GOVERNMENT OF INDIA
MINISTRY OF MINES

ANNUAL REPORT
2000-2001

MINISTRY OF MINES

Web Site Address: www.nic.in/mines

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CHAPTER I

HIGHLIGHTS OF 2000-2001

MINERAL LAW AND POLICY

1.1 The process of achieving the objectives of the National Mineral Policy, 1993 was continued during the year. Mines and Minerals (Development & Regulation) Act, 1957 was amended and notified on 20.12.99, which delegates more powers to the State Governments. Consequential amendments in Mineral Concession Rules (MCR), 1960 and Mineral Conservation and Development Rules (MCDR), 1988 were notified in the Gazette of India on 18.1.2000. Further amendments in MCR, 1960 and MCDR 1988 declaring 29 non-metallic and industrial minerals for which powers of approving mining plan (for open cast mines) have been given to State Governments and guidelines for calculating royalty on minerals, etc. were notified on 25.9.2000.

1.2 The steps taken to liberalise the mining sector following the National Mineral Policy, 1993 were continued to consolidate the ongoing process. Amendment in the MMDR Act 1957 introduced the concept of reconnaissance operations as a stage distinct from and prior to actual prospecting operations. This has made investments in the state-of-the-art technologies in mineral explorations more attractive. The policy changes have attracted many multinational companies for investment in exploration of base-metals, noble metals and other scarce minerals. Reconnaissance permits in 42 cases involving an area of about 53,000 sq km. have been approved upto February, 2001.

1.3 Revised rates of royalty for major minerals (other than coal, lignite and sand for stowing) have been notified in the Gazette of India on 12.9.2000.

1.4 The second meeting of the reconstituted Mineral Advisory Council was held on 30.8.2000 to discuss various issues regarding mineral policy and legislation, exploration of minerals in land and off-shore areas, production and internal distribution of minerals, human resource development in the minerals sector, export/import of minerals, fiscal issues etc. Follow-up action on the recommendations made in the meeting of Mineral Advisory Council is in progress.

1.5 A Multi-Disciplinary Committee appointed for suggesting an appropriate tax structure conducive to rapid development of minerals and mineral based industries in the country has submitted its recommendations to the Ministry of Mines. The acceptance of these recommendations has been conveyed to Ministry of Finance for further action at their end.

1.6 An Expert Committee constituted under the Chairmanship of Principal Secretary, Industries & Commerce Department of the State Government of Andhra Pradesh had earlier suggested upward ceilings of royalty rates and dead rent for Granite. State Governments were requested to incorporate the same in their respective Minor Mineral Concession Rules (MMCRs). The said Committee had also recommended some structural changes in the taxation regime for the granite sector. Granite Development Council constituted by the Ministry is examining these recommendations.

1.7 To fulfil a felt need of the marble industry, the Ministry of Mines has constituted a Group on

Marble Development is September, 1999 with a view to look into the various problems related to mining, value addition and exports, etc. of marble and suggest appropriate measures to overcome bottlenecks affecting this industry. This Group is working under the overall guidance and supervision of the Granite Development Council. Deliberations pertaining to Marble industry are in progress in the Group.

MINERAL DEVELOPMENT

2.1 The index of mineral production (base 1993-94 = 100) for the year 2000-2001 is estimated to be 130.03 as compared to 126.79 for 1999-2000, showing a positive growth of 2.5 per cent. The total value of mineral production (excluding atomic minerals) during 2000-2001 is estimated to be Rs. 55,042 crore, which shows an increase of 22 per cent over that of the previous year. During 2000-2001, fuel minerals have accounted for Rs. 46,844 crore or 85 per cent, metallic minerals, Rs. 3,608 crore or 7 per cent and non-metallic minerals (including minor minerals) Rs. 4,590 crore or 8 per cent of the total value. Data on production of selected minerals from 1996-97 to 2000-2001 is appended as **Annex-I.**

2.2 The value of export of ores and minerals during 1998-99 was Rs. 24,622 crore. Diamond (mostly cut) was the principal item of the export during 1998-99 which accounted for 81 per cent followed by iron ore with a contribution of 7 per cent, granite 4 per cent and precious and semi-precious stones 3 per cent. Chromite, Alumina and emerald were the other important minerals exported during the year 1998-99. Data on export of ores and minerals during 1994-95 to 1998-99 is presented at **Annex-II.**

2.3 The value of import of ores and minerals during 1998-99 was Rs. 37,349 crore. Diamond (uncut) was the main constituent of mineral imports during 1998-99, which accounted for 42 per cent of the total value of import of ores and minerals followed by petroleum (crude) with 40 per cent. Coal, rock phosphate and copper ores & concentrates were the other important minerals imported during 1998-99. Data on import of ores and minerals during 1994-95 to 1998-99 is presented at **Annex-III.**

PUBLIC SECTOR UNDERTAKINGS

3.1 In conformity with Government policy to balance the autonomy of PSUs commensurate with accountability and to set mutually acceptable targets, Memoranda of Understanding (MOU) were signed for 2000-2001 with National Aluminium Company Limited (NALCO), Bharat Aluminium Company Limited (BALCO), Hindustan Zinc Limited (HZL), Hindustan Copper Limited (HCL) and Mineral Exploration Corporation Limited (MECL). Greater autonomy is expected to result in quicker decision making, enhancing efficiency and increasing productivity of the MOU signing PSUs.

3.2 National Aluminium Company Limited (NALCO) had a turnover of Rs. 2142.32 crore and a net profit of Rs. 681.00 crore (PBT) during 1999-2000. Implementation of the project for expansion of capacity of NALCO's Aluminium Smelter from 2,30,000 tpa to 3,45,000 tpa is running on schedule. Expansion of NALCO's Captive Power Plant at Angul from 720 MW to 840 MW is likely to be completed by August, 2002. The project for expansion of bauxite mines from 2.4 million tpa to 4.8 million tpa and of Alumina Refinery from 0.8 million tpa to 1.575 million tpa, both at Damanjodi, is also progressing as per schedule.

3.3 Bharat Aluminium Company Limited (BALCO) had a sales turnover of Rs. 896.64 crore and earned a profit of Rs. 116.19 crore (PBT) in 1999-2000. The project for setting up of new Cold Rolling Mill is under implementation by the Company and is expected to be commissioned by June, 2001.

3.4 Hindustan Zinc Limited (HZL) had a sales turnover of Rs. 1515.15 crore and earned a profit of Rs. 182 crore (PBT) during 1999-2000. The Government has approved setting up of a 1,00,000 tpa greenfield Zinc Smelter plant by

HZL at Kapasan, Chittorgarh Distt. Rajasthan at an estimated cost of Rs. 1203.75 crore. The plant is expected to be completed in 48 months from the date of completion of the disinvestment process of HZL. The Company has been authorised to incur an expenditure of Rs. 9.97 crore during 2000-2001 for acquisition of land, etc. The rest of the expenditure will be incurred after completion of disinvestment process of HZL. The project will be funded by internal resources of the Company and the borrowings. Despite declining trend of LME prices in lead and zinc, HZL achieved a sales turnover and profit before tax during the period April-December, 2000 of Rs. 1183.65 crore and Rs. 201.00 crore respectively.

DISINVESTMENT

4.1 The Government decision regarding disinvestment of 51 per cent equity of BALCO to a strategic partner has been implemented. The Govt. received Rs. 551.5 crore from the transaction. In case of HZL the decision to disinvest 26 per cent of HZL's equity to a strategic partner with an appropriate role in management is also under implementation. In Phase I of the proposed disinvestment in HCL, the Khetri unit of HCL along with Taloja Plant will form a separate Company. The assets of the unit are being valued, which will constitute 49 per cent contribution from HCL in a new Company. The remaining equity in the new Company will be from a strategic partner. Process of disinvestment is under progress in HCL.

INTERNATIONAL CO-OPERATION

5.1 During the year 2000-2001 the Foreign Investment Promotion Board approved 7 proposals involving Foreign Direct Investment to the tune of Rs. 230 crore.

5.2 The first meeting of the India-Australia Joint Working Group on Energy and Minerals was held in Sydney, Australia on 10.4.2000. This Joint Working Group was set up in pursuance of the decision of the sixth meeting of the India-Australia Joint Ministerial Commission held in February, 1999. The meeting of the Joint Working Group adopted Terms of Reference for future work and enabled both sides to develop a better understanding of each other's energy and mineral supply and demand situation and future policies.

5.3 The 14th meeting of the Indo-French Working Group on Mineral Exploration and Development was held at Paris, France on 8-9.11.2000. The Working Group meeting reviewed the ongoing projects and also identified and prioritised nine new projects for future cooperation. At the end of the Working Group Meeting a Protocol was signed on 9.11.2000.

5.4 The 10th India-Vietnam Joint Commission Meeting was held in Hanoi on 6–8.11.2000. Both sides agreed to extend the Memorandum of Understanding for cooperation in the field of geology and mineral resources signed on 18.4.1994, for a further period of three years.

5.5 The 7th Session of the Indo-Russian Working Group on Ferrous and Non-Ferrous Metallurgy was held in Moscow on 10–11.01.2001. The protocol signed at the conclusion of the Working Group Meeting envisages strengthening cooperation in the ferrous and non-ferrous metallurgical sectors.

GEOLOGICAL SURVEY OF INDIA

6.1 Survey

- Specialised Thematic studies in 2086 sq km have been undertaken.
- Multi-sensor survey of 18,455 line km and Aerogeophysical Data Processing of 20,350 line km has been conducted.

6.2 Mineral Investigation

- 415 million tonne of coal in parts of Orissa, Madhya Pradesh and West Bengal.
- 30 million tonne of lignite from Gujarat.
- 3.65 million tonne of lead-zinc ore with grades from 4.60 to 4.84 per cent in Rajasthan.

- 2257 million tonne of limestone (cement, B.F., SMS, LD and chemical grades) estimated in Litang valley of Meghalaya and Porbandar, Junagadh districts of Gujarat.

6.3 Specialised Investigations

- 159 sponsored investigations conducted for providing geotechnical support to civil engineering projects for water resources development, communication (road, bridge, tunnel etc.) and miscellaneous construction projects.

NATIONAL MINERAL AWARDS

7.1 National Mineral Awards are presented every year to scientists and technologists working in the field of earth sciences for striving towards excellence.

7.2 National Mineral Awards for 1999 were presented by Minister of Mines to 29 outstanding recipients in their respective fields at a function held in New Delhi on 16.1.2001.

OTHER EVENTS

8.1 Ministry of Mines has participated in relief work in earthquake affected areas of Gujarat through HZL incurring an expenditure of about Rs. 50 lakh. NALCO has contributed an amount of Rs. 150 lakh to Prime Minister's National Relief Fund towards earthquake relief in Gujarat. BALCO has provided relief material to earthquake victims by incurring an expenditure of Rs. 40 lakh. GSI has provided about 250 tents for this cause.

8.2 Personnel of the Ministry, its subordinate offices and PSUs have also contributed about Rs. 110 lakh to the Prime Minister's National Relief Fund from their salaries for the purpose.

Shri Sunder Lal Patwa, Hon'ble Minister of Mines inaugurating National Mineral Award Ceremony in New Delhi on 16.1.2001

CHAPTER II

ROLE AND ORGANISATION OF MINISTRY OF MINES

(www.nic.in//mines)

MAIN FUNCTIONS

1.1 The Ministry of Mines is responsible for survey and exploration of all minerals, other than natural gas, petroleum and atomic minerals; for mining and metallurgy of non-ferrous metals like aluminium, copper, zinc, lead, gold, nickel etc. and for administration of the Mines and Minerals (Development and Regulation), Act, 1957 in respect of all mines and minerals other than coal, natural gas, petroleum and atomic minerals. A list of subjects allocated to the Ministry of Mines and Subordinate Offices, Public Sector Undertakings and Research Institutions under the administrative control of Ministry of Mines is given at Table I & II respectively.

ORGANISATIONAL STRUCTURE

2.1 Headed by a Secretary, the Ministry of Mines comprises an Additional Secretary, two Joint Secretaries, one Joint Secretary & Financial Adviser common for both the Ministry of Coal and the Ministry of Mines, six Directors, four Deputy Secretaries (two posts have been upgraded under in-situ promotion); three Under Secretaries, one Deputy Director (Official Language), three Principal Private Secretaries, one Junior Scientific Officer, fifteen Section Officers, six Private Secretaries, one Assistant Librarian and Information Officer and one Assistant Director (Official Language). Besides this, the Ministry has a technical wing comprising one Industrial Adviser, one Additional Industrial Adviser, one Development Officer and two Assistant Development Officers. The total number of sanctioned posts for the Secretariat of the Ministry of Mines is 52 Gazetted and 198 Non Gazetted posts. In addition, there is a Chief Controller of Accounts common for both Ministry of Steel and Ministry of Mines assisted by a Pay and Accounts Officer and 35 Non Gazetted staff in the Pay & Accounts Office.

TABLE I

LIST OF SUBJECTS ALLOCATED TO THE MINISTRY OF MINES

1. SUBJECTS ALLOCATED

- Legislation for regulation of mines and development of minerals within the territory of India, including mines and minerals underlying the ocean within the territorial waters or the continental shelf, or the Exclusive Economic Zone and other Maritime Zones of India as may be specified from time to time by or under any law made by Parliament.
- Regulation of mines and development of minerals other than coal, lignite and sand for stowing and any minerals declared as prescribed substances for the purposes of the Atomic Energy Act, 1962 (33 of 1962) under the control of the Union as declared by law, including questions concerning regulation and development of minerals in various States and the matter connected therewith or incidental thereto.
- All other metals and minerals not specifically allotted to any other Ministry/Department such as aluminium, zinc, copper, gold, diamond and nickel.
- Planning, development and control of and assistance to all industries dealt with by the Ministry.

2. SUBORDINATE OFFICES

Out of the three subordinate offices under the Ministry at present office of the Controller of Mining Leases will be closed on 1.3.2001. Geological Survey of India (GSI) with its headquarter at Kolkata and Indian Bureau of Mines (IBM) with its headquarter at Nagpur are other two subordinate offices.

3. PUBLIC SECTOR UNDERTAKINGS (PSUs)

There are five PSUs and two Joint Venture Companies under the Ministry of Mines. They are :

- National Aluminium Company Limited (NALCO), Bhubaneswar;
- Bharat Aluminium Company Limited (BALCO), New Delhi;
- Hindustan Zinc Limited (HZL), Udaipur;
- Hindustan Copper Limited (HCL), Kolkata;
- Mineral Exploration Corporation Limited (MECL), Nagpur;
- Bharat Gold Mines Limited (BGML), Kolar Gold Fields (Karnataka);
- Sikkim Mining Corporation (a Company jointly owned by the State Government of Sikkim and the Central Government)

4. RESEARCH INSTITUTIONS

There are three Research Institutions under the Ministry of Mines. They are :

- Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDC), Nagpur;
- National Institute of Rock Mechanics (NIRM), Kolar; and
- National Institute of Miners' Health (NIMH), Kolar.

TABLE II

ORGANISATION UNDER MINISTRY OF MINES

SURVEY AND EXPLORATION	REGULATION AND CONSERVATION	MINING AND PROCESSING
1. Geological Survey of India : Regional exploration, geological mapping, surveys on land, sea and airborne surveys and priority assignments to GSI. 2. Mineral Exploration Corporation Ltd. : MECL is responsible for detailed exploration of various minerals/ ores by drilling and exploratory mining and proving reserves for their eventual exploitation.	1. Indian Bureau of Mines : Engaged in promoting conservation and development of mineral resources of the country.	1. Bharat Aluminium Company Ltd. : Incorporated on 27.11.1965 with an integrated Alumina/ Aluminium Complex at Korba in Chhattisgarh. The Company has 49% Govt of India equity. 2. Bharat Gold Mines Ltd. : Incorporated on 22.03.1972 to own and manage the mines at Kolar Gold Fields (Karnataka) w.e.f. 1.04.1972. 3. Hindustan Zinc Ltd. : Incorporated on 10.01.1966 after the Government of India took over erstwhile Metal Corporation of India to own, manage and develop the mineral and smelting capacities for the strategic zinc and lead metals in the country. 4. Hindustan Copper Ltd. : Incorporated in November, 1967, it is presently the sole indigenous producer of primary copper in the country. 5. National Aluminium Company Ltd. : Incorporated on 7-1-1981 to implement the Bauxite-Alumina-Aluminium Project in Orissa. 6. Sikkim Mining Corporation (in which Central Government has 49 per cent equity participation) : It produces polymetallic ore which is treated in the concentrator plant producing copper, lead and zinc concentrates.

CHAPTER III-A

SURVEY AND EXPLORATION

GEOLOGICAL SURVEY OF INDIA

(www.gsi.gov.in)

INTRODUCTION

1.1 The Geological Survey of India (GSI) is a premier National Scientific Survey and Research Organisation and is also the principal provider of basic earth science information to the Government, industry and the general public, as well as responsive participant in international geoscientific fora. It is an agency known for high credibility of its information base and publications, nationally and internationally.

MINERAL EXPLORATION

2.1 Target for the year 2000-2001 (April, 2000 to March 2001) and the achievements for the period April, 2000-March 2001 (upto December, 2000) and performance during the last two previous years are indicated in tables 1, 1.1 and 1.2 and figures 1,2 and 3.

SURVEY PROGRAMMES

3.1 A coverage of 2900 sq km was achieved against a total target of 1280 sq km. Systematic

Gold Investigation in Sonbhadra district, UP. Native Gold (0.5 mm) in Borehole core in Gurhar Pahar Area.

TABLE I

PERFORMANCE DURING 2000-2001

Sl. No.	Name of the Scheme/ Project/Programme	Programme target 1998-99	Achievement for the period April '98 to March '99	Programme Target 1999-2000	Acheivement for April '99 to March 2000	Programme target 2000-01	Achievement for April '00 to Dec. 2000
I	MINERAL EXPLORATION						
(i)	Large Scale Mapping (sq km)	4500	3789.01	1774.97	2240.41	1885.07	1152.67
(ii)	Detailed mapping (sq km)	60	66.00	46.38	55.721	39.98	23.783
(iii)	Drilling (meter)	1,15,000	85,416.36	1,03,894.00	87,556.70	99,760.80	65,799.59
II	SURVEY & MAPPING						
(a)	Ground Survey						
(i)	Syst. Geol. Mapping (sq km)	4000	824.00	2160.00	1849	1280	2900
(ii)	Spl. Thematic Mapping (sq km)	7600	6585.50	5764.60	6327	7113	2086
(b)	Aerial Survey						
(i)	Multisensor/Aeromagnetic Survey (with Twin Otter) lkm	11,000	*	18,000	6877.77	28,000	18,455
(c)	Marine Survey						
(i)	EEZ mapping (sq km) (R.V. Samudra Manthan)	+	+	+	+	+	+
(ii)	Territorial waters (coastal launches) (sq km)	3800	3455	4300	3960	4400	4483

*Upgradation of Twin Otter Aircraft

+ Parametric studies were carried out. Data presented in Tables 1.1 and Table 1.2

TABLE 1.1

Coverage by R.V. Samudra Manthan

	(I) Parametric Studies carried within EEZ	Target (1998-99)	Achievement (1998-99)	Target (1999-2000)	Achievement (1999-2000)	Target (2000-01)	Achievement April 2000 to Dec. 2000
(a)	Bathymetry (lkm)	6700	2694	14510	13,839	8,242	1943
(b)	Magnetic (lkm)	5800	1520	4000	3287	5582	1943
(c)	Sample Station nos. (grab/core/ dredge/water)	578	449	807	717	1274	502
(II)	Parametric Studies beyond EEZ						
(a)	Bathymetry (lkm)	4113	3434	640	640	–	–
(b)	Magnetic (lkm)	4235	3434	–	–	–	–
(c)	Sample Stations (nos.) (grab/core/dredge/water)	30	04	50	29 from 50 stns.	–	–

TABLE 1.2

Coverage by Coastal Launches

	(II) Parametric Studies carried within T W	Target (1998-99)	Achievement (1998-99)	Target (1999-2000)	Achievement (1999-2000)	Target (2000-01)	Achievement April 2000 to Dec. 2000
(a)	Bathymetry (lkm)	2320	2623	2488	2449	2415	1101.2
(b)	Shallow solemic/sub-botton (lkm)	1951	1749	1696	1207	2888	831.01
(c)	Magnetic (lkm)	470	115	340	–	1210	–
(d)	Side Scan Sonar (lkm)	434	375	398	323	448	110.55
(e)	Sample Station nos. (grab/core/water)	699	705	745	593	1289	464
(f)	Current observations (nos.)	31	34	26	25	52	24

geological mapping was carried out in parts of East & West Kameng district, Arunachal Pradesh with an objective to build up lithostratigraphy and regional correlation. In the mapped area, three formations of the Siwalik Group namely (i) the upper Siwalik, (ii) the middle Siwalik and (iii) the lower Siwalik and rocks having affinity to the Permian Gondwana have been identified. A number of sedimentary depositional structures have been noticed and recorded in the area from the rocks of Siwalik Group. Fossil impressions of plant leaves and doubtful seeds/fruits have also been found in these rocks. The rocks of Permian Gondwana affinity are exposed over upper Siwalik rocks with a thrusted contact.

