways employs 1.6 million people.

Goods traffic, especially from minerals and mineral-products, forms a large portion of rail traffic and revenue. During 1993/94, the railways transported 358.72 million tonnes of goods, of which 269.3 million tonnes (75 per cent) is directly linked to the mining industry. Earnings from goods traffic represented 71 per cent of total earnings in 1993/94.

Indian Railways has recently come under criticism for delays in coal deliveries to some thermal power plants.

Ports

India has 11 major ports, most of which are operating at capacity. Ports handled a total of 179.3 million tonnes in 1993/94, and increase of 7.6 per cent over the previous year. The Government of India reports that productivity at Indian ports is low. Privatization of port facilities is a feature of the liberalization process, and is expected to improve capacity in this area. Over one-third of port traffic is made up of iron ore and coal shipments.

F. TAXATION

An analysis of Indian tax policy would extend well beyond the scope of this paper. Two good sources of information are Price Waterhouse, Doing Business in India, 1992, and Government of India, Ministry of Mines, Investment in India: The Mining Sector. The text in this section is heavily based on these publications.

In respect of Income taxes, tax is levied on profits calculated on a net income basis. Incentives are an important feature of Indian tax law, and include (a) tax holidays for investments in "backward" areas, (b) certain deductions for new mining ventures, (c) accelerated depreciation, (d) deductions for income derived from export of specified processed minerals, (e) deductions for certain expenditures related to prospecting and extraction, and (f) deductions for specified expenditures on scientific research, acquiring of know-how, and environmental protection.

As of 1994, corporate tax rates for Indian companies were 40 per cent plus a 5 per cent wealth tax for income over Rs 75,000. Foreign companies are taxed at 55 per cent of net income. Long term capital gains are taxed at 30 percent for Indian companies, and 20 per cent for foreign companies.

Indirect taxes in India include excise and custom duties, sales tax, and other taxes including real estate taxes or octroi levied by some state governments.

The most important taxation directly related to mining is the royalty scheme under the Mines and Minerals (Regulation and Development) Act. Royalties are payable to state governments, though the rates are set centrally. Currently, royalties are set on a unit basis; that is, as a function of the quantity (and sometimes quality) of ore mined. Rates for the major minerals of interest are summarized in Table 6.

Table 6

RATES OF ROYALTY - SELECTED MINERALS

Apatite - Rock Phosphate	
(a) Above 30 per cent $P_2 0_5$	Rs. 152 per tonne
(b) Above 25 per cent $P_2 0_5$ and up to 25 per cent $P_2 0_5$	Rs. 96 per tonne
(C) Above 20 per cent $P_2 0_5$	Rs. 56 per tonne
Asbestos	
(a) Chrysotile	Rs. 726 per tonne
(b) Amphibole	Rs. 28 per tonne
Bauxite	Rs. 34 per tonne
Chromite	
(a) containing 47 per cent Cr_2O_3 and above	Rs. 255 per tonne
(b) Containing less than 47 percent CrO_3 an more than 40 percent CrO_3	Rs. 135 per tonne
(c) Containing 30 percent Cr_2O_3	Rs. 90 per tonne
(d) Containing less than 30 percent Cr_3O_3	Rs. 23 per tonne
Copper Ore	Rs. 17 per unit cent of copper metal contained per tonne of Ore and on prorata basis.
Diamond	20 per cent of the sale price at the pit's mouth
Gold	Rs. 11 per 1 gram contained gold per tonne of ore and on prorata basis *By-product gold Rs. 10
Iron	
(i) Ore lumps	
(a) with 65 per cent Fe or more	Rs. 18 per tonne
(b) with 62 per cent Fe or more but less than 65 per cent Fe	Rs. 10 per tonne
(c) with 60 per cent Fe or more but less than 62 per cent Fe	Rs. 7 per tonne (d) with less than 60 per cent Fe
(ii) A. Fines produced incidental to mining and sizing of Ore	
(a) with 65 per cent Fe or more	Rs. 13 per tonne
(b) with 62 per cent Fe or more but less than 65 percent Fe	Rs. 7 per tonne
(c) with less than 62 per cent Fe	Rs. 5 per tonne
B. On concentrates prepared by beneficiation and/or concentration of low grade ore containing 40 per cent Fe or less	Rs. 2.25 per tonne
(a) containing 40 per cent $A1_2O_3$ and above	Rs. 85 per tonne
(b) Containing less than 40 per cent $A1_2 O_3$	Rs. 40 per tonne