3.2 Multidisciplinary specialised thematic studies covering 2086 sq km have been under taken with a view to resolving problem related to stratigraphy, structure and tectonics, ore localisation and conceptual modelling on various aspects including crustal evolution and metallogeny.

3.3 Multisensor Surveys were carried out covering 18,455 line kilometre (lkm) over Raichur-Narayanpet area, Karnataka and Andhra Pradesh to aid exploration for hidden kimberlite pipes and over Hungund area of Karnataka.

3.4 Processing of aerogeophysical data was carried out in the Geophysical Mapping Centre (GMC) of AMSE for generation of total intensity magnetic maps, electromagnetic contour maps and elemental distribution maps for U, Th, K and their total count. Data processing of about 20,350 line km over Raipur and Betul area was completed.

3.5 About 6929 lkm bathymetric and 3287 lkm magnetic surveys were carried out along with collection of 717 seabed samples in five cruises of R. V. Samudra Manthan. The surveys involved geochemical scan for hydrocarbons in the Tapti–Daman offshore sector of Arabian Sea, survey for micro-manganese nodules around Lakshwadeep, parametric survey for OTEC off Krishnampatnam, late Quaternary chrono-stratigraphy of the seabed of Bay of Bengal, west of Andaman & Nicobar Islands including geochemical scan for hydrocarbons and seabed surveys in the northern sector within the EEZ off north Andaman Island. About 640 lkm of bathymetric survey was carried out along with collection of 5 gravity cores and 24 grab samples under the Carlsberg Ridge project in the Indian Ocean. Additional data on bathymetry were collected from Arabian Sea and from west of Andaman in two cruises. Under "Legal Continental Shelf" programme, to delineate the 'Foot of the Slope' (FOS) and 2500m isobath, a total of 6910 lkm bathymetric survey has been carried out.

3.6 R.V. Samudra Kaustubh undertook two cruises for mapping of the seabed within the territorial waters covering an approximate area of 2480 sq km off Andhra and Ganga Delta, West Bengal coasts. About 783 lkm bathymetric, 379 lkm seismic, 24 lkm side-scan sonar survey and 206 samples were collected during the above two cruises. Besides about 1452 lkm bathymetry, 489 lkm seismic, 169 lkm side scan surveys and 189 samples were collected in six cruises. These included two cruises for placer mineral, two cruises under geotechnical investigations and one cruise each for engineering survey in KG offshore and OCEANSAT-1 programme. In addition to the above, 43 lkm magnetic and seismic surveys along with 5 gravity cores were collected under IGCP-396 project. Besides 84 lkm each of bathymetry and seismic survey, 21 samples were collected for preparation of sea level curve.

3.7 R.V. Samudra Shaudhikama undertook two cruises for mapping of seabed within territorial waters off south Gujarat coast and off Tamil Nadu coast covering an approximate area of 1480 sq km. About 394 lkm bathymetric, 367 lkm seismic and 169 samples were collected during the above cruises. Besides, about 997 lkm bathymetric, 718 lkm seismic, 154 lkm side scan sonar survey and 285 samples were collected in four cruises of R.V. Samudra Shaudhikama. These included one cruise for parametric survey, two cruises for geotechnical appraisal and one cruise for delineation of palaeostrand line and study of late Quaternary sea level changes of south Kerala

coast. Cruise SD-157 slated for preparation of special charts had to be modified to accommodate NIOT sponsored Pipavav pipeline project in Gulf of Khambhat.

3.8 Seabed mapping in the nearshore shallow water zone up to 5m water depth for geotechnical and environmental investigations of three projects were undertaken by mechanised boat. About 145 lkm bathymetry and 181 samples were collected.

MINERAL SEARCH AND EVALUATION

4.1 In connection with the mineral investigation and evaluation 1152.67 sq km of large scale mapping, 23.783 sq km of detailed mapping and 65,799.59 m of drilling were done.

4.2 Coal and Lignite

4.2.1 Additional reserves of 415 million tonne of coal and 30 million tonne of lignite have been assessed from the data generated by regional exploration in the states of Orissa, Madhya Pradesh, West Bengal and Gujarat.

4.3 Lead and Zinc Ore

4.3.1 1.75 million tonne of lead (Pb)-zinc (Zn) ore with an average grade of 4.60 per cent Pb + Zn in Latio-ka-Khera East block, Dariba-Bethumbi Belt, Rajasthan.

4.3.2 1.90 million tonne of lead-zinc ore with an average grade of 4.84 per cent Pb + Zn in Sindesar Khurd area of Dariba-Bethumbi Belt, Rajasthan.

4.4 Gold Ore

4.4.1 4.86 million tonne of gold ore with an average grade of 1.90 g/t Au down to a depth of 180 m in Dona East Block, Andhra Pradesh.

4.4.2 0.09 million tonne of gold ore with an average grade of 2.96 g/t Au in Bhukia East Block, Banswara district, Rajasthan.

4.4.3 3.27 million tonne of gold ore with an average grade of 1.04 g/t Au in Gurhar Pahar Block, Sidhi district, Madhya Pradesh.

4.4.4 0.024 million tonne of gold (Au) ore with an average grade of 13.36 g/t Au in Kottathara block, Attapady valley, Kerala.

4.5 Rare Earth Elements

4.5.1 79583 tonne of rare metal bearing pegmatite with 0.51 per cent Caesium (Cs) at 0.1 per cent cut-off at Beku, in Purulia district, West Bengal. The mineralised pegmatite is enriched in lithium and rubidium. The reserve of lithium (Li) rich pegmatite is 36660 tonne with 0.65 per cent Li at 0.5 per cent cut-off grade. 1233 tonne of the pegmatite contains 0.52 per cent rubidium (Rb).

4.5.2 Rhenium (Re) has been recorded along with molybdenum (Mo) in Harur-Uttangarai belt, Tamil Nadu, and analysis of 20 samples indicated average 5.2 ppm Re with a maximum of 8.3 ppm in one sample.

4.6 Manganese Ore

4.6.1 0.48 million tonne of Manganese (Mn) ore with grade varying between 22 per cent and 35 per cent Mn from three blocks in Bolangir district, Orissa.

4.7 Diamond

4.7.1 Processing of 481 tonne of material from Anumpalle pipe (A.P), yielded fourteen diamonds with a total weight of 2.38 carat. In addition a satellite kimberlite body yielded four diamonds weighing 0.66 carat by processing 75 tonne of material.

4.7.2 20 lamproite bodies, probable host rock for diamonds, were delineated from seven localities of Krishna district, Andhra Pradesh. A total of eight satellite pipes were identified within a spread of over one kilometer in the granite terrains of Gulbarga, Raichur and Chitradurga districts, Karnataka.

4.8 Bauxite

4.8.1 Preliminary assessment of resources of bauxite within laterite capping of Rajpura, Ratnagiri district, Maharashtra, indicate presence of grey

bauxite beneath 3 to 5 m thick laterite capping. Two blocks namely Kumbhawade and Kahaderi appear promising, where 1 to 3 m thick bauxite zone extends over a scarp length of 800 m and over an area of about 2 sq km. The bauxite is gibbsitic.

4.9 Emerald

4.9.1 Emerald mineralisation has been recorded from the contact zone of ultramafic bodies and pegmatite/leucogranite between Bargulla and Veenu Bhagal, Rajsamand and Udaipur district, Rajasthan.

4.10 Limestone

4.10.1 2137 million tonne of limestone in the Litang River Valley area, Meghalaya.

4.10.2 120 million tonne of cement grade limestone at Sheriyakhan, Inaj, Shepa and Rinvada in Porbandar and Junagadh districts, Gujarat, of which 68 million tonne is of chemical grade, containing 52.5 per cent Ca0.

4.11 Molybdenum

4.11.1 In Marudipatti Central and North blocks, boreholes intersected mineralised shear zone at anticipated depths with Mo grade varying from 80 ppm to 0.022 per cent.

4.12 Iron Ore

4.12.1 Exploration for iron ore deposits within the IOG of Sundargarh and Kennujhar districts, Orissa, has been completed in 1999-2000. Boreholes were drilled in Jumka-Pathiriposhi Pahar, Paharu Pahar and Kedeshala areas, lying on the eastern limb of the Horse-Shoe syncline, on 200 m $\times$ 200 m grid. The boreholes met with massive ore, hard laminated ore, limonitic ore and blue dust. The average grade of ore is around 62 per cent Fe.

4.13 Clay

4.13.1 200 million tonne clay at Palai block, Kasargod district, Kerala, suitable for textile, paper-coating, insecticides, rubber and ceramic industries.

4.14 Dimension Stone Granite

4.14.1 42.97 million cu.m dimensional stone at Mawsaw and Nonglwai in South Khasi Batholith in Meghalaya.

4.14.2 40,000 cu.m. dimensional stone around Adoni in Kurnool district, Andhra Pradesh.

SPECIALISED INVESTIGATIONS

5.1 Geotechnical

5.1.1 Geological studies were undertaken towards effective planning and execution of 159 civil engineering investigations for water resource development, communication and transportation and various civil constructions. Some of the important projects include Thein Dam (Punjab), Naptha-Jhakri (Himachal Pradesh), Tehri (Uttaranchal) and Ranganadi (Arunachal Pradesh). Several programmes were undertaken for rational management and mitigation of natural hazards such as earthquake, landslides and floods. The publication of Seimsmotectonic Atlas of India is dedicated to the international Decade for Natural Disaster Reduction. It would be a valuable document for planning and execution of pre-disaster initiatives and strategies for mitigation including seismic design of structures by all developmental agencies. Other significant achievements include (i) submission of final report on Chamoli earthquake, (ii) installation of Broad Band Seismic station at Jabalpur, (iii) completion of preliminary work and site preparation for the Khandwa Telemetred Seismic Network.

5.2 Environment

5.2.1 A total of 47 items of Geoenvironmental Appraisal studies have been taken up. The most significant are :

(i) Regional Geoenvironmental Appraisal of 17 districts, with identification of environmental hazards like water logging, gully erosion, water scarcity, overdraft of groundwater, soil alkalinity, salinity etc.

(ii) Regional as well as site and theme specific geoenvironmental studies for Asansol-

Durgapur area of West Bengal, Nongpo and Byrnihat towns of Meghalaya, Iron ore mines of Goa and Coimbatore and Salem towns of Tamil Nadu.

(iii) Geoenvironmental impact assessment of marble mining areas of Makrana, Rajasthan, and lignite mine areas of Mata-no-madh and Panandhro, Kachchh district, Gujarat.

(iv) Public health hazard like arsenic incidence in ground water in West Bengal and Rajnandgaon district of Madhya Pradesh.

5.3 Dovemap

5.3.1 As a part of Integrated Natural Resources Surveys for rural Development, 232 villages were covered in Assam, Meghalaya and Tripura under DOVEMAP (Development of Village Economy through Mineral Appraisal) project generating multithematic maps on cadastral base.

5.4 Seismotectonics

5.4.1 Highlights of work carried out during the period include (i) submission of final report on Chamoli earthquake of 29.3.1999, (ii) installation of Broad Band Seismic Station at the permanent site on Madan Mahal Granite, Jabalpur, (iii) completion of preliminary work and site preparation for Khandwa Telemetered Seismic Network, (iv) Seismotectonic Atlas in 42 sheets covering entire India and adjoining areas of bordering countries has been published (v) opening up of two new units for seismotectonic and seismological studies at Faridabad and Nagpur and (vi) agreement with DST for installation of four permanent GPS stations by GSI.

LABORATORY AND RESEARCH

6.1 Rb-Sr isochron age of 1071 + 83 Ma from basic granulites of Uslampatti, Madurai-first time Grenvillian event has been noticed in the southern granulite terrain.

6.2 The significant findings its of medusoid genera e.g. Cyclomedusoa davidi, Medusinites asteroides, Ediacaria flindersi etc. characteristic the Ediacaran stage (620-600Ma) from a bed at the base of the Lakheri Limestone of the Bhander Group (Upper-Vindhyan) in Madhya Pradesh. These finds coupled with the finds of advanced calcareous algae and large acritachs are expected to largely remove the obscurity still over shadowing the nature of early life during the latest Proterozoic time.

6.3 The finds of sphenodontid reptiles (lizards) are the latest addition to the long list of the terrestrial tetrapods of the Late Triassic (Carnian) Tiki Formation of the South Rewa Gondwana basin.

6.4 Geophysical works have been helpful in delineating in different geological formations in the coastal belt of Digha, West Bengal and to identify parameters for recognising concealed coal fire zones in Raniganj Coalfield.

INFORMATION DISSEMINATION

7.1 A total of 27 Geo-informatics Projects to build a comprehensive geoscientific database on prioritized themes were continued.

7.2 GSI has completed scanning and digitisation of 184 sheets (on 1:1 million scale) in the area lying between 8º N and 17º N latitudes, in the states of Kerala, Tamil Nadu, Karnataka and parts of Andhra Pradesh, NGRI has completed digitisation of the data for eastern block, bounded by latitudes 17º & 25º N and longitudes 77º & 89º E in 163 sheets (1:1 million scale), covering parts of Andhra Pradesh, Madhya Pradesh, Orissa, Bihar and West Bengal. The data of all the 184 sheets digitised by GSI have been merged to make a composite map using Clarke 1866 projection.

7.3 An Indo-Dutch Project INDIGEO, a collaborative venture between GSITI-ITC-MSM has been launched to establish adequate training facilities for map compilation and digitisation as well as management of digital geo-information.

7.4 A total of 17 quadrangle geological maps have been published bringing the total upto 209.

7.5 Other maps printed during the period include : (i) Mineral Map of India (scale 1:5 million) (ii) Hydrogeological Map of India of CGWB (1:2 million) 4 sheets and (iii) District Resource maps.

7.6 A total number of 25 scientific publications have been released.

7.7 One spectacular achievement of this year is the installation of a Dinosaur fossil, *Kotasaurus yamanapalliensis* (reconstructed) in the BM Birla Science Centre, Hyderabad.

TRAINING

8.1 The Training Institute has so far conducted 47 training courses involving 542 officials during the last field season. Apart from organising various basic and refresher courses for scientific professionals, considerable number of courses were conducted for technical and ministerial staff for their skill upgradation. Several in-house interaction-cum-training programmes were organised for HRD in various operations of GSI. 40 geoscientists have been trained in advanced computer courses like ARC-INFO (GIS). 16 officers have been trained abroad as a part of collaborative programme under ITC (the Netherlands), BRGM (France) and GRG (Japan).

INTERNATIONAL ACTIVITIES

9.1 There are eight on-going International Geological Correlation Programme (IGCP) projects for which GSI is the nodal national agency for implementation and monitoring.

9.2 Bhutan Unit of GSI continued investigations aided by drilling for base metal and chemical and cement grade limestones besides geological mapping and geochemical sampling for precious metals and industrial minerals. Geological consultancy for Tala Hydro Electric Project and a couple of Mini Hydel projects have also been provided.

9.3 Important bilateral activities include Indo-French, Indo-South Africa, Indo-Myanmar and Indo-Nepal in the various fields of earthscience activities and modernisation programmes.

9.4 44 GSI officers could participate in International Seminar/Conference/Workshop organised in India and abroad.

EXPEDITITION TO ANTARCTICA

10.1 GSI is one of the major contributors in the ongoing multi-disciplinary and multiorganisational Indian activity in Antarctica. The geological studies in Central Dronning Maud Land (CDML) being a prime activity of GSI, is aimed at understanding the crustal evolution of this part of Antarctica. The geological observations made in Antarctica are being extended to conceptualise models and processes of crust formation during the two recognised major tectonic events-Grenvillian and Pan-African. The GSI till date has mapped about 14,800 sq km on 1:50,000 scale comprising the entire Wohlthat and Orvin ranges of CDML. During XIX Antarctica Expedition, detailed geological mapping on 1:10,000 scale was carried out in the four nunatacks namely Baalsrudfjellet, Sonstebynuten, Starheirmtind and Pevikhornet. The iceberg-movement monitoring programme in the Southern Ocean during Antarctica Voyage has been continued by GSI since 1985, based on the norms provided by the Norwegian Polar Institute.

HUMAN RESOURCES

11.1 Employment Position as on 31.12.2000 in GSI is at Table-2

TABLE 2

	Sanctioned			Filled			Vacant		
	Scientific	Others	Total	Scientific	Others	Total	Scientific	Others	Total
Group A	2156	216	2372	1687	117	1804	469	99	568
Group B	452	323	775	347	245	592	105	78	183
Group C	6496	2942	9438	5059	2438	7497	1437	504	1941
Group D		3737	3737		3161	3161		576	576
Total	9104	7218	16322	7093	5961	13054	2011	1257	3268

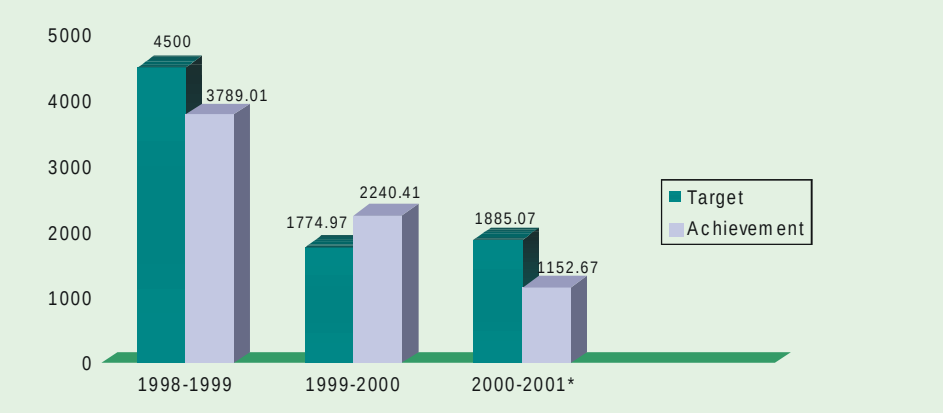
Figure 1

MINERAL EXPLORATION

LARGE SCALE MAPPING

Physical Target and Achievement

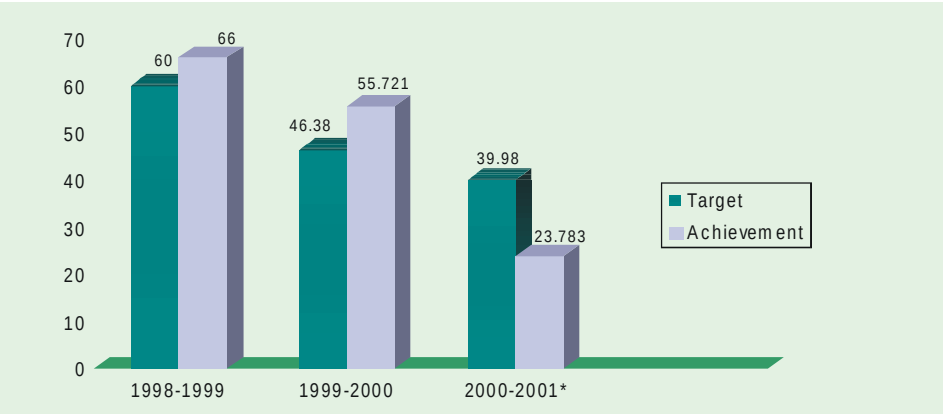
(in sq km)



DETAILED MAPPING

Physical Target and Achievement

(in sq km)



DRILLING

Physical Target and Achievement

(in metre)

* April-December 2000

Figure 2

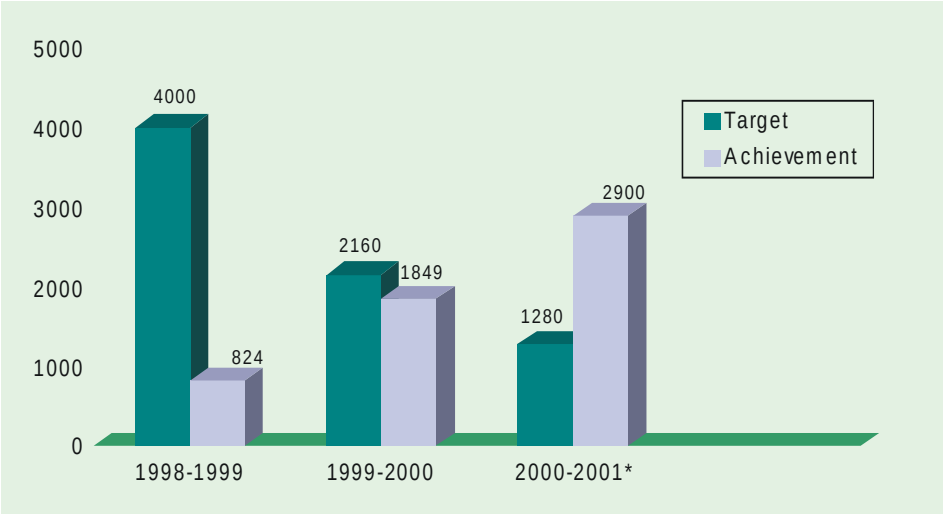
SURVEY AND MAPPING

GROUND SURVEY

SYSTEMATIC GEOLOGICAL MAPPING

Physical Target and Achievement

(in sq km)