Lead Ore	Rs. 8 per unit per cent of contained lead metal per tonne of ore and on prorata basis
Manganese Ore	
(a) manganese dioxide (containing 78 per cent or more of MnO2 and 4 per cent or below Fe)	Rs. 107 per tonne
(b) 40 per cent Mn and above	Rs. 40 per tonne
(c) 35 per cent Mn and above but below 46 per cent Mn	Rs. 23 per tonne
(d) 25 per cent Mn and above but below 35 percent Mn	Rs. 17 per tonne
(e) Below 25 per cent Mn	Rs. 7 per tonne
Mica	
(a) Crude Mica	Rs. 34 per 100 Kg.
(b) Waste and Scrap Mica	Rs. 14 per 100 Kg.
Nickel	Rs. 2.25 per unit of contained nickel metal per tonne of ore and on a pro rata basis
Silver	Rs. 340 per Kilogram of metal
Tungsten Ore	Rs. 30 per unit percent of contained WO_3 per tonne of Ore and on prorata basis
Zinc Ore	Rs. 16 per unit per cent of zinc metal contained per tonne of ore and on prorata basis.

Source: Mines and Minerals (Regulation and Development) Act, 1957, Schedule 2.

The structure and rates of royalty in India have come under some scrutiny by prospective foreign investors. The unit based approach is not common in major mining countries and does not take into account price and profitability fluctuations. Also, the rates themselves are seen to be high. In response, the Ministry of Mines has initiated a consultation process with industry and state governments to review the royalty structure. At time of writing (May 1995), this remains a high priority. Revisions to the royalty scheme within a period of months, possibly favouring an ad valorem approach have been foreshadowed by the Minister of Mines.

ENVIRONMENTAL ISSUES

Protection of the natural environment is accorded high priority in India. The Government of India has appointed a senior and respected politician, Mr. Kamal Nath, as Minister of Environment and Forests. The policies and legislation of the environment ministry have a direct impact on Indian industry, and on the policies of government industrial development ministries, including the Ministry of Mines.

India's environmental priorities are spelled out in the 1993 Environment Action Programme, India. The eight specified priority areas are:

"a) conservation and sustainable utilization of biodiversity in selected ecosystems:

b) afforestation, waste lands development, and conservation of soil and moisture and ensuring that water sources are not polluted:

c) control of industrial and related pollution with an accent on the reduction and/or management of wastes, particularly hazardous wastes:

d) improving access to clean technologies:

e) tackling urban environmental issues:

f) strengthening scientific understanding of environmental issues: and

g) an alternative energy plan."

Environmental Management

There are five pieces of legislation with direct relevance to the environmental management of mining operations. They are:

1) Mineral Conservation and Development Rules. 1988
2) Environment (Protection) Act, 1986
3) Water (Prevention and Control of Pollution) Act. 1974
4) Air (Prevention and Control of Pollution) Act. 1974: and
5) Forest (Conservation) Act, 1980

Mineral Conservation and Development Rules 1988

This legislation requires that "prospecting and mining operations shall be carried out in such a manner so as to ensure systematic development of mineral deposits conservation of minerals and protection of environment". Prospectors and mine lease holders are required to prepare detailed environmental management plans that may be reviewed by the regulator, in this case the Controller General of Mines (India Bureau of Mines).