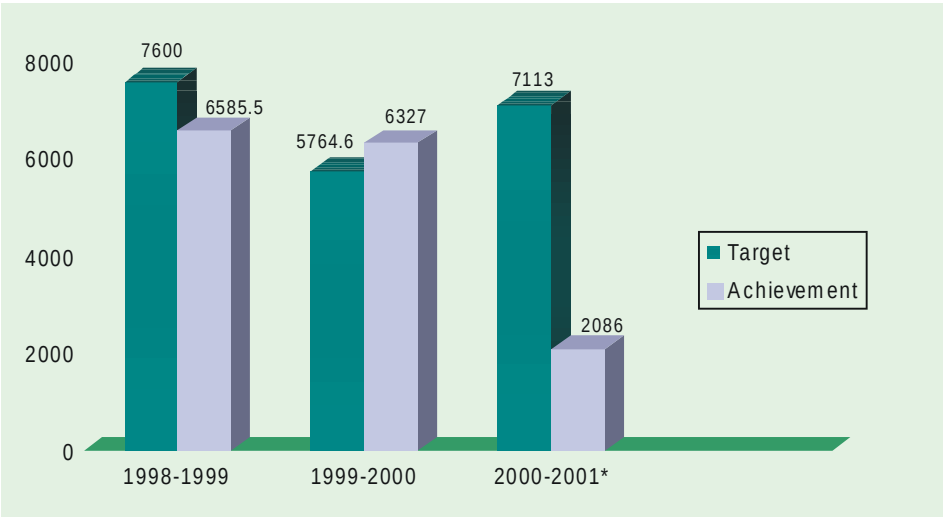


GROUND SURVEY

Specialised Thematic Mapping

Physical Target and Achievement

(in sq km)

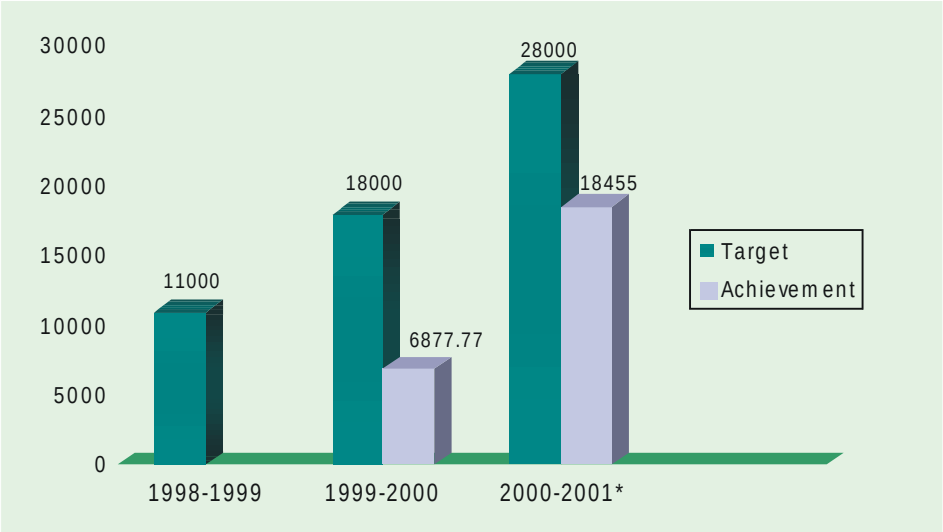


* April-December 2000

Figure 3

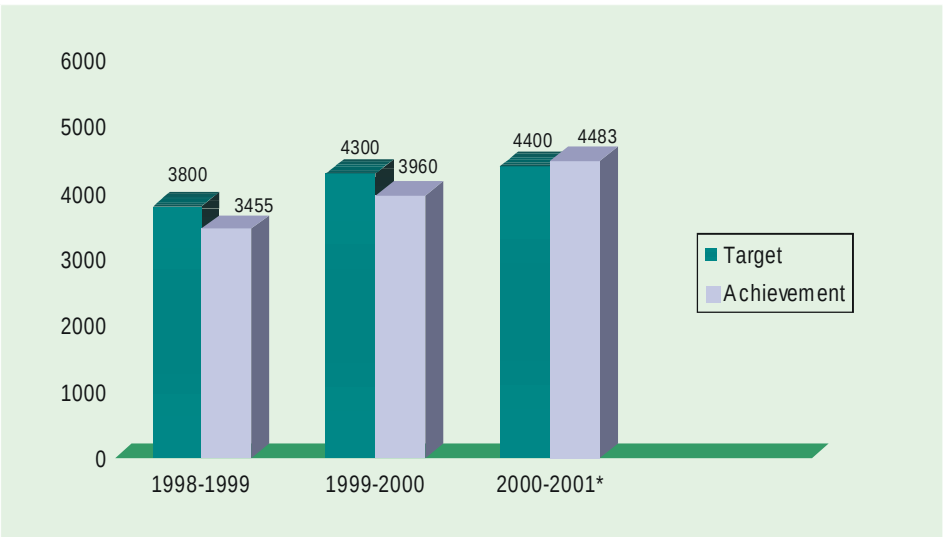
AERIAL SURVEY
MULTISENSOR/AEROMAGNETIC SURVEY
(with Twin Otter)
Physical Target and Achievement

(in line km)



MARINE SURVEY
TERRITORIAL WATER
(with COASTAL LAUNCHES)
Physical Targets and Achievements

(in sq km)



* April-December 2000

CHAPTER III-B

MINERAL EXPLORATION CORPORATION LIMITED

(www.meclindia.com)

INTRODUCTION

1.1 The Mineral Exploration Corporation Limited (MECL) was incorporated in 1972 with the specific mandate of detailed systematic exploration and establishment of reserves of various minerals/ores, so that the large time gap that is entailed between the discovery of a prospect and its eventual exploitation could be curtailed. It is the premier exploration agency in the country now and undertakes exploration work on behalf of the Government on promotional basis and for other agencies on contractual basis. The Company is also diversifying into commercial mining of selected minerals and coal sampling to increase its revenue.

1.2 With its Headquarters at Nagpur, MECL has been carrying out operations all over the country. The activities of the Company are carried out through separate divisions with specific functions. The operational divisions comprise, Geology, Drilling and Mining. Support services are provided by Finance Division, Materials Management Division, Personnel and Administration Division, Commercial Division and Planning Division. It also has a full fledged Information Technology Centre at Nagpur.

Coal Bed Methane Project, Barmer Drill—LMP 2500, Capacity-800 M

PHYSICAL PERFORMANCE

2.1 The achievement in respect of drilling and mining, and the submission of geological reports during the year 2000-2001 (Upto December-2000) vis-a-vis previous two years is at Table-1

TABLE 1

Production	1998-99 Actuals	1999-00 Actuals	Target for 2000-2001 (Revised Estimate)	Actuals 2000-2001 (Upto 31-12-2000)
Drilling (Mtrs)	2,21,100	2,14,546	2,15,000	105,124
Mining (Mtrs)	4,511	6,424	6000	4,996
Final Geological Reports (Nos.)	42	44	40	22

2.2 The drilling performance during the year has been depressed because of non availability of work in the coal sector. The physical targets are therefore not likely to be achieved this year. This has also resulted in reduced sales and much higher losses.

FINANCIAL PERFORMANCE

3.1 The financial performance of the Company is at Table-2.

OPERATING RESULTS

TABLE 2

(Rs. in crore)

Sl. No.	Details	Actuals for the Previous 2 years		Annual Estimates 2000-2001 (Revised Estimate)	Actuals 2000-2001 (upto 31-12-2000)
		98-99	99-2000		
1.	Income	63.46	61.68	60.03	35.65
2.	Operating Cost	55.70	54.88	56.02	38.72
3.	Interest	10.16*	6.22	7.00	5.18
4.	Depreciation & amortisation	3.43	2.72	3.00	1.84
5.	Net profit before income tax & dividend	-6.59	-3.62	-5.99	-10.09

*Includes Rs. 4.31 crore towards interest on Government loans for the year 1997-98.

SALES PERFORMANCE

4.1 Sales performance for the last two years and targets and actuals for 2000-2001 in the Table 3 :

TABLE 3

(Rs. in Crore)

Sl. No.	Details	Actuals for the Previous 2 years		Annual Estimates 2000-2001 (Revised Estimate)	Actuals 2000-2001 (upto 31-12-2000)
		98-99	99-2000		
1.	Sale	63.46	61.68	60.03	35.65

ONGOING PROJECTS

5.1 Exploration priority continues to be for energy minerals i.e. Coal and Lignite. In addition, exploration for Copper, Gold, Granite and Coal Bed Methane (CBM) was also continued.

5.2 Under promotional activity, exploration is in progress for following during 2000-2001 (Upto December 2000):

5.2.1 Promotional Exploration on behalf of Ministry of Mines

- Copper at Singhana, Rajasthan
- Gold at Dona East, Andhra Pradesh
- Molybdenum at Harur, Tamil Nadu

5.2.2 Priority Regional Exploration for Coal and Lignite on behalf of Ministry of Coal

- Coal in the command areas of Singareni Collieries Company Ltd. and Coal India Ltd. (Northern Coalfields Ltd., South Eastern Coalfields Ltd., Eastern Coalfields Ltd. & Western Coalfields Ltd. areas)
- Lignite in the States of Tamil Nadu, Rajasthan & Gujarat.

5.3 A brief review of major exploration programmes undertaken during 2000-2001 (Upto December, 2000) is given below:

Coal

5.3.1 Major exploration activities of MECL

continued to be for coal, in which exploration was continued on contractual basis for Non-CIL blocks on behalf of Coal India Ltd., and also on behalf of Ministry of Coal under priority regional exploration programme. A total of 40637 m. of drilling was completed in various blocks of Andhra Pradesh, Chasttisgarh, Madhya Pradesh Maharashtra and West Bengal for Coal India Ltd. and Singareni Collieries Company Limited respectively. Under Priority Regional exploration programme on behalf of Ministry of Coal, against an allocation of 12700 m for the year 2000-2001, 15,958 m of drilling has been completed. Beside, exploratory mining was continued at Kalidaspur, Bhopalpalli KTK-5, Bhopalpalli KTK-3 & Naheria projects and a total of 1747 m of mining has been completed upto December 2000.

Copper

5.3.2 Detailed exploration for copper at Singhana (Phase-II) was concluded where 496 m of drilling was carried out. While, detailed exploration for copper commenced at Singhana Extension block, Rajasthan and Ghari-Dongri block, Maharashtra and a total of 2900 m of drilling has been carried out upto December 2000.

Uranium

5.3.3 Mine construction work for Uranium was continued at Jaduguda and Narwapahar in Jharkhand state as a contractual work for UCIL and 1351 m of mining was achieved during the year upto December 2000.

Lead-Zinc

5.3.4 Mine construction work at Balaria-Mochia and Balaria-Mochia Development Projects (Rajasthan) on behalf of HZL were continued and 901 m of mining has been completed till December 2000.

Molybdenum

5.3.5 Mine construction work for Molybdenum at Harur (Tamil Nadu) on behalf of Ministry of Mines were in progress and a total of 899 m of Mining has been completed till December 2000.

Lignite

5.3.6 Exploration for lignite was continued on behalf of Ministry of Coal under priority regional exploration programme. Against 43700 m of drilling allocated in the states of Tamil Nadu, Rajasthan and Gujarat, 33,816 m of drilling representing 77 per cent has been carried out. Besides, exploration for lignite on contractual basis on behalf of Commissionerate of Geology and Mines (CGM, Gujarat), Gujarat Mineral Development Corporation (GMDC, Gujarat) and NLC was undertaken and a total of 16,731 m of drilling has been carried out upto December 2000.

Gold

5.3.7 Promotional Exploration work funded by Ministry of Mines for gold was taken up at Dona East, Andhra Pradesh and 1058 m of drilling was carried out during 2000-2001 upto December 2000. Besides, exploration of Gold at Jagpura block, Rajasthan, on behalf of HZL was commenced and 2525 m of drilling has been carried out.

Granite

5.3.8 Exploration for Granite on behalf of BARC was taken up and concluded with 121 m of drilling during the year.

Coal Bed Methane (CBM)

5.3.9 Deep drilling for Coal Bed Methane on behalf of ONGC was commenced during October 2000 at Raniganj and Jharia Coalfield. Till December 2000, a total of 2602 m of slime hole drilling has been carried out. During December'2000 exploration for Coal Bed Methane on behalf of Rajasthan Petroleum was taken up and 341 m of drilling was carried out.

5.4 Significant findings based on MECL's endeavour :

5.4.1 Total 7690 million tonne of coal reserves has been established (157 million tonne of medium coking coal and 7533 million tonne of non-coking coal) in the state of Andhra Pradesh, Chhattisgarh, Maharashtra and Madhya Pradesh.

5.4.2 190 million tonne of lignite reserves established in the state of Rajasthan and Gujarat.

EXPANSION AND DIVERSIFICATION

6.1 In order to expand the activities of the Company, vigorous marketing efforts were made through competitive biddings and discussions/ negotiations, besides entering into MOUs and collaborative programmes with different clients, within India and abroad. The results of these efforts, in brief, are as under :

6.1.1 A total of 48 offers were submitted upto December 2000.

6.1.2 Upto December 2000, a total of 26 work orders valued at Rs. 1555 lakh, were received from various agencies.

6.2 Memorandum of Understanding (MOU) signed with:

6.2.1 Vietnam National Gems and Gold Corporation (VIGEGO) Vietnam, for drilling and associated Geological work, Development of IT Centre, Jewels & Gem Stone processing.

6.2.2 Drilling and Mining Technical Services (DMTC), Vietnam for drilling and associated geological work.

6.2.3 Bharat Gold Mines Limited for shaft sinking work.

6.2.4 BARC for investigations in Dongargarh area and alternate regions and for investigations in JS-1 Extension zone in Jaisalmer District, Rajasthan.

6.2.5 Secretary Mines, Government of Rajasthan and MECL for carrying out exploration for CBM.

6.3 Agreement signed with:

6.3.1 South Eastern Railway, Kharagpur for supply of quality stone ballast at Dalbhumgarh, Galudih and Ghatsilla Depots.

6.3.2 UCIL for Mine Development work at Khundungri, Narwapahar.

6.3.3 M/s Adkins Services Inc. Texas for consultancy and Engineering Services for slim hole drilling for CBM in Raniganj and Jharia coalfields.

6.3.4 ONGC for slim hole drilling for CBM in Raniganj and Jharia coalfields.

ENERGY CONSERVATION

7.1 The scope of energy conservation in drilling and project work is very limited. However, following steps are taken on a continuous basis in MECL:

7.1.1 The Machineries/vehicles consuming excess POL are withdrawn from operation for immediate repair/overhauling.

7.1.2 Operators are instructed to switch off power to the motor as soon as the requirement is over, and running of idle motor is kept to the minimum.

7.1.3 Fluorescent tubes are used in place of incandescent bulbs to reduce consumption of power.

COMPUTERISATION

8.1 During the period under review, the Information Technology upgradation was done on a regular basis in terms of latest hardware, application softwares for undertaking the hi-tech applications such as CAD, geological modelling, Image processing, GIS etc. Facility of computers were extended to user divisions for effective working and quality improvement.

8.2 The computerised data processing related to geological modelling applications using advanced softwares GDM, GEMCOM, AUTOCAD, geological reports, salary, EPF, billing, cost modelling of BRGM-MECL project, MIS and other miscellaneous work continued during the period under reference.

8.3 Preparation of Ground water prospects maps (3 No's) on 1:50,000 scale in connection with Rajiv Gandhi National Drinking Water Mission was carried out using AUTOCAD MAP Software. The maps were submitted in hardcopy to NRSA.

8.4 Under BGRM-MECL project on

"Development of Cost Models for Economic Evaluation of Mining Projects", additional data on various cost parameters in mining activity from Gold and Copper mines was collected and put into databases. Applications of Cost Modeling in UN Framework classification has been added. New Window version of GDM software, BRGM, France received under the above project was successfully installed and made operational.

8.5 A two week training on Autocad map 2000 was conducted for officials of National Bureau of Soil Survey and Land use planning.

8.6 In connection with the work on Identification of Lignite Blocks for Captive Mining in India awarded by NLC, computerisation of Location Plans, Geological Logs, Cross-sections etc. was done for all lignite blocks in India. The processing work of final textual report was also done at IT Centre.

8.7 A total of 15 programmers were developed for different applications.

ACTION TAKEN ON ABATEMENT OF POLLUTION AND ENVIRONMENT

9.1 The exploration activities of MECL do not cause any significant pollution. However, as a part of exploration work MECL is carrying out environmental studies for helping the exploitation agencies to plan measures for possible pollution and Environmental Impact Assessment (EIA) in various exploration projects and a report on the same is included in geological reports of the projects. MECL has also taken up "Site Characterisation" studies for selection of suitable and safe places for disposal of hazardous wastes.

9.2 During the year 2000-2001, upto December 2000. MECL has submitted "Report on environmental data generation of Micro Meteorology and water table level generated during stage-II (Phase-III) operation at Sub-zone 'BD' of zone-8 project. Granite, Bundelkhnad region (Part-B), Madhya Pradesh" and "Report on Reconnoitery Field Survey to select a suitable zone for Stage-II investigation, Project Granite, Dongargarh Region".

9.3 Presently the work of Baseline Environmental studies is in progress at Velampatti molybdenum, Tamil Nadu, Langjigarh Bauxite Orissa and Dona-East Gold Andhra Pradesh.

PERSPECTIVE ON NON-FERROUS METALS

10.1 During the year 2000-2001 (upto December 2000), MECL has carried out exploration for copper ore in Singhana Blocks of Khetri Copper Belt, Rajasthan and Garhi-Dongri and Gidhori-Dhorli blocks of Malanjkhand Copper Belt, Madhya Pradesh, on behalf of Ministry of Mines, Government of India under promotional funds. A brief account of the exploration work carried out by MECL in above mentioned blocks is given below :

10.1.1 Khetri Copper Belt, Rajasthan

- In Khetri area, the exploratory drilling and associated geological and analytical work has been carried out by MECL in Singhana (Phase-II) and Singhana Extension blocks.
- In Singhana (Phase-II) block, a total of 10660.30 m of exploratory drilling was carried out during the period December 1997 to June 2000 and the work has been completed. During the year 2000-2001, a total 496 m of drilling in the block was carried out to conclude the exploration. The geological report submitted in December, 2000.
- Singhana Extension block is the northern continuity of Singhana (Phase-II) block which has been taken up for exploration in June 2000. Upto December 2000, a total of 1900 m of drilling and associated geological work has been carried out in the block and the work is continuing. Presence of copper mineralisation has been established in the block.

10.1.2 Malanjkhand Copper Belt, Madhya Pradesh

- In Malanjkhand Copper Belt, the exploration work is in progress in Garhi-Dongri and Gidori-Dhorli blocks.

10.1.3 Garhi-Dongri Block

- The geophysical work in the block was commenced in April 2000. It was followed by scout drilling and a total of 1000 m drilling along with associated geological work were completed upto November 2000. The data generated so far in the integrated exploration work in Garhi-Dongri block has established the sub-surface continuity of quartz-vein which is considered to be the host rock for copper-gold mineralisation in the area.

10.1.4 Gidori-Dhorli Block

- Geological mapping aided with trenching, sampling and geophysical survey commenced in the month of October, 2000 and is currently in progress.

RESEARCH AND DEVELOPMENT ACTIVITIES

11.1 Two Science and Technology (S&T) projects are in progress in the Company against which an amount of Rs 226.85 lakh have been received from Ministry of Mines as grant-in-aid for procurement of capital equipments, their commissioning by the foreign supplier firm, etc. To implement the projects four officers from geophysical section have been identified for full time. The running expenditure etc. for undertaking the field works are being borne by the Company. Project Monitoring Committee (PMC) has been constituted as per the guide lines of GOI to monitor the progress of the projects from time to time.

INDUSTRIAL RELATIONS

12.1 The industrial relations remained by and large peaceful and cordial in all establishments of the Company.

WELFARE OF SC/STs AND MINORITIES

13.1 MECL has given due importance to meet socio-economic needs of the tribals and minority communities living in and around each camp/ project sites. However, in view of continued financial constraints being faced by the Company, no welfare activities were undertaken during the period under review. However, if any proposal for welfare activities is received for the upliftment of weaker sections of society, the same will be considered on merits of each case keeping in view the fund availability. Keeping in view difficult financial position of the Company, it has been decided to keep all recruitments including under 'Special Recruitment Drive'

HUMAN RESOURCE

14.1. The overall employment position in the Company as on 31.12.2000 is at Table 4.

TABLE 4

Group	Total No. of Employees	SC	ST	Ex-Service man	Physically Handicapped	Minorities
Executives	413	63	23	03	01	31
Non-Executives	2483	355	190	16	10	220
Total	2896	418	213	19	11	251

DISABILITY ACT 1995

15.1 Status of implementation of the persons with Disability Act 1995 specially on implementation of Section 33 on reservation of vacancies for the persons with disabilities is at Table 5.

TABLE 5

Group	Total No. of post as on 31-12-2000.	No. of disable persons in position as on 31.12.2000	% of disabled person
A	71	01 (OH)	1.40%
B	11	-	-
C	2263	08(OH)	0.35%
D	220	2 (1 OH + 1 VH)	0.90%

MOU RATING

16.1 The MOU rating of the Company for last three years is given in Table 6.

TABLE 6

Year	MOU Rating
1997-98	Very Good
1998-99	Good
1999-2000	Good

PROGRESSIVE USE OF HINDI IN OFFICIAL WORK

17.1 In accordance with the Policy of the Government of India for extensive use of Hindi for official purposes and also keeping in view that the year 2000-2001 as Golden Jubilee Year for implementation of Hindi as Rajabhasha, MECL made increased efforts for added use of Hindi in official work.

17.2 4 employees were imparted training in Hindi typing during internal training programme from 5.6.2000 onwards in order to promote the use of Hindi in official work.

- On 2.8.2000, a Hindi Debate competition was successfully organised for students from VIIIth to XIIth Class of Central School, Vayusena Nagar, Nagpur. On 14.8.2000, the Hindi debate competition for wards of MECL Employees was organised in the MECL Premises.
- Two days inhouse Hindi workshop was organised on 4–5.8.2000 wherein 27 MECL employees participated.
- Hindi fortnight and Hindi diwas was organised during the period from 4th to 16th September, 2000 and on 14.9.2000 respectively.

PROGRESS ACHIEVED WITH REGARD TO THE WELL BEING OF THE OLDER PERSONS DURING THE YEAR

18.1 In Order to provide assistance to our employees opting for VRS or retiring on superannuation for better and judicious investment of their earnings, a two day workshop on "Management of post retired life" was organised from 25–26.2.2000 wherein 21 participants took part. Similar type of programmes are also proposed to be conducted subject to availability of resources in future.

REDRESSAL OF PUBLIC GRIEVANCES

19.1 The public grievance generally received by the office pertains to payments to suppliers and settlement of terminal dues of retired employees. These are handled through Director (PG) or at CMD's level. Also these grievances are discussed in the quarterly review meetings taken by CMD and Directors and redressal measures taken. Only one grievance case was received during the year, which was settled.

CHAPTER IV

REGULATION AND CONSERVATION
INDIAN BUREAU OF MINES

(http://ibm.nic.in)

INTRODUCTION

1.1 Indian Bureau of Mines (IBM) is a subordinate organisation under the Ministry of Mines. It is engaged in the promotion of conservation of minerals, in regulating the impact of mines' on environment and scientific development of all the mineral resources of the country, other than coal, petroleum and natural gas, atomic minerals and minor minerals.

1.2 Towards this end, it performs regulatory functions, namely enforcement of the Mines and Minerals (Development and Regulation) Act 1957, Mineral Conservation and Development Rules 1988 (MCDR, 1988), and the relevant provisions of the Mineral Concession Rules 1960 and Environmental Protection Act 1986. It also undertakes scientific, techno-economic, research oriented studies in various aspects of mining, geological studies, ore beneficiation and environmental studies.

1.3 IBM also performs the role of a facilitator for the mining industry. It provides Technical

Afforestation at Kudremukh Iron Ore Mines

Consultancy Services to the mining industry for the geological appraisal of mineral resources, and the preparation of feasibility reports of mining projects, including beneficiation plants. It prepares mineral maps and a countrywide inventory of mineral resources of leasehold and freehold areas. IBM also functions as the Data Bank of Mines and Minerals and publishes statistical periodicals. It also brings out technical publications/ monographs on individual mineral commodities and bulletins of topical interest. It advises the Central and State Governments on all aspects of mineral industry, trade, legislation, etc.

1.4 IBM imparts training to technical and non-technical officials of IBM and also persons from the mineral industry and other agencies in India and abroad.

ORGANISATIONAL SET-UP

2.1 IBM is organised into four functional divisions, namely, (i) Mines Control and Conservation of Minerals (MCCM) Division, (ii) Ore Dressing and Technical Consultancy Division, (iii) Mineral Economics, Statistics, Research and Publication Division, and (iv) Planning and Co-ordination Division having two sub-divisions:

- Administration, Establishment matters (including training), accounts with all other administrative and financial matters; and
- Planning and Coordination.

2.2 IBM has its headquarters at Nagpur and twelve regional offices at Ajmer, Bangalore, Bhubaneswar, Calcutta, Chennai, Dehradun, Hyderabad, Jabalpur, Margao (Goa), Nagpur, Ranchi and Udaipur and two sub-regional offices at Guwahati and Nellore.

2.3 IBM has well equipped ore dressing laboratories and pilot plants at Nagpur, Ajmer and Bangalore.

PERFORMANCE REVIEW

3.1 The performance of IBM in respect of its main activities during the period under review is indicated in Table-1.

3.2 During the year, 2000-2001 (upto December, 2000), 1887 mines were inspected for implementation of MCDR, 1988 and to ensure that mining operations are carried out in accordance with the approved mining plan. As a result, during the year 2000-2001 (upto December, 2000) 1,641 violations of Mineral Conservation and Development Rules (MCDR) 1988 were pointed out in respect of 835 mines and 508 violations were fully rectified. Seventy-nine prosecutions were launched in various courts. Fifty one cases were decided in favour of IBM and 28 cases were compounded.

3.3 Cumulative number of mining plans received by the IBM at various Regional Offices since its introduction upto the end of December, 2000 were 10,322. Out of these, 8065 mining plans were approved, 1098 rejected, 787 withdrawn by the parties and 212 were pending with the parties for modification with reference to the comments conveyed to them after scrutiny, 149 mining plans were under scrutiny with the IBM at various Regional/Zonal offices and 11 mining plans were pending with the Directorate of Mines Safety for their comments.

MEASURES FOR ABATEMENT OF POLLUTION AND ENVIRONMENTAL PROTECTION

4.1 IBM undertakes inspections/studies for the enforcement of provisions of MCDR, 1988 which include provisions on protection of environment. During inspections it ensures that mine operators are taking due care for removal and utilisation of top soil, storage of over-burden/waste rock, reclamation and rehabilitation of land, precaution against ground vibration, control of ground subsidence, abatement measures against air, water and noise pollution, restoration of flora etc., in addition to other conservation and developmental measures. Necessary guidance to mine managements/operators are also given for systematic and scientific development of mines including protection of environment. While approving the mining plans and the schemes of mining, IBM ensures that environment impact assessment studies have been carried out and to

TABLE I

PERFORMANCE OF IBM DURING THE YEAR 2000-2001 (UP TO DECEMBER, 2000)

Sl. No.	Item	Actual 1998-1999	Actual 1999-2000	Target for 2000-2001	Achievement 2000-2001 (upto Dec., 2000)
1.	Inspection of Mines	2760	2791	2650	1887
2.	Mining, Geological and Other Studies	51	39	-	-
3.	Special Geological Investigations/ Studies for updating NMI	562	1230	5015	4774
4.	Approval of Mining Plans				
	(a) No. of Mining Plans				
	(i) Approved	679	670	-	561
	(ii) Rejected	78	71	-	72
	(b) No. of Mining Schemes				
	(i) Approved	138	177	-	157
	(ii) Rejected	27	23	-	26
5.	Updation of National Mineral Inventory (NMI)				
(i)	Generation of regionwise/ depositwise output as on 1.4.1995 (No. of minerals)	18	43	-	-
	(ii) Processing and tabulation of data for NMI as on 1.4.2000. (No. of minerals)	-	-	20	Work in progress.
6.	Preparation/Updation of Mineral Maps (Hects)	19,698	18,000	14,000	Mineral maps alongwith forest overlays of limestone lease-holds in Rajasthan covering about 22,700 Hects. were prepared. Preparation of mineral maps of sillimanite leaseholds in NE region was in progress
7.	OD Investigations	70	70	70	46 completed and 13 in progress.
8.	Chemical Analyses (No. of radicals)	53,348	49,095	50,000	38,494 completed and 501 in progress.
9.	Mineralogical Studies	2,689	2,444	2,300	1,697 completed and 23 in progress.
10.	Technical Consultancy assignments	2	8	9	7
11.	Mining Research including Environmental Studies	3	3	2	6
12.	Training	21	27	20	14

that effect environmental management plan has been incorporated for its effective implementation.

4.2 After the enforcement of MCDR, 1988, extensive afforestation has been undertaken in the mines. During the year 2000-2001 (upto December, 2000) about 3.15 million trees have been planted in and around mine areas, thus totalling to 51.15 million trees planted so far.

4.3 IBM continued to take initiative to organise Mines Environment and Mineral Conservation (MEMC) Weeks every year in important mining centres through its regional offices to promote awareness amongst mine owners for minimising environmental pollution.

PREPARATION OF MINERAL MAPS

5.1 During the year 2000-2001 (upto December, 2000), preparation/updation of mineral maps of limestone leaseholds in Rajasthan, covering about 22,700 hectares was completed and corresponding forest overlays are in progress. Preparation of mineral map of sillimanite leaseholds in North-Eastern Region was also in progress. Besides, 20 index maps of bauxite in Goa, Karnataka, Maharashtra and Tamil Nadu, and iron ore in Goa were digitised.

MINERAL BENEFICIATION

6.1 Mineral beneficiation studies including mineralogical testing and chemical analysis is intimately related to both conservation and development of mineral resources. During the year 2000-2001 (upto December, 2000), 46 ore dressing investigations, 38,494 chemical analyses and 1,697 mineralogical examinations were completed. Besides, 13 in-plant studies were carried out during the period.

INVENTORY OF MINERAL RESOURCES AND MARKET SURVEY REPORT

7.1 Five-yearly updating of National Mineral Inventory as on 1.4.2000 is in progress. Market Survey report on China clay was released. An annual bulletin on Copper-Lead-Zinc, 1998-99 issue was released. Besides, three quarterly reports on End-use metal consumption for Copper-Lead-Zinc for quarters ending March, 2000, June, 2000 and September, 2000 were prepared.

STATISTICAL PUBLICATIONS

8.1 IBM disseminates statistical information on mines, minerals, metals and mineral based industries through its various publications. Information on mineral production, stocks, despatches, employment, inputs in mining, mining machinery and related matters received from the mine owners on statutory basis under the MCDR, 1988 and ancillary statistics on metals production, mineral trade and market prices of minerals, revenue from the mining sector, rent, royalty and cess on minerals, etc. from other agencies is compiled regularly by IBM.

8.2 The statistical publications released during the year 2000-2001 (upto December, 2000) include Statistical Profile of Minerals, 1999-2000 issue, and 8 issues (upto June, 2000) of Monthly Statistics of Mineral Production. Besides, Indian Mineral Industry at a Glance, 1998-99 issue was under printing.

CONSULTANCY SERVICE

9.1 IBM provides technical consultancy services on prescribed charges for geological appraisals, survey of the areas, preparation of feasibility study reports, environment impact assessment and environment management plan, selection of suitable mining equipment, evaluation of feasibility report prepared by other consultants, financial institutions, etc. The assignments completed during the year 2000-2001 (upto December, 2000) include (i) Experimental deep hole drilling in Viyakaloor Thutoor area in Kanyakumari district for M/s Indian Rare Earths Ltd., (ii) Mining Scheme of Dalli (Manual) Iron ore Mine for M/s Bhilai Steel Plant (iii) Mining plan of Red Hill Magnesite Mine for M/s Burn Standard Co. Ltd., Salem (iv) Collection of sample from Nalwaya Soapstone mine for M/s Nalwaya Mineral Industries (P) Ltd., Udaipur (v) Collection of limestone samples for

Lab. scale and pilot plant scale tests for M/s DLF Cements Ltd., Distt. Pali, Rajasthan (vi) Topographic survey of Kasnau-Matasukh Lignite block for M/s RSMM, Ltd., Udaipur and (vii) Volume assessment of rock excavation from the pit of Malanjkhand Copper Mine for M/s HCL. In addition to the assignments already completed, 11 assignments on preparation of mining scheme/ preliminary geological appraisal reports are in progress.

TECHNICAL PUBLICATIONS

10.1 IBM brings out technical publications relating to mines and minerals, mineral based industries, trade, beneficiation, R&D activities, etc. During the year 2000-2001 (upto December, 2000), a publication on India's Trade and Export Prospects in Minerals, Metals and Alloys, Bulletin on Mining Leases and Prospecting Licences - 1988 and a half-yearly bulletin on Mineral Information, April-September, 1999 issue were released. Besides, Indian Minerals Year Book (IMYB) 2000 issue was under printing.

10.2 Under the series "Mineral Facts and Problems" the Monograph on Copper was released and Monograph on Clay was under printing. Besides, updating of Monographs on (i) limestone and dolomite and (ii) chromite was in progress. A bulletin on Reclamation/Restoration Techniques and Strategy for Mined out areas was released.

MINING RESEARCH

11.1 Applied Mining Research is carried out on various mining aspects so as to help in systematic development of mines and improvement in productivity in mines through evolution of suitable norms. Industry sponsored assignments on environment and rock mechanics aspects, on charge basis are also undertaken. During the period under review, six assignments viz (i) Geo-technical studies at Osam Hill Perlite Mine for M/s Raj Minerals (ii) Geo-technical Investigation for ensuring safety of Makrana-Jodhpur Railway Track near Makrana Marble Mine, Rajasthan (iii) Geo-technical Investigation of Sukinda Chromite mine for M/s TISCO (iv) Study of Controlled Blasting and assessment of ground vibration due to blasting at Mainpet bauxite mine for M/s BALCO (v) Study of Blast vibration at the mines of My Home Cement Mines Ltd., in Nalgonda district. (AP) and (vi) Environmental Audit of Karmarda chromite mine for M/s B C Mohanty & Sons, Pvt. Ltd, Cuttack (Orissa) were completed and reports submitted to the parties. Besides, 14 assignments sponsored by the Industry on charge basis are in progress.

TRAINING

12.1 IBM imparts training to technical and non-technical officials of IBM and also to persons from mineral industry and other agencies in India and abroad. During the year 2000-2001 (upto December, 2000), 14 training programmes were conducted in which a total of 183 IBM personnel and 79 industry personnel including 27 from North-Eastern States participated.

ADVISING CENTRAL AND STATE GOVERNMENTS ON MATTERS CONNECTED WITH THE MINING AND MINERAL INDUSTRY

13.1 IBM continued to advise the Central and State Governments on matters concerning mines and minerals, mining legislation, export and import policies, mineral consumption and industrial utilisation, recovery of by-products, demand and supply of minerals, renewal of mining leases. Necessary material was also furnished to the Ministry for answering Parliament Questions during its various sessions. Assistance was also rendered to private parties, institutions and foreign organisations on subjects like mineral production and other statistics.

IBM-BRGM PROJECTS

14.1 Project on Development of Application Techniques in relation to Environmental Management of Mines and Waste Recoveries:

14.1.1 Final report on regional EMP on Sukinda and Goa areas, Joint Task Force Executive

Summary report, EMP reports of South Kaliapani mine of Sukinda area and Jaquella-Pale mine of Goa area were received from BRGM, France. Thus, the project was successfully completed and termination agreement was signed between IBM & BRGM, France on 10.10.2000 at Nagpur. As a follow up action of the report, the mine managements in respect of 11 iron ore mines in South Goa were directed to take proper abatement measures to prevent wash offs from the waste dumps which pollute paddy fields etc. Similarly, environmental issues were brought to the notice of the mine managements in respect of 11 mines in Sukinda chromite valley highlighting the problems of pollution of surface and underground water by hexavalent chromium and educating them about the possible abatement measures. Further, they have been directed to take necessary corrective measures and intimate the detailed action plan to IBM.

14.2 Technical Management Information System (TMIS) at IBM

14.2.1 The main objectives of the project are (i) Organisation of MCCM data into a relational data base (TMIS), (ii) Establishment of a database link between Central Headquarters, Zonal & Regional offices of MCCM (WAN & LAN), (iii) Procurement/ installation of network and computer equipment (iv) Training of IBM personnel in administration and management of TMIS database and (v) Upgradation/linkage of existing MRIS database.

14.2.2 Out of nine phases of the project, so far eight phases have been completed as per schedule. Final phase of the project on preparation of final report as well as technical report of the project is excepted to be completed by March, 2001.

SEMINARS/EXHIBITIONS

15.1 IBM jointly with Indian Institute of Mineral Engineers organised a National Seminar on Mineral Processing Technology-Perspective for new Millenium during 4.4.2000–6.4.2000 at Nagpur. The objectives of the seminar were to have close interaction between R&D Organisations, Academic Institutions, Equipment Manufacturers and Experts from Mineral Industry, and to review the problems faced by Mineral Industry vis-a-vis to take stock of latest developments to meet the challenges of New Millenium.

15.2 An R&D meet with the representatives of mining and mineral industry was jointly organised by Kolkata and Bhubaneswar Regional offices of IBM on 8.8.2000 at RRL, Bhubaneswar.

15.3 IBM had set up a stall in the Pavilion of Ministry of Mines during 27–29.9.2000 in the International Trade Fair Minerals, Metals and Metallurgy-2000, which was co-sponsored by Ministry of Mines.

IMPLEMENTATION OF UNITED NATIONS (UN) CLASSIFICATION OF MINERAL RESOURCES

16.1 With a view to providing exposure to the United Nations Frame Work Classification (UNFC) System, FIMI organised a Regional Seminar on Implementation of UNFC for reserves/resources: solid fuels and minerals in the Indian Ocean Rim countries under the auspices of the Ministry of Mines in cooperation with the United Nations Economic Commission for Europe (ECE) and United Nations Social and Economic Commission for Asia and Pacific (ESCAP) at Agra on 23–24.11.2000. IBM presented a report of the Committee on formulation of field guidelines for implementation of UNFC for Mineral Resources in India. A paper entitled "A Comparison and Correspondence between Existing Mineral Classification System of India and United Nations Frame Work Classification (UNFC) System" was also presented by IBM.

NATIONAL TECHNOLOGY DAY IN IBM

17.1 In pursuance of the declaration made by the Honb'le Prime Minister of India that 11.5.2000 may be celebrated as National Technology Day, IBM celebrated National Technology Day in its Headquarters at Nagpur as well as in all Zonal/ Regional offices and laboratories and pilot plants.

17.2 Modern Mineral Processing Laboratory and Pilot Plant at Nagpur and Regional Ore Dressing Laboratories at Ajmer and Bangalore conducted live demonstration of operations of machines, test work on ore beneficiation etc., to the visitors. Lectures of eminent personalities from Academic Institutions and Mineral Based Industries were arranged at various offices. A one day seminar was also organised at Bangalore.

SUB-GROUP CONSTITUTED BY THE GROUP ON MARBLE DEVELOPMENT (GMD)

18.1 The Sub-group constituted by GMD submitted its report entitled "Report of the Sub-group Constituted by Group on Marble Development for Examining Mechanisation in Marble Quarries" to the Chairman of the GMD for consideration.

EXPERT GROUP FOR CONSIDERING THE RECOMMENDATIONS FOR CMRI PROJECT

19.1 Expert Group constituted under the Chairmanship of Controller General, IBM for considering the recommendations for CMRI project on "Design, Development and Production of Multi Processor based continuous Deformation Monitoring System for the Safety of Mines and Underground Openings" submitted its report to the Ministry of Mines for consideration.

VISIT OF NATIONAL STATISTICAL COMMISSION

20.1 The Govt. of India has recently set up a National Statistical Commission to look into the deficiencies in the existing statistical system in India and also to recommend measures for systematic revamping of the system to make it more responsive to the needs of the economy, especially in view of the liberalisation and globalisation of the World Economies. In this regard, members of the sub-group "Industry, Commerce and Corporate Sector Statistics" visited IBM on 16.8.2000 and held detailed discussions on the present system of collection, processing and dissemination of data relating to mining and quarrying sector to suggest ways and means of improving the existing statistical set up in the Bureau. Special emphasis was given on the generation of monthly mineral production data used for computation of index of mineral production with base 1993-94 = 100. This data is supplied to the Central Statistical Organisation every month by the Bureau as per the Special Data Dissemination Standards laid down by the International Monetary Fund.

VISIT OF TRADE DELEGATION FROM CANADA

21.1 A Trade delegation from Canada visited Regional Ore Dressing Laboratory, IBM, Bangalore on 5.12.2000. An overview of areas where collaborative work is possible were discussed and the delegation assured that they will visit IBM again once the projects are identified.