In addition, there are a number of specific conditions of mining leases aimed at environmental protection. For example, mine operators are required to conserve top soil by using it for site rehabilitation or otherwise storing it for future use. Likewise, tailings dumps are to be managed "to ensure minimum leaching effects", and reclamation is required prior to the abandonment of a prospect or mine. "All possible precautions" are to be taken to prevent the discharge of toxic liquid effluents, and reforestation is required by planting twice the number of trees destroyed".

These rules tend not to be written in prescriptive terms (i.e. by spelling out means of environmental protection), but instead specify the objectives to be met.

Environment (Protection) Act, 1986

This legislation empowers the Government of India to protect the environment by setting and enforcing standards, and among other features, to close or regulate operations that fail to follow Ministry directives. This Act also requires environmental assessments of new projects (called Environmental Clearances), as well as annual "environmental statements" of performance.

As is the case with mining legislation, environmental laws are jointly administered by the national and State governments. At the national level, the responsible agency is the Ministry of Environment and Forests (MOEF), while Pollution Control Boards (PCB) tend to serve as administrators at the state level.

All new mining projects or expansions with leases of more than 5 hectares require environmental clearance, as do smelters and refineries where the investment exceeds Rs. 500 million (C$ 21.75 million). New mining projects also require a site clearance from MOEF.

The environmental assessment process is described very well in the CII publication Indian Environmental Legislation: Guide for Industry and Business. Briefly, the first step is to obtain clearances from the State PCBs under the Water and Air Acts. The next step is the environmental assessment process itself. It entails preparing a detailed project proposal (including the environmental management plan, a risk analysis, and a rehabilitation plan) which is then considered by the Impact Assessment Agency (IAA) at MOEF. The IAA may request further data/clarifications, and may recommend a public hearing. The IAA will also consult a committee of experts, after which a decision on the environmental clearance is issued.

During 1993-94, 37 mining projects were sent to MOEF for environ mental clearance, in addition to the 33 projects in the pipeline at the beginning of the fiscal year. During the year, 41 of the 70 projects were approved, while additional information was requested on the other 29. Notably, more mining projects were considered for approval than from any other industrial sector.

In practice, if the original application is complete, the timeline for approvals is normally about six months. The MOEF has extensive information requirements - perhaps onerous for some operators - but the nature of the information requested is quite predictable. The important exception to this timeframe is where the project is proposed on forest land. In this case, separate procedures are in place, and the process can take 'years'. According to a Ministry of Mines official, forested lands are probably best avoided.

Water (Prevention and Control of Pollution) Act
Air (Pollution and Control of Pollution) Act

These two pieces of legislation describe the powers of the State Pollution Control Boards to manage compliance with prescribed air and water effluent standards.

Pursuant to these Acts, the PCBs issue "Consent to Establish" and "Consent to Operate" for new mining and other projects. As noted above, "Consent to Establish" is a prerequisite for the environmental assessment process. "Consent to Operate" is issued once environmental clearance is given. By law, the PCBs must take a decision on a project within four months of receiving a completed application, or else the application is automatically considered approved.

PCBs, in their capacity as regulators, are authorized to sample effluent, and otherwise to request information on effluent treatment or control systems being employed. The annual 'environmental statements' (see Environmental Protection Act) are submitted to the PCBs.

Forest (Conservation) Ad, 1980

The Forest (Conservation) Act provides for a different, and more rigorous, environmental protection process in the case of projects that would divert forested land for non-forest purposes. in fact, the strongly worded Act states, inter alia, that "no forest land shal be converted into non-forest activity for the sustenance of an industry". Development is also discouraged in a number of specified "ecologically sensitive" areas. Administered by MOEF (not the PCBs), applicants must justify use of forest land, and provide a cost-benefit analysis, impact statements, and a detailed reforestation scheme.

Some Observations and Trends

Environmental protection is well-rooted in India, and the legislative mechanisms to reduce pollution are established. That enforcement is not up to western standards is obvious to anyone who visits india. However, there is a willingness to shut down polluting industrial sites, and the regulatory agencies at the state and central levels are taken very seriously.