WORK DONE BY IBM IN NORTH-EASTERN REGION

22.1 Sub-regional office of IBM at Guwahati continued to undertake inspection of mines/ studies on development of resources of the North-Eastern region.

22.2 IBM conducted a training programme at Aizwal during 25–29.4.2000 on Mining and Geology for the personnel from the State Directorates of Geology and Mining, State Undertakings and Private Companies of North-Eastern Region. A total of 25 technical persons connected with Mining Industry participated in the training programme, which was free of cost.

22.3 S&T Scheme on "Characterisation of Clay and Silica Sand Deposits occurring in NE States and their Techno-Economic Evaluation for Industrial uses" is being implemented by IBM. A number of studies on clay samples received from NE region were conducted by IBM and it will continue to collect samples and test them free of cost in the IBM's laboratory on regular basis.

22.4 IBM has already taken up a study to improve the grade of concentrates and performance of plants operated by Sikkim Mining Corporation. In this connection samples of complex sulphide ore (Lead-Zinc-Copper) have been received from SMC and the test work is in progress. Based on the results of the test work, IBM will develop process

flow sheet on fresh raw samples from Bhotang complex ore, Panchghani Copper ore and Dikchu complex ore.

22.5 IBM has already taken up environmental study on generation of baseline data and preparation of rapid EMP for Bhotang and Dikchu copper mines of M/s SMC with a view to study the impact on environment due to disposal of tailings in the surrounding river and suggest ways to treat the effluents before they are discharged into the river.

22.6 Consultancy assignments on preparation of (i) Mining plan of Panchghani copper mine of SMC (ii) Mine development scheme of Bhotang copper mine of SMC (iii) Updating of feasibility report on Dikchu copper lead zinc project of SMC (iv) Mining scheme of Umrangso limestone mine of M/s Assam Mineral Development Corporation Ltd., Guwahati (v) Mining scheme of Umrangso limestone mine of M/s Umrangso Cement Ltd., Guwahati, were taken up by IBM and are in progress.

REVENUE GENERATION IN IBM

23.1 Revenue generated during 2000-2001 (upto December, 2000) from the consultancy work in mining, geology, ore dressing and mining research work, training and through sale of publications etc. was Rs. 62.51 lakh against an annual target of Rs. 1 crore.

COMPUTERISATION

24.1 Under Mineral Resource Intelligence System (MRIS), IBM is maintaining databases on National Mineral Inventory, Mines cum Production, Mining Leases, External Trade, Mineral Consumption and World Mineral Intelligence. These databases are important information source for Government and Private agencies on mining and mineral based industries.

24.2 Besides Word Processing, computers are being used for preparation of Environment Management Plan, Orebody Modeling and Geo-statistical Analysis, preparation of Mineral Map using ML-GIS package and Library Management. Advanced software like JKSIMMET, CANMET, BILCO 2.0, VISIO 2.0 etc. are used in the Ore Dressing Laboratories and Pilot Plants. Data Acquisition System is used while conducting Pilot Plant test runs for controlling some of the circuits like pulp density in grinding circuits, pH in flotation circuit etc. and acquiring real time data from various filed instruments.

24.3 In order to link all the Regional/Zonal offices and Headquarters of IBM, more sophisticated system based on client server architecture has recently been established with the help of BRGM, France, which include new databases required by IBM. IBM has added well established LAN facility, besides WAN system to communicate and exchange data from Regional, Zonal offices and Headquarters.

24.4 IBM is maintaining a website (http://ibm.nic.in), linked with the site of Ministry of Mines. This website provides the main functions and activities of IBM, services provided in the fields of geology, mining, environmental studies as technical consultancy, computerised information, list of IBM publications along with contact persons and their address, and mineral resources, production, exports and imports of minerals and metals.

IBM ADVISORY BOARD

25.1 12th meeting of the IBM Advisory Board was held at Nagpur on 24.5.2000 under the chairmanship of Secretary (Mines). Important decisions taken in the meeting are as under:

- Charter of functions of IBM may be modified in the light of present Scenario of Mining Industry.
- MCDR forms may be revised in the light of recent amendments so as to make them more meaningful and useful for decision making.
- IBM and GSI should make all efforts to adopt the UN classification for preparing

mineral inventory and find out ways to ensure global compatibility.

- IBM shall specify a minimum area for grant of mining lease below which it will not be amenable for scientific development and mining.

INTERNATIONAL CONGRESSES

26.1 IBM officers attended the 18th World Mining Congress and MINEXPO International 2000 at Las Vegas, Nevada, USA organised by National Mining Association, USA during 9–12.10.2000 and presented a paper entitled "Surface and Underground Metalliferous Mining-Evolving Scene in India".

26.2 IBM Officers attended the XXI International Mineral Processing Congress held during 23–27.7.2000 at Rome, Italy and presented a paper entitled "Physical Separation Processing of a Bulk Tin-Tungsten Pre-concentrate into its Individual Constituents for Commercial Applications". In all, 432 delegates from various countries participated in the Congress.

WORK DONE CONCERNING WOMEN (PERSPECTIVE PLAN FOR WOMEN)

27.1 IBM has not drawn up any specific perspective plan for women, however, out of a total strength of employees, women employees constitute about 11 per cent. Training was imparted to some women employees in the field of technical as well as administrative matters.

27.2 Women employees are also actively participating in various cultural and extra-curricular activities organised by IBM from time to time. The 'Women's Day' was observed during the National Integration Week.

EMPLOYMENT OF SC/ST, WOMEN AS ON DECEMBER, 2000

28.1 Employment of SC/ST, Women as on 31.12.2000 is at Table 2.

TABLE 2

Class	Total No. of employees in position	No. of SC	ST	OBC	No. of Women
Group A	252	53	19	3	08
Group B	84	14	05	1	04
Group B (NG)	54	08	06	0	13
Group C (Tech)	472	74	37	9	29
Group C (Min)	342	67	31	6	86
Group D	354	107	35	9	28
Total	1558	323	133	28	168

REDRESSAL OF PUBLIC GRIEVANCES

29.1 At the opening of the year eleven cases were pending. Four more cases were received during the year 2000-2001 (upto December, 2000), and three cases were disposed off and twelve cases are pending.

CHAPTER V

OVERVIEW OF ALUMINIUM, ZINC, LEAD AND COPPER

A PERSPECTIVE ON ALUMINIUM

1.1 India has large resources of High Grade Bauxite deposits of the order of 3037 Million Tonnes (MT) (proved + probable + possible). The recoverable reserves are placed at 2525 MT. The proved and proable reserves are 1218 MT, placing the country 5th in rank in the world, next only to Australia, Guinea, Brazil and Jamaica. Even at an anticipated consumption of 7 Million Tonne Per Year (MTPY) of Bauxite, these reserves are expected to last for over 350 years. Given the natural resource endowment, growing demand for Aluminium and its alloys, economic opportunities and scope for exports, India can produce Alumina at internationally competitive prices. Aluminium metal can also be produced competitively with the latest technology coupled with cheaper energy arrangements in India or by toll smelting Alumina in low power cost Aluminium smelters abroad. The greatest scope for value addition and employment lies in the development of down stream Aluminium end-products like extrusions, rolled products, fabrication and finished items. India can benefit by this value addition given the low energy requirements and labour intensity of down-stream industries. Aluminium has significant industrial and economic importance for India, as this is the one metal for which the country has abundant raw material. While our Bauxite reserves account for 7.5% of the world's total deposits, our Aluminium capacity is only 3%, indicating the scope and need for new capacities to meet growing internal demand and for sizable exports on a long term basis. Demand for Aluminium is expected to grow rapidly with increasing use in the construction, power transmission, transport and packaging sectors.

BAUXITE

2.1 Alumina is produced from Bauxite ore. About 1 tonne of Alumina is produced from 3 tonnes of Bauxite and about 1 tonne Aluminium is produced from 2 tonne of Alumina.

2.2 About 89% of the recoverable reserves of Bauxite is of metallurgical grade. Orissa, Andhra Pradesh, Madhya Pradesh, Gujarat, Maharashtra and Bihar are the principal States where Bauxite deposits are located in India. Major Bauxite reserves are concentrated in the East Coast Bauxite deposits of Orissa and Andhra Pradesh.

ALUMINA

3.1 The annual installed capacity for production of Alumina in the country is at Table 1.

TABLE 1

(Unit in tonne)

Company	Quantity	Location	
NALCO	800,000	Damanjodi	(Orissa)
BALCO	200,000	Korba	(Chhattisgarh)
INDAL	312,000	Muri Belgaum	(Jharkhand: 72,000) (Karnataka: 240,000)
HINDALCO	350,000	Renukoot	(Uttar Pradesh)
MALCO	50,000	Chennai	(Tamil Nadu)

3.2 Government has approved the expansion of the capacity of the Bauxite Mines of Nalco from 2.4 Millions Tonnes Per Annum (MTPA), to 4.8 MTPA and that of the Alumina Refinery from 0.8 MTPA to 1.575 MTPA. Currently, the project is under implementation by Nalco and is progressing on schedule.

ALUMINIUM

4.1 There are seven smelters with a total installed capacity of 714,000 TPA. Two plants with a total capacity of 330,000 TPA, belonging to Nalco and Balco, are in the public sector and remaining five are in the private sector.

ALUMINUM PRODUCTION

5.1 Aluminium production in India commenced in 1943 with a modest 25,000 TPA capacity, which grew to an installed capacity of 714,000 TPA. The five primary producers of Aluminium metal in the country are given in Table 2.

TABLE 2

PUBLIC SECTOR	INSTALLED CAPACITY
NALCO	230,000 TPA*
BALCO	100,000 TPA
PRIVATE SECTOR	
HINDALCO	242,000 TPA
INDAL	117,000 TPA
MALCO	25,000 TPA
Total :	714,000 TPA

*The Government has approved expansion of the capacity of Nalco's Aluminium Smelter from 230000 TPA to 345000 TPA. The project is under implementaion by NALCO and is progressing on schedule.

5.2 Production of Aluminium by the primary producers in the country during the last three years is at Table 3.

TABLE 3

(In tonne)

Company	1997-98	1998-99	1999-2000
NALCO	200162	146206	212663
BALCO	88198	91839	91345
HINDALCO	200304	240926	248930
INDAL	38823	42193	43458
MALCO	25853	24536	23345
TOTAL	520612	545700	619741

EXPORTS OF ALUMINIUM

6.1 The quantity of Aluminium and its secondary products exported by the primary producers during the last three years is indicated in Table 4.

TABLE 4

(In tonne)

Company	1997-98	1998-99	1999-2000
NALCO	55475	39868	95185
BALCO	Nil	Nil	116
HINDALCO	26207	25736	46369

DEMAND AND CONSUMPTION OF ALUMINIUM BY THE DOMESTIC INDUSTRY

7.1 India was dependent upon imports of Aluminium metal till 1988. With the commissioning of Nalco's plant in 1988 a sea change took place and the country which was a net importer of Aluminium became self-sufficient. Consequently, the Aluminium Control Order which regulated supplies and prices of indigenous Aluminium was withdrawn on 1.3.1989. The Table 5 indicates the domestic consumption, exports and imports of the metal from 1997-98 to 1999-2000.

TABLE 5

(In thousand tonne)

Year	Domestic Consumption	Exports	Imports
1997-98	542	82	70
1998-99	567	75	95
1999-2000	588	120	80

STEPS TAKEN BY GOVERNMENT TO IMPROVE AVAILABILITY OF ALUMINIUM

8.1 To facilitates better availability of the metal in the country, the Govt. of India has permitted free import of Aluminium under OGL.

8.2 Custom duty on primary metal and secondary products is applicable @ 25% ad-valorem (15% ad-valorem on scrap) + surcharge @ 10% of basic duty + 4% SAD. The custom duty on scrap is 15% ad-valorem + 10%. The net duty currently applicable is 21.91% on scrap, and 33.42% on other items.

8.3 Excise duty on Aluminium and its products has been gradually reduced and is currently at 16% both for the metal and its products.

8.4 Aluminium metal and its down stream products have been exempted from the provisions of compulsory licensing.

8.5 MODVAT credit has been extended to the Aluminium industry including petroleum based raw material like CPC and Coal Tar Pitch used in the manufacture of Aluminium.

8.6 Effective from 11.2.2000, the FDI on Aluminium industry has been increased from 50% to 100%.

ZINC

9.1 Zinc is ranked fourth among metals in terms of consumption after iron, aluminium and copper. About 7.8 million tonne of zinc is consumed worldwide every year. While North and Latin America, Australia, erstwhile Soviet Union States (CIS), East European countries, China, North Korea are the major contributors in zinc mine production, Europe, North America, China and other countries in Asia are the major metal producers. In case of zinc production, Asia has achieved the highest annual compound growth rate of around 29% (from 0.187 to 1.185 million tonne) during 1960-1994 period. Asia's share in world zinc production has almost trebled from the 1960 share of 5.9% to 16.7% in recent years. Zinc consumption is maximum in galvanising sector.

LEAD

10.1 Among the non-ferrous metals, the consumption of lead ranks fourth after aluminium, copper and zinc. About 6 million tonne of lead is consumed worldwide every year. Batteries are important end use sector for lead and this sector's share in the world lead consumption has gone up significantly from 49.4% in 1980 to 68.4% in recent years. In fact, the substantial increase in this sector has compensated for loss of consumption in the other sectors like Cable Sheathing (due to substitution), gasoline additives, chemicals, etc. (due to environmental and health regulations). Asia has increased its share in the world production of lead metal from 5.1% in 1960 to 12.7% in 1994. West Europe and Asia are the net importers of lead concentrate while the American continent, Australia, East Europe, China and North Korea are quite delicately balanced at present.

LEAD AND ZINC SCENARIO IN INDIA

11.1 The identified zinc and lead resources in the country are estimated at 383 million tonne. Out of this, 167 million tonne containing 2.17% lead and 8.16% zinc fall under category of minieable reserves. The bulk of the lead-zinc deposits occur in Rajasthan and are under lease/ exploitation of HZL. A major multi-metal world-class deposit of zinc, lead and associated metals is in Rampura-Agucha belt in Bhilwara District of Rajasthan, which has estimated ore reserves of 60.35 million tonne containing 13.48% zinc and 1.93% lead.

11.2 The present smelting capacities for zinc and lead metal in the country are 1,82,000 TPA and 67,000 TPA respectively. The break-up of these capacities is indicated at Table 6.

TABLE 6

(Unit TPA)

	Zinc	Lead
Hindustan Zinc Limited (HZL)	152000	43000
Binani Industries Limited (BIL)	30000	-
Indian Lead Limited (ILL)	-	24000
Total	182000	67000

11.3 While HZL is a Public Sector Undertaking BIL and ILL are in the private sector. BIL does not

have any captive mines and produces zinc by procuring zinc concentrate either from abroad/ indigenously at their Alwaye (Kerala) Plant. ILL has two units at Kolkata and Thane (Maharashtra) having 12000 TPA capacity each. Both units are based on imported concentrates/scraps. Besides these units, both zinc and lead are also produced through secondary routes from scrap, dross, residue, etc. Most of the secondary producing units, especially in lead, are in the unorganized sector.

11.4 Available data at Table 7 suggest that lead and zinc consumption in the country has registered 7% and 6% growth respectively during April-October, 2000 as compared to the corresponding period in 1999. Based on anticipated growth in various sectors of national economy such as energy, steel, transport, communications, rural electrification, construction etc. the annual growth rate for lead and zinc demand during 10th Plan will be 7% and 6% respectively. Datas are given at Table 7.

TABLE 7

(In Metric Tonnes)

Year	Lead Demand 7% growth	Zinc Demand 6% growth
1999-2000	1,00,000	2,52,000
2001-2002 (end of IX plan)	1,14,500	2,83,000
2006-2007 (end of X plan)	1,60,500	3,79,000

11.5 To bridge the gap between demand and supply of lead and zinc metals steps have been initiated to increase the production as well as the resource base of these metals in the country. The steps taken in this regard could be summarised as follows :

- The import of lead and zinc metals is under OGL.
- The ban on import of zinc dust has been lifted.
- HZL is expanding the existing installed capacities of Vizag and Debari Smelters by 10,000 TPA each.
- Government has approved setting up of a new zinc smelter of 1,00,000 TPA at Kapasan in Chittorgarh district, Rajasthan by HZL.
- Exploration is being carried out to augment lead and zinc reserves in the country.

PERSPECTIVE ON COPPER

12.1 In the last few years, price of copper was steadily declining till 1998-1999 but thereafter gradual appreciation has started. The yearwise average LME price per ton of copper is given in Table 8.

TABLE 8

Year	LME price of copper (US $ per ton)
1995-96	2844
1996-97	2257
1997-98	2096
1998-99	1581
1999-2000	1670
2000-2001 (Upto December, 2000)	1820

12.2 The known copper resource in India is characterised by low volume, narrow width, low grade and practical absence of precious metal content. With the exception of Malanjkhand deposit in Madhya Pradesh, no deposit is amenable to low cost surface mining.

12.3 The thrust is, therefore, on exploration for identification of reserves amenable to economic exploitation. The National Mineral Policy announced by the Ministry of Mines in March, 1993 has thrown open the doors for mineral exploration and exploitation to Private Sectors. HCL had also undertaken a Geological and Geochemical exploration in Gidori and Dhorli areas near Malanjkhand, Chhattisgarh. The results of this exploration were found encouraging and based on which MECL has been engaged for further exploration in these areas.

12.4 Due to poor economics of operation, some of HCL's underground Mines namely Mosaboni, Pathargora and Kendadih, have been closed down. This has resulted into reduction in availability of indigenous Copper ore. In order to meet the requirement of HCL's Smelters, the shortfall is being met by way of importing Copper concentrate.

12.5 Copper smelting capacities are expected to maintain upward trend and by the year 2001-2002 the total indigenous smelting capacity is expected to increase from the present 2.47 lakh tpa to 3.47 lakh tpa. The existing and proposed smelting capacities are given at Table 9.

TABLE 9

(In TPA)

Name of Organisations	Existing capacity	Proposed Capacity by 2001-2002
Hindustan Copper Ltd.	47,500	47,500
Sterlite Industries (India) Ltd.	100,000	150,000
Birla Copper	100,000	150,000
Total	247,500	347,500

12.6 Besides these smelters, HCL has a Continuous Cast Copper Rods Plant at Taloja, Maharashtra having capacity of 60,000 tpa. It may be mentioned here that M/s. SWIL Ltd. is yet to establish their production capacity of 50,000 tpa and Metdist has backed out from their project of 150,000 tpa.

COPPER SURVEY

13.1 The present copper ore resources are estimated as 740 million tonne averaging 1.20% metal content. Out of this 420 million tonne of ore with an average grade of 1.21% copper, is under mining lease held by HCL.

13.2 The other important small Mining Units are being operated by Sikkim Mining Corporation (SMC) at Rangpo, Sikkim and Hutti Gold Mines Ltd. (HGML) at Chitradurga and Kalyani in Karnataka.

13.3 The per capita consumption of refined copper metal in India is 0.30 kg. which is very low against World average of 3 kg. In advanced countries, per capita consumption is more than 10 kg.

13.4 In the wake of liberalisation policy of the Govt. new copper smelters have been installed in Private Sector as detailed above.

CHAPTER VI-A

MINING AND PROCESSING
NATIONAL ALUMINIUM COMPANY LIMITED

(www.nalcoindia.com)

INTRODUCTION

1.1 NALCO was incorporated on 7th January, 1981 as a fully owned Govt. Company to exploit a part of the large deposits of Bauxite discovered in the East Coast. Aluminium Pechiney of France, a major world leader in the field of alumina-aluminium technology, provided the technology and basic engineering for bauxite mine, alumina refinery and smelter. NALCO emerged as the major manufacturer and largest exporter of Alumina and Aluminium in the country. NALCO's entry into the world of export began in January, 1988 with a shipment of 76,000 tonne of Alumina. Since then, the Company never looked back.

1.2 NALCO is the first Indian Company to be registered with London Metal Exchange (LME). The Company has also received ISO 9002 and 14001 certification for all its units viz. Mines, Alumina Refinery, Aluminium Smelter and Power Plant. As a Star Trading House, NALCO has emerged as the largest integrated Bauxite-Alumina-Aluminium Complex in Asia.

Environment Friendly Captive Power Plant of NALCO at Angul

1.3 NALCO products are sold in about 30 countries world-wide including U.K., USA, France, Norway, Italy, Switzerland, Belgium, Brazil, Russia, Australia, China, Japan, etc.

1.4 The spectrum of operations of NALCO includes Bauxite Mines located on Panchpatmali Hills in the Koraput District of Orissa, a fully mechanised opencast mine of 24 lakh TPA capacity is under operation since 1985, serving feed stock to Alumina Refinery located in the foot hills. The capacity has been expanded to 48 lakh TPA from December, 1999. The Alumina Refinery of 8.0 lakh TPA is in operation since 1986 located in the picturesque valley of Damanjodi. The capacity is being expanded to 15.75 lakh TPA and this is scheduled to be completed by March,2001.