As in Canada, the mining industry is perceived as a major polluter. In fact, the greatest breaches of environmental law in the industry tend to occur at the many small mines in India. The larger producers continue to make significant investments in environmental management technologies and processes.

The manner in which environmental laws are administered has come under criticism from industry. At the regional seminars held during the Fall, 1994, three major issues were raised:

a) a separate "Consent to Establish" authority from Pollution Control Boards was seen to be unnecessary;

b) the 5 hectare trigger for environmental assessments is considered too small, and should be increased to 200 ha.; and

c) small mines should be exempt from the environmental assessment process if the investment is less than Rs. 500 million.

At time of writing, all three of these provisions remain in place. However, modest changes to the environmental assessment rules were announced in 1994 in the case of small-scale expansions of previously approved projects. Regulatory agencies at both levels of government are also very aware of the need to streamline processes in order to attract investment.

FINANCING

The Indian financial system features a large, publicly-owned banking system, supplemented by financial institutions which specialize in providing capital for industrial development. The stock market system has grown rapidly in recent years. There are now 19 recognized stock exchanges, of which the largest are in Bombay, Calcutta, Delhi, Madras and Ahmedabad.

The normal range of financing mechanisms in India are available to the foreign investor. These may include loans, share issues, or the issuing of debentures. In addition to the banks, the largest of which is the State Bank of India, other key financial institutions include the Industrial Development Bank of India (IDBI), the Industrial Finance Corporation of India (IFCI), the Industrial Credit and Investment Corporation of India (ICICI), and the Industrial Reconstruction Bank of India (IRBI).

Foreign banks also operate in India. At the time of writing, the Bank of Nova Scotia in Bombay and New Delhi is the only Canadian bank to have established an office in the country.

In Canada, the Export Development Corporation and the Industrial Cooperation Division of the Canadian International Development Agency (CIDA) both support private sector investment in India. CIDA Inc. (as it is known) provides funding for feasibility and pre-feasibility studies for Canadian companies that have established indian joint venture partners. Mining projects are eligible for this funding, along with other industries.

The Export Development Corporation (EDC) is Canada's most important financial institution for the promotion of Canadian exports. EDC has provided bans and insurance for Canadian projects in India valued at over C$700 million since 1960, including support for mining projects.

The EDC upgraded its position on India in 1993. According to "Focus India", it will provide support "on a selective basis, for medium to long term transactions, based on sovereign guarantees or guarantees from first class banks." Priority is given to projects which provide benefits to Canada, are commercially viable, and which do not require concessional financing. EDC will also insure against business risk in India.

Finally, a wide range of multilateral financial institutions maintain active portfolios in india. Among these are the International Finance Corporation (IFC) of the World Bank, the Asian Development Bank, the International Bank for Reconstruction and Development (IBRD), the Commonwealth Development Corporation.

SOCIO-ECONOMIC FACTORS

Working conditions and labour standards at Indian mines are governed by the Mines Act, 1952 as well as other labour legislation of general application. The legislation applies mostly to the larger, 'organized' sector of the economy where enforcement is feasible.

Most large organizations, including in the mining sector, are unionized. Collective bargaining is well established as a mechanism to set wages and working conditions.

Labour supply, of both skilled and unskilled workers, is excellent in India. Compensation in the mining sector is low by Canadian standards. In a recent settlement in the coal sector, basic monthly wages for unskilled labour were set at Rs. 1700 (about C$85). For the skilled trades, total compensation will average Rs. 5000 per month (about C$21 5) and up in labour contracts with the large mining companies. The compensation package typically includes an annual bonus equal to one-month's wages, contributions to pension ("provident") funds, cost of living allowances, and possibly provision of housing or a housing allowance. Severance payments equal to at least 15 days per year of service are also required by law.

Mine Health and Safety is regulated by the Directorate General of Mines Safety (DGMS), an agency of the Ministry of Labour. The relevant legislation is the Mines Act, 1952 (amended most recently in 1983). The DGMS is headquartered in Dhanbad, with regional offices throughout the mining areas in India. The Minister of Labour reported that 259 people died in mine accidents during 1992/93, and 310 during 1993/94. Total employment in mining and quarrying in 1992 (most recent data) is estimated at 1.09 million persons.

A notable feature of the Indian demographics is the existence of "scheduled tribes" and "scheduled castes". Public sector companies, including the mining companies, are required to reserve jobs for people from these disadvantaged groups. In addition, special efforts are made to employ people from villages that are displaced as a result of a mining operation. As an example, NALCO reports that displaced persons from the village of Damanjodi were provided with replacement houses at company expense, and that one person from each displaced family was offered direct employment with the Company.

CONCLUSIONS

"The country can expect exciting discoveries of minerals since intensive exploration campaigns involving State of the Art technologies, and modem management practises backed by large scale risk investments have not taken place so far in India. This has been particularly the case in a few deficient minerals which deserve to be focused. The minerals in question are diamonds, gold and copper."

O.P. Sachdeva, Controller General, indian Bureau of Mines, May 1995

The process of liberalization initiated in 1991 has opened the country to substantial private and foreign investment for the first time since the 1950's. The economic reforms have taken hold. International financial institutions congratulate india for the degree to which key financial indicators, such as the level of foreign exchange holdings, were turned around. That nearly 4000 new foreign collaborations have been approved since 1991 in a number of sectors of the economy is a sign of investor confidence.

For mining, the reform process has a shorter history than some other sectors. The policy framework was set in 1993, and the process of modernizing mining legislation continues. Thirteen minerals previously reserved for public sector companies are now open to foreign investment. Fifty per cent equity positions are automatic, thereby encouraging a joint venture approach with Indian partners.

Mining has a vital place in the economic development of India. The geology of the country is considered excellent for mineralization. Despite widespread geological mapping by the Geological Survey of india, industry observers state that advanced exploration methods could yield significant finds of base and precious metals.

More is required to bring the indian investment climate up to par with some major Western mining nations. Land access rules for prospecting are restrictive, and royalty rate structures are outdated. Bureaucratic requirements for information and approvals appear cumbersome, and certainly exceed those in Canada. Also, doing business in India will be very different for Canadian entrepreneurs not familiar with working in a developing nation.

However, the key point is that a process of change is underway. The indians are welcoming investment, and indications are that steps are being taken to address deficiencies in mining law and administration.

Equally relevant, other mining nations are taking note. Australian ministerial trade missions placed mining as a top priority during India visits in 1995. Memoranda of Understanding with Australian firms related to gold, diamond and base metal projects have been signed. In March, India and France signed a Memorandum of Understanding for gold and precious metal exploration in Karnataka. Canadian interest has been growing, if slowly.

Of course, mining investments are a long-term proposition. Potential investors would want to assess the Indian situation in detail, and draw their own conclusions. However, there is little doubt that mineral exploration and development in India is worth a serious look.

ANNEX I

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ANNEX 2

KEY CONTACTS IN INDIA

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1.	Federation of Indian Mineral Industries (FIMI), 301, Bakshi House,40-41 Nehru Place, New Delhi-110019.	Mr. R.K. Sharma, Secretary General, Tel.641 0786/6410078 Fax: 91-11-621-7004
2.	Federation of Indian Chamber of Commerce & Industry (FICCI), Federation house, Tansen Marg, New Delhi-1 10001.	Mr. Amit Mitra, Secretary General, Tel:3319251 Fax: 011331 5424
3.	Confederation 0f Indian Industry (CII) 23-26,Institutional Area, Lodi Road, New Delhi-1 100003.	Mr. Tarun Das, Director General & Secretary, Tel: 4621874 Fax: 4633168/4626149
4.	Associated Chambers of Commerce & Industry of India (Assocham), YMCA Cultural Centre, Jai Singh Road, New Delhi-1 10 001	Mr. V. Raghuraman, Secretary General, Tel: 344202
5.	Ail India Manufacturers Organisation (AIMO) 1-E/i 1, Jhandewalan Extension New Delhi- 110005	Mr. Surinder Anand, Secretary General Tel: 528848/527836 Fax: 01186179 (Bombay)