1.5 NALCO's various production units, their location and installed capacities, both existing and after expansion are given at Table 1.

TABLE 1

Units	Location	Existing Capacity	Capacity after Expansion
Bauxite Mines	Panchpatmali	2.4 MTPA	4.8 MTPA
Alumina Refinery	Damanjodi	0.8 MTPA	1.575 MTPA
Smelter Plant	Angul	2,30,000 TPA	345000 TPA
Captive Power Plant	Angul	720 MW	960 MW
Port Facilities	Vizag	3,75,000 tpa (Alumina Export) 146000 tpa (Caustic Soda Lye Import)	

PHYSICAL PERFORMANCE :

2.1 The production of the Company during the last two years and 2000-2001 (upto December, 2000) is given at Table 2.

TABLE 2

Sl. No.	Product	Unit	1998-1999 Actual	1999-2000 Actual	Target for 2000-2001	2000-01 Actuals upto 31-12-2000	2000-01 Estimated Jan-Mar.01
1	2	3	4	5	6	7	8
A. PRODUCTION							
1	Bauxite	MT	2806288	2822464	2850000	1911169	93880
2	Calcined Alumina	MT	894500	886000	950000	685400	24460
3	Aluminium Cast Metal	MT	146206	212663	218000	170567	5440
4	Net gen. From CPP	MU	3588	3985	4100	2950.06	1050.00
B. SALES							
1	Alumina Export	MT	610940	479620	525000	338907	15200
2	Aluminium Export	MT	39865	95185	100000	91143	2900
3	Domestic Metal Sale	MT	98573	120171	118000	78853	2600
4	Total Metal Sale	MT	138438	215356	218000	169996	5500
5	Power to GRIDCO #	MU	920	595	809	291.18	108.00

FINANCIAL PERFORMANCE

3.1 The operating results of the Company during the last two years and 2000-2001 (upto Dec. 2000) are given at Table 3.

TABLE 3

(Rs.in crore)

Sl. No.	Details	1998-99 Actual	1999-00 Actual	Target for 2000-01 (BE)	Actuals upto Dec. 2000	Estimated Jan-Mar-01 (RE)
1.	Income	1,722.71	2,261.61	2,397.30	1,856.22	604
2.	Operating Cost	1,063.71	1,234.18	1,322.52	930.88	363
3.	Interest etc.	38.06	63.43	108.32	71.07	23
4.	Depreciation& Amortisation	283.11	283.00	313.37	217.75	80
5.	Net Profit before Tax & Dividend (PBT)	337.22	681.00	653.09	636.52	138
6.	Net Profit after Tax but before Dividend (PAT)	248.25	511.53	511.05	495.52	83

3.2 The sales performance of the Company are given at Table 4. It includes export sales also.

TABLE 4

Details	Unit	1998-99 Actual	1999-2000 Actual	Target for 2000-2001	2000-01 Actuals upto Dec. 00	2000-01 Estimated Jan-Mar-01
EXPORT						
Cal.Alumina	MT	610940	479620	525000	338907	152000
Aluminium	MT	39865	95185	100000	91143	29000
Total Export Earning	Rs. Crs	632.17	1031.64	1133.59	969.95	337
DOMESTIC						
Aluminium	MT	98573	120171	118000	78853	26000

PROJECTS UNDER IMPLEMENTATION

4.1 NALCO is implementing a number of downstream projects to manufacture value added items like Special Grade Alumina, Zeolite, Gallium etc. The status of these projects is as follows :

Special Grade Alumina :

4.1.1 A 26,000 TPA special Grade Alumina plant at Damanjodi at a capital cost of Rs. 56.78 crore based on technical knowhow obtained from Alumina Technology Associates, USA and consultancy service rendered by Engineers India Limited is expected to be commissioned during March, 2001. The plant is designed to produce a total of 24 grades of special hydrate and alumina. With in-house expertise, NALCO is already in the process of production and test marketing of several grades of special hydrates and alumina products produced from the pilot plant. The special products have been sold to different customers. The Special Products Marketing group provides necessary technical and marketing services to customers for gainful use of the products and market development.

Zeolite-A Project :

4.1.2 A 10,000 TPA Detergent Grade Zeolite (Zeolite-A) Plant at Damanjodi, at a capital cost of Rs. 24.10 crore based on technical knowhow from Central Salt & Marine Chemical Research Institute (CMCSRI), Bhavnagar licenced through National Research Development Corporation (NRDC), New Delhi and with consultancy services rendered by Engineers India Ltd., is scheduled for completion during March, 2001. Due to competition from sodium tri polly phosphate (presently used in detergents) in the country, marketing of Zeolite-A in domestic market will be a constraint. However, efforts are on for exploring overseas market for the same.

Gallium Project :

4.1.3 A 950 Kg/annum 5N purity Gallium Extraction Plant at Damanjodi at a capital cost of Rs. 12.77 crore based on indigenous technology and financial assistance to the extent of Rs. 5.54 crore coming from associated Government of India agencies viz. DSIR, DST, DRDO and NRDC is under implementation. The process knowhow is from Central Electrochemical Research Institute (CECRI), Karaikudi and Nuclear Fuel Complex (NFC), Hyderabad, licenced through NRDC, New Delhi and consultancy services rendered by EIL.

Takeover of IAPL :

4.1.4 As a strategic move, NALCO has taken over International Aluminium products Limited (IAPL), on 16.03.2000 a 100% EOU Company with an estimated project cost of Rs. 292 crore. Prior to 100% takeover, NALCO had 26% equity stake in IAPL. IAPL is a 50,000 TPA cold rolled product plant to produce a product mix of cast coils, cold rolled sheets and coils for end use in foils, cans, roll forming of other industries. The integration of IAPL operations will benefit NALCO in view of synergies, in several areas. IAPL will remain as a separate 100% EOU unit even after merger.

EXPANSION & DIVERSIFICATION

5.1 Mines & Alumina Refinery

5.1.1 NALCO has commissioned the 1st phase of the expansion of its Alumina Refinery in June, 2000 which has taken the production capacity of Refinery from 8,00,000 TPA to 10,50,000 TPA.

The final phase of expansion to the level of 15,75,000 TPA is scheduled to be completed by March, 2001. In the first phase of expansion itself, NALCO has already doubled its bauxite production capacity from 24,00,000 TPA to 48,00,000 TPA to meet the ultimate requirement of bauxite ore for the expanded refinery capacity. The captive Port Facilities of the Company at Visakhapatnam which handle bulk import of input materials and export of alumina are being upgraded with additional facilities to deal with the higher volumes of import and export.

5.1.2 After the expansion, NALCO becomes the largest alumina producer in Asia with an exportable surplus of about one million tones per annum after meeting the captive demands of the expanded Smelter at Angul. The expansion programme in Mines and Refinery envisages an expenditure of Rs. 1,665 crore. However, through careful selection of the technologies, optimum use of the available infrastructure and proper splitting of various packages coupled with competitive bids, NALCO is likely to achieve significant savings on the projected cost of expansion. With the demand scenario expected to grow further, NALCO's presence in the international market with higher volumes of Alumina is expected to improve the Company's financial performance and result in higher returns on investment.

5.2 Smelter & CPP :

5.2.1 In the metal segment also NALCO is on the fast track, already implementing an expansion project which will enhance the smelting capacity from the current level of 2,30,000 TPA to 3,45,000 TPA. The Captive Power Plant capacity is being increased from 720 MW to 840 MW. This project envisages an investment of Rs. 2,062 crore and is scheduled to be completed by May, 2002. With the expansion completed, NALCO's share in the country's primary Aluminium production capacity will go up from the current level of 32.21 % to about 42%.

5.2.2 The tendering activities for Smelter and CPP - 7th Unit are underway. The work for site grading and piling work are at advanced stage and are nearing completion. Similarly, the civil and structural tenders for Potline and Power House have been placed. The Smelter expansion project is scheduled to be completed by May,2002.

5.2.3 The seventh unit of CPP is scheduled to be commissioned by May,2002. The proposal for addition of 8th unit of 120 MW at a cost of Rs. 497.50 crore (August, 2000 price level) has been approved by the Government.

ENERGY CONSERVATION

6.1 The specific energy consumption figures for the Company for the last two years are given at Table 5A & Table 5B.

TABLE 5A

Alumina Plant	Unit	Norm	1998-1999	1999-2000
AC Power consumption per MT of Alumina	KWH	380	350.26	359.29
Fuel Oil consumption per MT of Alumina.	KG	85.3	78.12	77.51

TABLE 5B

Smelter Plant, Angul	Unit	Norm	1998-1999	1999-2000
AC Power consumption per MT of cast metal	KWH	14,600	17,725	15,549
Fuel Oil consumption per MT of cast metal.	KG	95	119.05	111.00

COMPUTERISATION

7.1 Pursuing the strategic plan on computerisation, activities mentioned below were taken up during the year:

7.1.1 LAN : ATM based campus LAN was installed at Captive Power Plant. WAN :

Implementation 64KBPS leased data circuit between Corporate Office, Smelter,CPP and Refinery, using fiber based DOT link, in progress.

7.1.2 New Servers: Three servers inducted at Corporate Office .

7.1.3 Development server : A dedicated server for application development was installed at Corporate Office. Applications/database are developed and tested on this server before being deployed on the production servers. Office productivity server: This server hosts Office productivity tools and applications.

7.1.4 CDSL server : NALCO has signed an agreement with Central Depository Services Limited, Mumbai for effecting electronic share transfer of NALCO shares. Installation of server, software and network equipment has been completed.

7.1.5 Automated backup: DLT based backup systems have been procured at Corporate Office for automating backup of all servers beyond office hours, thereby raising availability of servers.

7.1.6 PCs and printers were procured to facilitate computing needs of various departments.

7.1.7 Information Management System : Study on NALCO's Information Management System was completed by NALCO Chair Professor from MDI, Gurgaon.

7.1.8 For better usage of IT in various functional areas such as Finance, HRD, Marketing, MIS, Share Registry, Materials etc the application packages have been developed /converted to graphical user environment using PowerBuilder, thus keeping abreast in latest technology.

7.1.9 Facility Management services have been deployed at Zonal Offices to take care of computing needs . Implementation of commercial packages at the Zonal Offices is in progress.

7.1.10 Bilingual packages such as Leap Office 2000 have been deployed in relevant PCs to facilitate office work in Hindi.

POLLUTION CONTROL & ENVIRONMENT MANAGEMENT EFFORTS

8.1 The performance of the Company in Pollution Control and Environment Management has been satisfactory during the year 2000-2001. All the units of NALCO have been meeting the stipulated norms for air & water quality prescribed in the consent given by Orissa State Pollution Control Board(OSPCB) and have been certified to ISO 14001. The Surveillance Audits for these units and the recertification audit for Captive Power Plant have been conducted successfully.

8.2 In addition to the above, to assess the impact of pollution, additional studies had been carried out from time to time during the past i.e. biological monitoring of flora around Smelter Plant and vegetation survey around Alumina Refinery, both studies by Orissa University of Agriculture Technology (OUAT). And epidemiological survey in and around Smelter Plant was done by Regional Occupational Health Centre, (ROHC), Calcutta. Separate studies had also been carried out by Regional Research Laboratory (RRL), Bhopal and Botanical Department of Utkal University, Bhubaneswar for utilisation of fly ash generated in Captive Power Plant.

8.3 To enhance the environmental performance of the Company, installation of a defluoridation plant at Smelter and recycling of ash pond overflow at Captive Power Plant (CPP) have been completed.

8.4 So far 60.88 lakh nos. of trees have been planted at different units of NALCO covering an area of 3000 ha. During the last year, approximately 3.2 lakh trees have been planted.

8.5 As a recognition of excellent performance in the field of Pollution Control and Environment Management, the Captive Power Plant has received Pollution Control Excellence Award-2000 from Orissa State Pollution Control Board(OSPCB).

8.6 The Captive Power Plant of NALCO located in Angul, Orissa is a thermal power plant and the waste fly ash is impounded in two large ash ponds. The embankment of one of the ash ponds

of NALCO's CPP at Angul breached on 31.12.2000 which resulted in a flash flood in Nandira rivulet. This resulted in sudden flooding of near-by villages down stream who were directly or indirectly affected.

8.7 Ministry of Mines has ordered an independent enquiry into the breach of NALCO's ash pond which took place on 31.12.2000. Though NALCO has already appointed an internal Committee to enquire into the cause of the breach, the Union Ministry of Mines decided that since environmental issues were involved, an independent enquiry by experts drawn from outside the Company should look into not only the cause of the damage, but also the long term solution to the problem of ash disposal. A three member Enquiry Committee with 2 experts from NTPC and 1 from Ministry of Environment and Forest has been set up on 8.1.2001 and asked to submit its report within 6 weeks.

RESEARCH & DEVELOPMENT

9.1 NALCO's In-House R&D establishments both at Mines & Refinery Complex, Damanjodi and Smelter & Power Complex, Angul have been recognised by DSIR, Ministry of Science and Technology, Government of India upto 31st March, 2003. Some achievements in Process and Product Development are:

9.1.1 Fully backed by In-house technological expertise, a 600 TPA capacity Special grade Alumina Pilot Plant has been commissioned at an investment of Rs.3.29 crore including financial support of Rs.1 crore from DSIR, Government of India. Various range of products as planned, have been developed and successfully test marketed. 124 MT of Special Grade Alumina and 733 MT of Special Grade Hydrates were sold to the prospective customers.

9.1.2 After successful development of new Rare Earth Added Aluminium Alloys for Conductor Application in the laboratory scale in close collaboration with RRL, Trivandrum and subsequently patenting the process in India, pilot scale studies were undertaken utilising the facilities of DMRL, Hyderabad and BALCO, Korba. Plant scale trials were also carried out at NALCO's Smelter Plant, Angul and 3 nos of charges of 10 tonne each of different Aluminium Metal Compositions were prepared. Testing and characterisation of the products are underway.

9.1.3 After successful characterisation of Spent Cathode Pot Lining Materials in collaboration with JNARDDC Nagpur, Process Flow Sheet for extraction of valuables have been developed. Indepth analysis of the constituents and suitable applications of such valuables for its effective re-cycling are under investigation.

9.1.4 Technology Demonstration Project on Effect of Fly Ash on Soil Fertility and Crop Yield covering an area of 3 acres has been takenup at CPP, Angul in collaboration with RRL, Bhopal and Fly Ash Mission, TIFAC, DST, Government of India. The project is under active implementation and seasonal crops, vegetables and cereals are being cultivated by using Fly ash in various compositions matching with the soil quality.

9.1.5 Wear Resistant Cast Iron from NALCO Red Mud and Conversion of NALCO Red Mud into Ferro-Titanium have been successfully completed in laboratory scale in collaboration with Department of Metallurgy and Material Science, IIT, Kharagpur. Based on the findings of laboratory scale studies, Industrial scale trials have also been taken up and results are more or less in agreement with the laboratory scale studies.

9.1.6 A Laboratory scale R&D project has been successfully completed in collaboration with RRL, Bhubaneswar for Removal of Oxalates and Colouring Materials from NALCO's Sodium Aluminate Liquor.

9.1.7 Scores of collaborative R&D projects are being taken up with various CSIR laboratories and IITs and National Institutes of repute for Process and Product Development related to Alumina, Aluminium and allied fields.

9.1.8 In-house R&D activities pertaining to Development of Technology for Coated Alumina Hydrates, Reduction of Soda content in Alumina

Hydrate and Calcined Alumina, Production of Light Alumina Hydrate, Studies in high temperature furnace for conversion in to Alpha Alumina and Studies on De-colourisation of Aluminate liquor through alternate routes have been successfully carried out in the Mines and Refinery Complex Laboratory, Damanjodi.

9.1.9 As regards In-house R&D activities in Smelter Plant, Angul, Effects on Anode quality improvement, Reduction in Anode Butt Generation, Improvement in recovery of cathode rejected blocks, Evaluation of effectiveness of low density Aluminium Flouride and Development of New types of Anode Clads have been successfully carried out.

INDUSTRIAL RELATIONS

10.1 The industrial relations scenario of the Company, although cordial, was characterized by multi unionism, acute inter union and intra-union rivalry. The growth in number of unions in the Company has been remarkable making the total number of functional unions now 21 (out of which 14 are affiliated to various Central Trade Union Organisation viz INTUC, BMS, HMS & CITU).

10.2 An uneasy situation is prevailing because of the delay in revision of pay/wages and fringe benefits for both executives and non-executives. The delay in wage settlement in turn is because of the growth in number of unions with rival objectives and the litigation resorted to by the Unions.

PERSPECTIVE PLAN FOR WOMEN'S WELFARE:

11.1 The representation of women employees is relatively low among the employees of the Company on account of the mismatch between the nature of job requirement in the Company vis-a-vis the availability of technically experienced women candidates in the labour market. However, the Company continues to provide equal opportunity to women in employment.

11.2 Apart from providing developmental and functional training programmes to the women employees, the Company's thrust is to develop the women employee towards assertiveness and courage to deal with the issue of harassment of women at work place. Institutional mechanism through conduct rules has also been put in place to avoid sexual harassment of women.

11.3 As a mark of development in their individual leadership, women executives of the Company have got a place as co-ordinator/member of National Organizations like Women in Public Sector (WIPS). In addition to this, support in various forms is extended to members of ladies club/ Mahila Samaj for the improvement of the cause of women.

WELFARE OF TRIBALS AND MINORITIES

12.1 The Alumina and Mines units of the Company are placed in the midst of a predominantly tribal area at Damanjodi. The focus is therefore on the rehabilitation and provision of amenities for 521 families who have been displaced for the establishment of the project. Development of roads, school, college, library, recreation center, ponds, wells and agricultural land etc have been the hallmark of the developmental works undertaken along with the literacy development programme on the peripheral tribal dominated villages. Besides, direct employment in NALCO Damanjodi Sector has been provided to 425 persons on the basis of one able bodied person from each displaced family and opportunity is provided to the balance for their engagement with contractor.

12.2 Adherence to the Presidential Directives on reservation of SC/ST persons in employment has been the basic policy of the Company. There are also exclusive Cells constituted for the welfare of the SC/ST employees besides guidance and interaction with the welfare associations framed by the SC/ST employees at its various units.

12.3 The Company takes due care towards the sentiment of various minority community with a greater objective of communal harmony. In the selection committees of Group-'C' & 'D' vacancies a member of minority community is invariably

associated as a part of recruitment practices.

EMPLOYMENT IN THE COMPANY

13.1 Employment in the Company of SC/ST/ EX.SM/PH/ LDP/Minorities as on 31.12.2000 is given at Table 6.

TABLE 6

Sl. No	Group	Total No. of Emplo-yees	SC	ST	Ex-S M	PH	LDP	Mino-rity
1	Executives	1530	174	77	09	04	10	65
2	Non-executives	4921	915	1096	79	51	1709	176
3	Trainees	63	10	10	-	-	30	23
	Total	6514	1099	1183	88	55	1749	264

PROGRESS ACHIEVED WITH REGARD TO WELL BEING OF THE OLDER PERSONS DURING THE YEAR.

14.1 The Company, besides the statutory retirement benefits viz. Provident Fund, Group gratuity life assurance scheme, pension etc., has a contributory scheme for post retirement medical facilities to the superannuated employees and also their spouse.

14.2 The Company also provides the recreational facilities to the retired employees and their family members in its club, community center etc.

DISABILITY ACT 1995

15.1 Notwithstanding the fact that the Company is established with state-of-the-art technology requiring mostly healthy and competent technical personnel, measures are being taken to achieve 3% representation in all posts in Group - C&D and in identified posts in Group-A&B under section 33 of the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995. As on 30.12.2000 there are 56 Physically Handicapped Persons in employment of the Company in various identified posts constituting 0.86% of the total work force.

15.2 Further keeping in view the limited scope for recruitment of disabled persons, the Company has sought for exemption under referred provisions of the Act on recruitment of persons in Executives as well as Non-executive category, particularly in the technical stream.

MOU RATING

16.1 The MOU rating for last three years is given at Table 7.

TABLE 7

Year	MOU Rating
1997-98	1.452 (Excellent)
1998-99	4.466 (Average*)
1999-2000	1.42 (Excellent)

*** This was due to potline problem that occurred during the year.**

PROGRESSIVE USE OF HINDI - 2000-2001

17.1 During the year 2000-2001 efforts were continued for achieving targets for progressive use of Hindi. To encourage noting and drafting in Hindi a booklet of Hindi-English notings 'Karyalaya Tippanian' was published and distributed.

17.2 Many programmes organised for celebrating Rajbhasha Golden Jubilee year at different units of the Company.

17.3 At the different units of the Company, Hindi fortnight and Hindi day on 14th September were organised with a number of programmes. During this period different Hindi competitions were organised and in the closing ceremony held on 16th September at Corporate Office, prizes were distributed by Chairman-cum-Managing Director.