MAJOR PRODUCERS

1.	Bharat Aluminium Company Limited Aluminium Sadan, Core 6, 3rd Floor, Scope Office Complex Lodi Road,	Chairman : Mr. S.H. Azad Tel : 4360073 Fax : 91-11-4360018

2.	Bharat Gold Mines Limited, Suvarna Bhavan, Oogaum (KGF)- 563120 Karnataka	New Delhi -110 003 Chairman : Mr. P.A.K. Shettigar Tel : KGF 60274 Fax :081538-60330
3.	Coal India Ltd. 10, Netaji Subhas Road Calcutta 700 001	Chairman: Mr. P.K. Sengupta Tel. (033) 2209980 / 2207812 2207449 / 2208230
4.	Hindustan Copper Limited Industry house, 10 Camac Street, Calcutta - 700 017	Chairman: Mr. Ved Leekha, Tel : (033) 2426677/2425496 Fax : (033) 2429536/2427966
5.	Hindustan Zinc Limited 6, New Fatehpura, Udaipur -313001 Rajasthan	W. Bengal Chairman: Mr. A.C. Wadhawan Tel: 523854 Fax : (0294) 25765/26443
6.	India Aluminum Company Ltd. (INDALCO) 1 Middleton St. Calcutta 700 071 West Bengal	Vice Chairman & M.D. (CEO): Mr. Tapan Mitra Tel. (033) 402210, 247-0424 Fax: (033) 247-3808, 403694/401922
7.	Indian Rare Earths Limited, Sherbanno, 6th Floor, 111, Maharishi Karve Road, Bombay - 400 020 Maharashtra	Chairman: Mr. M.S. Nagar, Tel : 2054467, 2030914-15 Fax : (022) 2084430/2188021
8.	Kudremukh Iron Ore Co. Ltd., 11 Block, Koramangla Bangalore - 560 034, Karnataka	Chairman : Mr. A. Krishnamurthy Tel : (080) 76605
9.	Manganese Ore India Limited 3 Mount Road Extension PB 34, Nagpur - 440 001 Maharashtra	Chairman: Dr. M.P. Dewangan. Tel : 533205, Res. 533871
10.	Mica Trading Corporation of India Ltd. 137, Pataliputra Colony Patna - 800013 Bihar	Chairman : Mr. A.K. Srivastava, Tel : 3311461, 3310990 Fax : 3310884

11.	Mineral Exploration Corporation Limited Seminary Hills, Nagpur - 440 006 Maharashtra	Chairman : Mr. M. Kumar Tel : 522141-522143,5255213,53431
12.	Minerals & Metals Trading Corporation of India Ltd., Scope Complex, Core 1, Lodi Road, New Delhi - 110 003	Chairman: Mr. S.N. Malik Tel: 4362200 Fax: 011-4362077
13.	National Aluminium Company Limited IDCO Tower, Janpath, Bhubaneswar - 751 007 Orissa	Chairman : Dr. S.K. Tamotia Tel : 0674-404233, 405552 Fax: 0674-402713/407966
14.	National Mineral Dev. Corpn. Ltd. Khaniji Bhavan, 103-311 A, Masab Tank, Hyderabad, A.P.	Chairman : Mr. C.S. Mohan Tel : 222722, 222065 Fax : 91-040-222236
15.	Pyrites, Phosphates & Chemicals Ltd. 12-A, Sector 24, Noida - 201 301 Uttar Pradesh	Chairman : Mr. S.S. Gui Tel : 89-58892, 89-58893 Fax : 6469340 (New Delhi)
16.	Rashtriya Ispat Nigam Ltd., Visakhapatanam Steel Plant. Visakhapatanam - 560 034,	Chairman : Mr. B.N. Rath, Tel : 98302, 68702
17.	Steel Authority of India Limited, Ispat Bhavan, P.B. No. 3049 Lodi Road, New Delhi - 110003	Chairman : Mr. M.M. R. Nair, Tel : 469-0481 Fax : 469-4015
18.	Tata Iron and Steel Co. Ltd. (TISCO) 43 Chowringee Rd. Calcutta - 700 071 West Bengal	Executive-in-Charge Mr. V.S. Rao Tel. (033) 247-7540, 247-7051 Fax: (033) 247-6993/7290
19.	Uranium Corporation of India Ltd. P.O. Jaduguda Mines, Dist. Singhbhum - 832 102 Bihar	Chairman: Mr. J.L. Bhasin Tel : 065773-348 Fax : 065773-322