17.4 Special issue of the Hindi magazine 'Akshar' was published on the occasion of Hindi Week celebration, and the best compositions of Employees published has been awarded with prizes.

17.5 Publication of Hindi magazine 'Parichaya' was a regular feature. Efforts were continued to

improve the get-up and matters of this house magazine.

17.6 Hindi 'Parichaya' has been declared as the best house magazine and has been awarded by Kendriya Sachivalaya Hindi Parishad on 19th September, 2000 at New Delhi.

17.7 Hindi magazines 'Bhavava' from Angul, 'Teen Suman' from Damanjodi and 'Panchapatmali Samachar' from mines were published regularly.

17.8 At S & P Complex, Angul the Town Official Language Implementation Committee meetings were organised regularly under the chairmanship of NALCO and Deputy Director (Implementation), Deptt. of Official Languages, Ministry of Home Affairs has attended the meetings and guided the member offices. NALCO's cooperation and guidance was significant in providing encouragement for progressive use of Hindi to the Central Govt. Offices of this region.

17.9 Bilingual computerisation of different forms used in office has been started by Hindi Cell. 41 Forms has been computerised in first phase.

17.10 The Drafting and Evidence sub-committee of Committee of Parliament on Official Language inspected the Vizag office of the Company on 11.09.2000.

17.11 The third sub-committee of Committee of Parliament on Official Language inspected the Corporate Office of NALCO on 08.11.2000 and reviewed the status of Official Language implementation.

17.12 Till November, 2000 two Hindi workshops at Corporate Office and one at Angul were organised. Rajbhasha Cell has also given faculty assistance at many workshops organised by other Central Government offices.

CHAPTER VI-B

BHARAT ALUMINIUM COMPANY LIMITED

(www.balcoindia.com)

INTRODUCTION

1.1 Bharat Aluminium Company Limited (BALCO) was incorporated on 27th November, 1965 with an integrated Alumina / Aluminium Complex at Korba in the district of Korba (erstwhile Madhya Pradesh) now comes under Chhattisgarh State. The Alumina Plant has 200,000 tonne per annum (TPA) capacity and is based on Hungarian Technology. The Aluminium Smelter of 100,000 TPA capacity is based on Soviet Technology. The down stream facilities has capacity to produce 35,000 TPA of Properzi Rods, 40,000 TPA of Rolled Products, 7,000 TPA of Extrusions and 18,000 TPA of Billets and Slabs etc.

1.2 BALCO has another Unit at Bidhanbag, near Asansol in West Bengal, vested in BALCO following its nationalisation in June, 1984 by the Govt. which then owned it.

1.3 As on 31st March, 2000 the Authorised Capital of the Company stood at Rs. 500 crore and the subscribed Capital at Rs. 244.42 crore.

Gas Cleaning Plant of BALCO at Korba

PRODUCTION PERFORMANCE

2.1 The actual production figures of Korba Complex and Bidhanbag Unit(BBU) for the last two years along with the target of 2000-01 and actual production figures for April-December, 2000 are given at Table 1.

TABLE 1

Production Performance of Korba/BBU

(Figures in tonne)

	1998-99 Actual	1999-2000 Actual	2000-2001 Target	Apr. to Dec. 2000 Target	Apr. to Dec. 2000 Actual	Anticipated Production 2000-01
Korba Complex	91,844	94,345	95,500	71,547	70,525	94,500
Bidhanbag Unit	2,415	2,901	2,500	1,880	2,155	2,200

FINANCIAL PERFORMANCE

3.1 Financial Performance of the Company is given in the Table 2.

TABLE 2

(Rupees in Crore)

Details	Actual for the Previous Years		Target for	Actuals (Apr.-
	1998-1999	1999-2000	2000-2001	Dec. 2000)
Income	923.72	979.14	892.31	647.16
Operating Cost	733.93	809.64	680.69	576.31
Interest & Transaction Loss	6.30	5.82	9.00	8.14
Depreciation & amortisation	48.73	46.20	55.01	37.29
Net Profit before Income Tax and Dividend	134.77	116.19	147.61	23.36

SALES PERFORMANCE

4.1 During the year ending 31st March, 2000, the Company had made sales turnover of Rs. 896.64 crore. It had sold 92,568 tonne of metal. In the previous year 1998-99 the Company sold 93,838 tonne of metal and achieved a turnover of Rs. 870.96 crore. However, during the current financial year upto December, 2000 the Company has sold 70,786 tonne of metal and achieved a turnover of Rs. 727.96 Crore.

ON-GOING PROJECTS, EXPANSION AND DIVERSIFICATION

5.1 New Cold Rolling Mill:

5.1.1 The New Cold Rolling Mill (NCRM) is being installed at Korba with major equipment from M/s FATA HUNTER, Italy. Erection work of Super Caster is ready and CRM is being erected. All the associated facilities like Nitrogen plant, AC and ventilation, cooling towers and power distribution etc. are also in advanced stage of completion. As per the present estimates, the NCRM is now likely to be commissioned by June 2001.

5.2 Modernisation of Foil Plant at Bidhanbag Unit

5.2.1 The tendering process for the modernisation of Foil Plant at BBU are in progress. The total job has been planned in 10 packages at an estimated cost of Rs. 3.87 crore. The LIOs for different packages are being placed.

5.3 Development of New Bauxite Mine

5.3.1 The Company is developing two captive mines viz. Mainpat and Bodai Daldali (Kwardha) in M.P. While the production from Mainpat mine has already commenced, the other mine at Bodai Daldali is in the process of development. The Company expects to receive necessary clearances from MOEF soon. BALCO had requested M. P. State Govt., to grant permission for 60 hectares encroachment free Govt. land to start up the preliminary activities at Bodai Daldali mine. The prodution at the mine is likely to commence from 2001.

5.3.2 Meanwhile the Company is making its all efforts to get mining lease for Jamirapat deposit in M.P.

ENERGY CONSERVATION

6.1 Number of energy conservation measures have been taken in Alumina, Smelter & Fabrication Plants and engineering services.

COMPUTERISATION

7.1 BALCO has been making use of information technology to achieve better productivity. It has put up its own web site that has linkage with e-mail. The Information Technology is also being made use of in some other areas.

7.2 Smelter process control.

7.2.1 Smelter pots are monitored by microprocessor based equipment (CELTROL). Information regarding voltage is collected by sensors and passed on to CELTROL through communication buffers which in turn pass information to a supervisory computer.

7.2.2 The supervisory computer, which is a Unix based server, is networked through thicknet to shop floor terminals. Voltage is controlled from set parameters through anode movement.

7.2.3 Supervisory computer also generates exception reports when set parameters are violated. Anode effect, duration of tapping can be controlled by setting proper parameters. All reports become available to terminals on the shop floor.

7.2.4 There is voice annunciation system (VORTAX) which announces (automatically in Hindi) the anode effect in all 8 rooms for the benefits of operators, the pots to be attended or where anode effect is expected. It also helps in maintaining certain minimum level of hot metal in the pots which has improved productivity. Another advantage of this system is quick restoration of the cells after power trips.

7.3 Marketing

7.3.1 The whole gamut of marketing activity has been computerised. BALCO has implemented a fully integrated on line marketing system using local area network (LAN) and wide area network (WAN). Activities of Regional Marketing Offices, like receiving inquiries, purchase order, confirmation of orders (CO), financial instruments (FI) etc. are computerised.

7.3.2 Necessary information like, on ordering & financial arrangement is sent to Korba using dial up modems on WAN. The main server (computer) is installed at Korba which processes the information and generates manufacturing program and production plan. It receives input like, production of finished goods, receipt of quality test results etc.

7.3.3 It generates dispatch slip, invoice, exercise gate pass, customer ledger etc. Information regarding finished goods inventory, despatch, invoiced raised, customer ledger is made available to regional marketing offices.

7.3.4 The server at Korba is Compaq P-III 500 MHz, 1 GB RAM, 2x9 GB hard disk drive with 15 terminals spread over production planning dept., marketing coordination cell, quality test laboratory, shop floors, dispatch, sales accounting group. The software is UNIX and database is Oracle.

7.3.5 At the regional offices, it is Pentium PCs with window and Power Builder at the front end.

POLLUTION CONTROL AND ENVIRONMENT PROTECTION MEASURES

8.1 Overhauling and monitoring of performance of ESPs.

8.2 Monitoring and corrective action for maintaining pH, Oil, Fluorine (F) gas etc. in various effluents.

8.3 Covered shed for storage of Spent Pot Lining (hazardous waste) was constructed for reducing Fluorine contents in Smelter & Anode Paste Plant effluents.

8.4 Horticulture development work and tree plantation was carried out in open spaces inside the plant premises.

8.5 Environmental and Pollution control awareness has been enhanced by conducting various programmes among the employees.

SALIENT ASPECTS OF THE WORK BEING DONE BY ADVISORY BOARD/ COUNCILS

9.1 BALCO is presently availing of the technical know-how and other related services from Jawaharlal Nehru Aluminium Research, Development & Design Centre (JNARDDC), National Environmental Engineering Research Institute (NEERI), Nagpur and Central Glass Ceramic Research Institute (CGCRI), Calcutta.

RESEARCH AND DEVELOPMENT

10.1 The research and development activities at BALCO are a continuing phenomenon aimed at improving the production performance and quality of its products.

10.2 The Company has been successful in meeting stringent requirements of the defence research organisations and has proved its mettle time and again. During 1999-2000 the Company has developed Al-Zn-Mn alloy for armoured plate as per defence specification.

10.3 BALCO's extensive laboratory facilities are manned by competent technical people. The functions of laboratory include exploration and production samples assaying for the mine, production and quality control for alumina, smelter and fabrication plants and monitoring of the environment. The samples from various stages of production starting from bauxite grinding, various stages of alumina production, smelter hot metal and fabricated products are also analysed to have strict quality control on all incoming and outgoing materials.

INDUSTRIAL RELATIONS

11.1 The industrial relations remained cordial during the year under review. Interactions with the Unions were maintained on continous basis. The most predominant event occupying the minds of all the Unions, Associations and employees is the issue of disinvestment of the Company. All the Unions are active on this issue.

11.2 The pay scales of executives/officers following IDA pattern have been recently revised w.e.f. 1.1.1997 in accordance with the guidelines issued by the Department of Public Enterprises, Govt. of India.

PERSPECTIVE PLAN FOR WOMEN

12.1 Women employees of BALCO are being given all the statutory and normal benefits including operation of Creche for their children. Seminars and workshops are being organised especially for participation of women employees and delegations are also being sent to outside seminars and programmes.

WELFARE OF TRIBALS & MINORITIES

13.1 Company has shown a serious concern for the welfare of tribal and minorities many of whom are land-oustees from inception of the Company. Emphasis has been placed on their rehabilitation, induction into the Company, imparting of adult education to them, initiation into sports, providing free medical check up, helping them with medical treatment and providing medicines, organising family welfare activities and eye camps and cultural programmes. The Company has shown particular interest in preserving and encouraging their cultural values and heritage. Cultural programmes are regularly organised to popularise and preserve their folk music and theatre art. The Company has extended financial assistance and also infrastructural facilities for construction of permanent tar roads connecting Parsabhata and Rogbahari villages apart from providing handpumps, streetlights and approach roads to the villages inhabited by tribal population.

LONG SERVICE AWARD

14.1 In recognition of the work done, the Company has awarded long service awards to its Executives/workers who have completed 25 years of service with the Company.

EMPLOYMENT IN THE COMPANY AS ON 31ST DECEMBER, 2000

15.1 The Company is alive to its social objectives and it has been making all out efforts to induct

SC/ST & OBC candidates for maintaining their due representation in line with the directives issued by the Government from time to time.

15.2 The employment position in the Company as on 31st December, 2000 is given at Table 3.

TABLE 3

Group	Total No.	SC	ST	Ex-SM	PH	LDP	Minorities
Executives	1102	62	38	6	7	-	87
Non-Executives	5502	921	865	54	11	-	392
Management Trainees	-	-	-	-	-	-	-
Apprentice	31	2	3	-	-	-	3
Trainees	130	27	35	-	-	-	3
Total	6765	1012	941	60	18	-	485

MOU RATING

16.1 The MOU ratings achieved by the Company for the last three years are given at Table 4.

TABLE 4

Year	MOU Rating
1997-98	Very Good
1998-99	Very Good
1999-2000	Good

PROGRESSIVE USE OF HINDI IN OFFICIAL WORK

17.1 The Company continued its efforts to encourage and popularise the use of Hindi in day-to-day official work. Various programmes for training were organised on regular basis.

PROGRESS ACHIEVED WITH REGARD TO THE WELL BEING OF THE OLDER PERSONS DURING THE YEAR

18.1 Post retirement free medical facility is being provided in our hospital to our retired employees and their spouses staying at Korba.

18.2 Contributory scheme of post retirement medical facility is provided to employees of BALCO and their spouses who are not at Korba.

18.3 Free medical facilites to the inhabitants of the adopted villages are being provided by BALCO Management under Rural Development Programme to the villagers.

CHAPTER VI-C

HINDUSTAN ZINC LIMITED

(www.hzlindia.com)

INTRODUCTION

1.1 Hindustan Zinc Limited (HZL) is one of the leading producers of lead and zinc in the country. It was incorporated in January 1966 as a public sector Company after the take over of the erstwhile Metal Corporation of India Limited, to develop mining and smelting capacities to substantially meet the domestic demand of zinc and lead metals.

1.2 HZL is an MOU signing Company since 1991-92, with Government. The provisional rating of MOU 1999-2000 is "Excellent". The authorised share capital of HZL is Rs. 500 crore. The paid up capital is Rs. 422.53 crore. The Government holds 75.92% of the equity as 24.08% of its equity was disinvested during the period 1991-93. Government has decided to further disinvest 26% equity capital of HZL to a strategic partner with an appropriate role in management.

1.3 HZL with its Headquarters at Udaipur operates five lead-zinc Mines with a total lead-zinc ore production capacity of 3.49 million tpa

Rampura Agucha Mine of HZL in Bhilwara District of Rajasthan

and four smelters with combined installed capacity of 152,000 tpa zinc and 65,000 tpa lead, besides a rock phosphate mine. The Company offers a wide range of zinc and lead metal grades to its customers, besides a range of by-products. Table-1 and Table-2 depict the mines and smelters of the Company with corresponding production capacity :

TABLE 1

Ore Production Capacity of HZL Mines.

Mines	Ore	Capacity (TPD)
Zawar Group of Mines Disst. Udaipur (Rajasthan)	Lead-Zinc	4000
Rajpura -Dariba Mine, Distt. Rajsamand (Rajasthan)	Lead-Zinc	2400
Rampura Agucha Mine, Distt. Bhilwara (Rajasthan)	Lead-Zinc	4500
Sargipali Mine, Distt. Sundergarh (Orissa)	Lead	500
Agnigundala Mine, Distt. Guntur (Andhra Pradesh)	Lead	240
Maton Mine, Distt. Udaipur (Rajasthan)	Rockphosphate	600

TABLE 2

HZL Smelterwise Metal production capacity

Smelters	Capacity (TPA)	
	Zinc	Lead
Debari Zinc Smelter, Distt. Udaipur (Rajasthan)	49,000	-
Vizag Zinc & Lead Smelter, Distt. Visakhapatnam (Andhra Pradesh)	33,000	22,000*
Chanderiya Lead-Zinc Smelter, Distt. Chittorgarh (Rajasthan)	70,000	35,000
Tundoo Lead Smelter, Distt. Dhanbad (Jharkhand)	-	8,000

*** Since closed down w.e.f. 24.1.2001.**

PHYSICAL PERFORMANCE HIGHLIGHTS (APRIL-DEC., 2000)

2.1 The performance highlights between April 2000 and December 2000.

- MOU performance rating provisionally works out to "Excellent".
- Net Profit earning (PBT) of Rs. 201.00 crore, compared to the budget of Rs. 115.18 crore.
- Sales turnover of Rs. 1183.65 crore, compared to the budget of Rs. 1112.70 crore.
- Lead-Zinc concentrate production at 108% of the target.

PHYSICAL PERFORMANCE

3.1 The Physical performance of the Company is at Table-3.

TABLE-3

(Figures in tonne)

Product	1998-99 Actuals	1999-2000 Actuals	Target for 2000-2001	2000-2001 Actuals upto Dec.2000
Lead-Zinc Ore	2644883	2740612	2528000	1939532
Lead-Zinc Conc.	412617	422127	391220	305057
Zinc Metal	141806	145796	149500	107513
Lead Metal	39010	35120	33500	25548

3.2 The Lead-Zinc ore and concentrate production are estimated at 100% and 101% respectively of the annual targets.

3.3 Zinc and lead metal production are estimated at 100% and 102% respectively of the annual targets during the current year.

FINANCIAL PERFORMANCE

4.1 The financial performance of the Company is given at Table-4.

TABLE-4

(Rs. in crore)

Details	1998-99 Actuals	1999-00 Actuals	Annual Budget Estimate 2000-2001 (BE)	2000-01 Actuals Upto 31-12-2000
Income	1346.05	1565.46	1537.84	1183.65
Operating Cost	1120.91	1304.40	1303.40	932.41
Interest	15.24	10.46	5.05	3.14
Depreciation & Amortisation	58.75	68.43	69.39	47.10
Net Profit (PBT)	151.15	182.17	160.00	201.00

4.2 During the period April-December, 2000, the Company had a record sales turnover of Rs. 1183.65 crore and again a record profit before tax of Rs. 201.00 crore as compared to budget of Rs. 1112.70 crore and Rs.111.39 crore respectively. The Company expects to end the year with a profit (before tax) of Rs.176 crore and turnover of more than Rs.1700 crore.

SALES PERFORMANCE

5.1 Zinc sales during the period April-December, 2000 was 103830 tonne. It is expected that sale for the year will be 144000 tonne. Lead metal sale during the period April-December, 2000 was 25947 tonne and for the year 2000-2001 it is expected to be 34,000 tonne. The Company expects to export about 80,000 tonne zinc concentrate during the current financial year.

PROJECTS

6.1 Kayar lead-zinc prospect, Dist. Ajmer, Rajasthan

6.1.1 HZL acquired mining lease for an area of 4.875 sq km. for Kayar lead-zinc prospect, district Ajmer.

6.1.2 In order to delineate the deposit with a fair degree of confidence and establish firm geological and metallurgical parameters for preparation of techno-economic feasibility report, detailed exploration involving 16800m drilling at an estimated cost of Rs. 12 crore is in progress.

6.1.3 For speedier exploration a high-speed All-Hydraulic Sweden drill machine has been commissioned. During the period April-December, 2000, 3695m drilling has been completed with a total 5723m since inception. The exploration data generated indicate a complex geological behaviour of the deposit. The project is scheduled to be completed by Sept. 2001 and detailed feasibility report by March, 2002 for investment decision.

6.2 Jagpura Gold Prospect, Dist. Banswara, Rajasthan

6.2.1 HZL is continuing its exploration campaign in Jagpura area, distt. Banwara where it holds a prospecting licence over 43.10 sq km. The drilling for oxidized ore in northwest and northeast blocks has been completed. Exploration is now being carried out in the southwest and southeast blocks. A total of 16129 m of drilling has been carried during period April-December, 2000. A possible resource of 1.18 million tonne averaging 1.83 g/t gold in oxidized zone, and 1.41 million tonne with 3.08 g/t gold in sulphide zone has been estimated in NW and NE blocks upto a depth of 50m.

6.2.2 The drill core composite sample have been sent to M/s. Mintek of South Africa for metallurgical test work. The geological and pre-feasibility study is expected to be completed by March, 2001.

6.3 New Zinc Smelter :

6.3.1 The Government has approved setting up of a 100,000 TPA greenfield Zinc Smelter plant by HZL at Kapasan, Chittorgarh Distt. Rajasthan at an estimated cost of Rs. 1203.75 crore. The plant is expected to be completed in 48 months from the date of completion of the disinvestment process of HZL. The Company has been authorised to incur an expenditure of Rs. 9.79 crore during the current financial year for acquisition of land, etc. The rest of expenditure would be incurred

after completion of disinvestment process of HZL. The project would be funded by internal resources of the Company and the borrowings.

6.4. Zinc Smelters' Expansion

6.4.1 The expansion of Vizag and Debari Zinc Smelters by 10,000 TPA each is in progress. Turn key execution work for expansion has been taken up by L&T (Madras) for Vizag and NICCO (Calcutta) for Debari.

6.4.2 These projects are likely to be mechanically completed during the quarter January-March, 2001.

6.5 Nickel Technology Proving Plant

6.5.1 The Nickel Technology Proving Plant for recovery of Nickel from low grade lateritic chromite overburden dumps at the Sukinda Valley in Orissa State has been commissioned in March, 2000. The plant is in operation to firm up the operating parameters.