SELECTED STATE GOVERNMENT ENTERPRISES

1.	Andhra Pradesh Mineral Development Corporation Ltd . "Khanijadhara" Pancom Business Centre, 2nd & 3rd Floors, 8-3-945, Ameerpet, Hyderabad - 500 016 Andhra Pradesh	Shrimati Chandana Khan Vice Chairman & Managing Director Tel: 30155, 30152 Fax: 091-842-30152
2.	Bihar State Mineral Development Corporation Ltd. Raj Hotel Building, Main Road, Ranchi - 834 001 Bihar	Mr. Shaligram Mahto, Chairman- Cum-Managing Director Tel: (0651) 306455
3.	Madhya Pradesh State Mining Corporation Ltd. E-S/i 4, Area Colony Ravishankar Nagar, Bhopal - 462 016 Madhya Pradesh	Mr. P.S. Tomer Managing Director, Tel: (0755) 553 504
4.	Mysore Minerals Ltd. 39, Mahatama Gandhi Road, Bangalore - 560 001 Karnataka	Mr. T. Narayana, Technical Director, Tel: (080) 5583275 Fax: 00-91-080-5583172
5.	Maharashtra State Mining Corporation Ltd. 5; Abhayankar Marg, Nagpur - 440 010 Maharashtra	Mr. V.A. Soitkar Managing Director Tel: (0712) 522875, 526419, 533101
6.	Orissa Mining Corpn. Ltd. P.O. Box No. 34 Bhubaneswar - 751 001	Mr. Ujal Singh Bhatia Chairman- Cum-Managing Director Tel: (0674) 52295, 51913, 50777
7.	Rajasthan State Mines & Minerals Ltd. 4, Meera Marg, Udaipur - 313 001 Rajasthan	Mr. G.D. Sharma Director Tel: (0294) 2720 (Off), 23346 Fax: 0294-23170

8.	Rajasthan State Mineral Development Corpn. Ltd. Udyog Bhavan, Tilak Marg, Jaipur - 302005 Rajasthan	Mr. R.K. Mundra, Chief Mining Engineer Tel: 3809338 Ext. : 266 Fax: 91-141-380148
9.	Hutti Gold Mines Co. Ltd. P.O. Hutti, 584 115 Via Raichur, Karnataka	Mr. B. Eswarappa, Managing Director Tel:(08532) 565529, 567540, 565422
10.	Kerala Minerals & Metals Ltd. P.O. Box No. 30, Quilon 691 001 Kerala	Mr. M.Mohan Kumar, Chairman, Shri T.G. Rajendran, Managing Director Tel: (027147)67586,4117,3724
11.	Singareni Collieries Co. Ltd. Meher Manzil Khairathabad, Hyderabad - 500 004 Andhra Pradesh	Mr. P.P. Williams, IAS Chairman-Cum-Managing Director Tel: 040-33746, 229638
12.	West Bengal Mineral Development & Trading Corporation Ltd. 13, Lindsay Street, Calcutta - 700016, W.B.	Mr. B.N. Neogi, Managing Director Tel: (033) 243819, 247376