6.6 100 MW Power Plant

6.6.1 An MOU was signed between HZL and Rajasthan State Mines & Minerals Ltd., (RSMML) in February, 1997 to set up a 100 MW Power Plant.

6.6.2 Availability of alternate fuel and sources of supply are being collected to identify most economic alternatives.

6.6.3 Studies for preparation of EIA/EMP are continuing and Rapid EIA/EMP report is at the final stage.

7. INTERNATIONAL CO-OPERATION

7.1 Pac Lang (Vietnam) Joint Venture :

7.1.1 As BRGM's assignee Selanor was not willing to have financial participation, the equity split in the proposed Pac Lang JV will be HZL-70%, VIGEGO-30%. However, BRGM will be assisting the JV in technical areas on mutually agreed terms between HZL & BRGM.

7.1.2 A delegation consisting of representatives from Selanor, BRGM and HZL visited Vietnam in October, 2000 to hold discussions with VIGEGO and other Vietnamese Government officials besides visiting Pac Lang area for expediting the take off of the project.

7.1.3 HZL has resubmitted PL/EL applications alongwith work programme and budget to the Ministry of Industry, Govt. of Vietnam. After scrutiny of the applications, an Evaluation Committee will call HZL for discussions before granting the requisite licences to commence the work at Pac Lang.

ENERGY CONSERVATION

8.1 The Company has been adopting various measures as on-going process for conservation of energy in all the units of HZL. The following measures are being continued to give overall saving in energy at different units of the Company:-

- Load & energy management.
- Use of energy efficient equipment.
- Optimization of system power factor.
- Sizing of equipment to achieve minimum energy consumption.
- Plugging of losses of energy by way of leakages in air/ water & steam line, defective insulation, etc.
- Process improvement / modifications.
- Measurement & monitoring consumption of various forms of energy.
- Energy audit at regular intervals.

COMPUTERISATION

9.1 Old, obsolete & Non-Y2K compliant PC-XTs/286s/386s have been replaced with latest Pentium III based computers.

9.2 E-Mail/Internet on Local Area Network : (HZL's Intranet) Web server and mail servers are setup and access is provided to PC users for accessing the net and sending and receiving the mail from a common HZL domain.

9.3 Maintenance, updation and administration of HZL web sites **(hzlindia.com & hzlmetals.com)**

is carried out remotely from HZL head office for constant updation/improvement of HZL web sites.

POLLUTION CONTROL AND ENVIRONMENT MANAGEMENT EFFORTS

10.1 Solid wastes generated at mining units were utilized for raising tailing dam height and filling low lying areas. Excess waste is being properly stacked and stablized. Regular monitoring of air, water, noise etc. was carried out throughout the year.

10.2 Nearly 12000 numbers of new saplings were planted during the year in addition to the existing trees being kept well maintained at all the mining units of the Company.

RESEARCH AND DEVELOPMENT ACTIVITIES

11.1 Bioreactor Technologny

11.1.1 In order to mitigate likely adverse environmental impact due to storage of large quantity of zinc bearing tails with acid forming tendencies, development of bioreactor technology has been taken up to recover zinc in collaboration with EIL and RRL (B). The project cost estimate is Rs.95 lakh being funded by HZL, DST and MOM with the aim to generate Zn SO4 solution with 20-25 gpl Zn. So far a concentration of 11 gpl has been achieved with Thiobacillous ferrooxidans bacteria in 9K solution. Further work for improving concentration is in hand.

11.2 Recovery of Germanium

11.2.1 For recovery of Germanium (40-50 ppm) in Waelz Kiln oxide of Visakhapatnam Zinc Smelter, it is proposed to have collaboration with C-MET, Hyderabad.

11.3 Manganese Nodule

11.3.1 HZL has been chosen as implementing agency for R&D work and has been entrusted with the task to put up a 500 kg/day pilot plant for recovery of value added metals Ni, Co, Cu for ocean bed nodules by Department of Ocean Development (DOD), GOI. Pilot scale studies were carried out to test the process flow-sheet for the starch-Sulphuric Acid Leaching Process developed by CRDL, HZL. LOI for supply and erection of PMN pilot plant has been released. The plant is expected to be commissioned by May, 2001.

11.4 Cobalt Metal Recovery

11.4.1 To improve the recovery of metal from 40% to 60% and purity of 99% in the demonstration plant, HZL undertook a project at a cost of Rs.94.54 lakh, of which TIFAC advanced a loan of Rs.40 lakh. The revised 3-stage leaching process was developed with BARC and implemented in the existing solvent extraction plant. Modifications were also made in the solvent extraction section. The project was completed successfully in July, 2000.

Salient Aspects of the Work Being done by Advisory Boards/Councils :

12.1 Joint Consultative Committees are functioning in all major units of the Company. The Committee consists of representatives from workmen and managament, and the areas discussed include production & productivity improvement, reduction in cost of production etc. The recommendations of the Committee are generally implemented.

12.2 In addition to the Joint Consultative Committees, various other Bipartite Committees/ Forums on Welfare, Safety, Canteen Management, House Allotment etc. are functioning. The unanimous recommendations of these Committees are also generally implemented. The functioning of these Bipartite Forums have created a conducive climate for better production/productivity at all levels.

INDUSTRIAL RELATIONS

13.1 The industrial relations in the Company by the large had been peaceful and cordial. However, one day token strike was observed by the Workmen on 15th September, 2000. against the disinvestment in the Company. Token strike by workmen of Vizag Unit on 11th May and 23rd October, 2000 were also observed opposing

disinvestment and closure of Lead Plant of the Company at Vizag respectively.

13.2 Pay scales valid for 10 years w.e.f. 1.1.1997 in respect of Executives and in respect of workmen w.e.f. 1.7.1997 have been revised.

13.3 Voluntary Retirement Scheme (VRS) was notified for workmen of Zawar Mines, Rajpura Dariba Mines and Zinc Smelter Debari, and 559 workmen opted were released in April, 2000. In addition 35 executives opted for VRS were released during the period. Special VRS was notified twice for the workmen of Lead Plant, Vizag Unit and 4 workmen opted were released in September, 2000. All the employees of lead smelter of the Company at Vizag opted for VRS and they were disengaged after the payment of terminal benefits. Now the lead smelter at Vizag stands closed w.e.f. 24.1.2001.

WOMEN WELFARE

14.1 The female employees of the Company are given better welfare amenities. They are also being sent for training, both in-house and outside. Participation by female employees in various National Forums is also encouraged.

14.2 To take care of Medical facilities of female employees, the Company has Lady Doctors in its hospitals/dispensaries.

WELFARE OF TRIBALS AND MINORITIES

15.1 Various welfare measures including Free Medical aid, Drinking Water, School facilities, Co-operative/Provision store facilities etc. are being availed/extended to the tribals and minorities residing in the adjacent areas of the units.

EMPLOYMENT IN THE COMPANY

16.1 The manpower employed in the Company as on 30th September, 2000 was 9482 out of which 1634 belonged to SC and 1321 to ST.

WELL BEING OF THE OLDER PERSONS

17.1 To take care of the medical needs of retired employees, a medi-claim policy has been taken through Unit Trust of India (Senior Citizen Unit Plan) under which the retired employees and their spouses can get medical treatment/hospitalisation charges upto Rs. 5.00 lakh.

STATUS OF IMPLEMENTATION OF THE PERSONS WITH DISABILITY ACT, 1995

18.1 The provisions relating to reservation of vacancies for persons with disability have been notified to Units for Implementation.

EXPORT / IMPORT PERFORMANCE

19.1 Export

19.1.1 The Company has exported 36,023 tonne Zinc Concentrate upto December, 2000 during the current financial year. It is expected to export about 80,000 tonne Zinc Concentrate during the year 2000-2001.

Imports

(Rs. in lakh)

Import	1999-2000	2000-2001 (Estimated)
Raw materials	490.05	1375.00
Components, stores and spare parts	1800.93	1500.31
Capital goods	975.15	3735.44
Total	3266.13	6610.75

MOU RATING :

20.1 The MoU rating achieved by the Company during the last three years is given at Table 5.

TABLE-5

Year	MOU Rating
1997-98	Excellent
1998-99	Very Good
1999-2000	Excellent

PROGRESSIVE USE OF HINDI

21.1 100% compliance of Section 3(3) of the Official Languages Act has been achieved in all the units including Head Office.

21.2 The progress of Hindi correspondence of the various units is as follows: HO-38.5%, CRDL-37.5%, Debari Smelter-32.5%, Maton Mine-65%, Zawar Mines-62%, Rajpura Dariba Mine 76%, Cahanderiya Smelter-13.5.%, Rampura Agucha Mine-27.5% and Tundoo Smelter-28%

21.3 Non-Hindi speaking units : Vizag Smelter-69.%, Agnigundala Mine-13.5%, Sargipalli Mine-31%

21.4 4 employees appeared for Hindi typing and 1 for Hindi Stenography exam conducted under Hindi Teaching Scheme of the Government

21.5 20 Hindi workshops were organized from time to time in all units of the Company in which 285 employes took part.

21.6 Hindi weeks have been celebrated effectively in all the units. On this occasion Rajbhasa seminars/ competitions/ Hindi workshops were organized.

21.7 Active cooperation is extended to Udaipur Town Official Language Implementation Committee constituted by Rajbhasa Vibhag (Govt. of India).

21.8 Inspections have been made of one Unit and Head Office by Rajbhasha Inspection Committee.

21.9 The branches of kendriya Sachivalaya Hindi Parishad, New Delhi are active in several units including Head Office and various competitions have been organized from time to time.

21.10 Official Language Implementation Committees have been formed in all units of the Company and quarterly meeting are held regularly.

21.11 Rajbhasha Golden Jubilee Year was concluded by holding grand and graceful Rajbhasha functions.

21.12 Following number of employees were awarded under the various incentive schemes :

- Hindi Teaching scheme (Hindi teaching) 15
- Hindi teaching scheme (Hindi Typing/Stenography) 5
- Hindi Cheque incentive scheme. 3
- Monthly allowance scheme for Hindi typing/Stenography 57
- Incentive scheme for use of Hindi. 2

HINDUSTAN COPPER LIMITED

(www.hindustancopper.com)

INTRODUCTION

1.1 Hindustan Copper Limited(HCL) was incorporated on 9th November,1967, under the Companies Act,1956. It was established as a Govt. of India Enterprise to take over from National Mineral Development Corpn. Ltd., all plants,projects,schemes and studies pertaining to the exploration and exploitation of copper deposits, including smelting and refining, for fulfilling long-term objectives of the nation, viz. Development and growth of copper mining industry on sound lines and to maximise indigenous production of copper metal. This is to be achieved by developing new copper deposits, known or to be discovered, by adopting appropriate and modern technologies.

1.2 The Government of India nationalised the only copper producing Company, Indian Copper Corporation Ltd. at Ghatsila in March 1972 and handed over its management and ownership to HCL.

1.3 In November 1982, the prestigious Malanjkhand Copper Project comprising of a large

A panoramic view of Taloja Copper Project, Maharashtra.

and fully mechanised open pit mine and Concentrator plant was dedicated to the nation.

1.4 The Continuous Cast Copper Rod plant at Taloja Copper Project of Hindustan Copper Ltd. was commissioned in December,1989 with an installed capacity of 60,000 tonne. The Company has selected Southwire SCR-2000 technology using natural gas as fuel.

1.5 As on 31-12-2000, the Authorised Capital of the Company stood at Rs. 800 crore and the subscribed capital at Rs. 543.61 crore.

1.6 Present capacities of HCL's Mines and Smelters are given at Table 1A, 1B and 1C.

TABLE-1A

Mines

(In lakh TPA)

Location of Mines	Ore Capacity
Khetri Copper Complex, Rajasthan	19.5
Indian Copper Complex, Jharkhand	6.9
Malanjkhand Copper Project, Madhya Pradesh	20
Total	46.4

TABLE-1B

Smelters

Location of Smelters	Metal Capacity
Khetri Copper Complex, Rajasthan	31000 tonnes per annu m
Indian Copper Complex, Jharkhand	16500 tonnes per annu m
Total	47500 tonnes per annu m

TABLE-1C

CC Rod Plant

Location of Plant	Capacity
Taloja Copper Project, Maharashtra	60,000 tonnes per annu m

PHYSICAL PERFORMANCE

2.1 The production of ore, metal in concentrates, refined copper(cathode) and wirerod during the year 1997-98 to 2000-2001 are given at Table 2.

TABLE-2

Product	1997-98 Actuals	1998-99 Actuals	1999 2000 Actuals	Target for 2000-2001	2000-2001 Actuals up Dec. 2000	2000-2001 Esti-mate
Ore Pro-duction ('000 T)	4496	4220	3109	3350	2461	3350
Metal in concen-trates (T)	41440	38553	33462	33150	24738	33150
Refined Copper (Cathode) (T)	42374	35834	38464	39250	29188	40000
Wirerod (Taloja) (T)	31484	33025	29778	30000	20672	29000

FINANCIAL PERFORMANCE

3.1 Financial Performance of the Company is given at Table 3.

TABLE-3

(Rs. in crore)

Sl. No.	Details	Actuals for the previous 2 years		Target for	2000-2001 Actuals up to Dec '00 (Prov)	2000-2001 Esti-mated
		1998-1999	1999-2000	2000-2001		
1.	Income	678.61	551.21	627.28	460.52	612.51
2.	Operating Cost	791.61	448.81	586.64	440.47	562.30
3.	Interest and transaction cost	123.91	62.26	60.91	58.66	79.51
4.	Depreciation and Amortisation	62.11	187.60	61.90	45.21	60.25
5.	Net Profit/ (Loss) before income tax and dividend	(51.20)*	(147.46)	(82.17)	(83.82)	(89.55)

* includes effect of interest waiver amounting to Rs.155.76 crore arising out of Capital Restructuring.

SALES PERFORMANCE

4.1 The Company achieved a total sale of 37285 tonne of copper during the year 1999 - 2000. The Company is likely to achieve a total sale of around 41000 tonne of copper during 2000-2001.

PROPOSED DISINVESTMENT IN HCL

5.1 The Central Govt. had approved the following disinvestment strategy for Hindustan Copper Limited:-

5.1.1 Phase-I : The Khetri Unit of HCL along with Taloja Plant be formed into a separate Company. The assets of these Units may be valued and may form 49% contribution from HCL in a new Company in which 51% equity may be injected by a Strategic Partner.

5.1.2 Phase-II : The remaining portion of HCL comprising the Indian Copper Complex and the Malanjkhand Copper Project may be restructured by closure of unviable mines in a phased manner with consequent separation of surplus manpower under VRS. HCL may then look for one more strategic partner for 51% disinvestment in the remainder of HCL

5.2 The Deptt. of Disinvestment, Govt. of India, has appointed the IDBI-Sumitomo Bank Consortium as Adviser for helping the Inter Ministerial Group(IMG) for implementing Phase-I of disinvestment of HCL.

5.3 The Company has appointed M/s. Vaish Associates and M/s. S.Jalan & Co., Advocates as Taxation and Legal Advisers respectively. IMG has already finalised the route for the first phase of disinvestment of HCL and asked M/s. S.Jalan & Co., Legal Adviser to prepare the Draft Investment Agreement, Shareholders Agreement etc. It is expected that the entire work in connection with the first phase of disinvestment of the Company may be completed by 30.6.2001.

STATUS REPORT OF IMPLEMENTATION OF CAPITAL RESTRUCTURING OF HCL

6.1 The Government had earlier approved Company's capital restructuring proposal and the same has already been implemented by the Company.

6.2 The outstanding Govt. Loan of Rs. 180.73 crore as on 31.3.1998 has already been converted into 7.5 % Non-cumulative Redeemable Preference shares and the share certificate has already been issued to the President of India.

6.3 The outstanding interest on Govt. Loan amounting to Rs.167.43 crore as on 31.3.1998 March,1998 has already been waived and its effect given in the accounts of the Company.

6.4 Company has raised working capital term loan of Rs. 75 crore twice from IDBI against the Central Govt. guarantee for meeting its cash losses. In addition, the Company has raised another working capital term loan of Rs. 100 crore from ICICI against the Govt. guarantee.

6.5 Govt. sanctioned non-plan loan of Rs. 414 crore specifically for separation of surplus manpower, which was to be given by the Govt. in a phased manner. Till 3.12.2000, the Govt. has released Rs. 280 crore. The Company has utilized Rs. 260 crore and has 5537 employees released.

ENERGY CONSERVATION

7.1 Copper extraction is an energy intensive operation. Special attention is given in making the operation energy efficient at all stages starting from mining of ore to extraction of metal. Due to energy conservation awareness and regular monitoring on consumption of all energy inputs, HCL has been able to achieve the objective of energy conservation.

7.2 Constant thrust is also maintained on improvement of power factor. Improvement in power factor during last three years and this year upto December, 2000 is given at Table 4.

TABLE-4

Units	Power factor		
	1998-99	1999-2000	2000-2001 (Up to 31-12-2000)
KCC	0.94	0.94	0.94
ICC	0.93	0.95	0.92
MCP	0.99	0.99	0.99

COMPUTERISATION

8.1 There has been further progress in computerisation in HCL during the current year 2000-2001. Most of the system development work started in the year 1999-2000, have been completed.

8.2 The computer resources have also been augmented in the units and offices, either by purchasing new machines or by replacing the old PCs with the advanced version to take care of increasing load of work and new jobs.

8.3 HCL website **(www.hindustancopper.com)** was developed and launched during the current year. Integrated system design and development is being carried out in a phased manner to standardise the programs and MIS reports in offices/units.

8.4 Networking at Corporate office is under progress and will be completed by March 2001. Networking in other offices and units will be taken up in a phased manner subsequently.

POLLUTION CONTROL AND ENVIRONMENT MANAGEMENT EFFORTS

9.1 Air and Water pollution control facilities and plants at all units of the Company are operated regularly to maintain emissions within permissible limits. Monitoring of treated effluents and gaseous emissions are being carried out regularly.

SALIENT ASPECTS OF THE WORK BEING DONE BY ADVISORY BOARDS/COUNCILS

10.1 In line with the Scheme for Employees' Participation in Management, Joint Councils and Shop Councils have been functioning in the projects of the Company. In the meetings matters relating to production facilities, materials economy, operational problems, wastage control, hazards, safety problems, quality improvement, cleanliness, monthly targets of production schedules, cost reduction programmes, formulation and implementation of the work systems, design group working, welfare measures etc. are considered.

10.2 Joint Consultative Committee (JCC) consisting of representatives of each recognised union at the projects/offices and representatives of the management has been functioning with a view to discuss and review matters of common interest concerning the industrial relations, welfare, leave, educational facilities, production policy, safety, productivity, elimination of wastage, optimum utilisation of man and machinery and quality of worklife etc.

10.3 In addition to the above, National Joint Committee for Copper (NJCC) consisting of the representatives of the recognised unions and the management have been functioning to deal with the service matters of workmen.

RESEARCH AND DEVELOPMENT ACTIVITIES

11.1 During the year under review HCL continued to reel under severe financial constraint. In view of above HCL maintained its focus on development and absorption of all technologies to improve quality of finished products, reduce specific consumption of major inputs and increase production and productivity.

11.2 HCL in its Smelter at KCC during the year, through inhouse expertise successfully developed operational technology to treat fine size imported concentrate and to operate the downstream waste heat boiler always at near constant heat load.

11.2.1 Whereas the former has reduced concentrate dust carryover from the furnace and

thereby reduce frequent stoppages of feed to the furnace to clean the downstream equipment, the later has reduced considerably the downtime of waste heat boiler and thereby increased plant's production and productivity

11.3 To improve quality of its CC Rod product from Taloja Copper Project, following innovations have been absorbed during the year :

11.3.1 Inhouse development and absorption of loop controller to ensure tension free bar entry to the mill.

11.3.2 Realignment of NAPS spray nozzles and inclusion of special chemical doze to reduce dust generation during subsequent drawing by down-stream customers using CC Rod produced at TCP.

11.3.3 Developing and introducing new wooden pallet for packing of finished rods to increase its shelf life and better protection of CC Rod coils during transportation.

INDUSTRIAL RELATIONS

12.1 The industrial relations situation in the Company has been peaceful and harmonious. There had been no mandays lost due to strike or lock-out. The recognized unions of the Company had, however, served a strike notice on the Company on 18.10.2000 on certain demands including revision of wages, withdrawal of the proposal on rolling back of retirement age to 58 years, payment of unpaid salary and DA and restoration of the suspended facilities like LTC, leave encashment etc. All the issues were related to the difficult financial position, the Company has been passing through and this was explained to the unions in details during discussions which had followed. Finally, on the request of the unions, 50% of the remaining DA arrears were released and the unions refrained from resorting to strike as they had initially proposed. There were no other irritants in the area of industrial relations.

PERSPECTIVE PLAN FOR WOMEN WELFARE

13.1 Implementation of Equal Remuneration Act

13.1.1 In HCL no discrimination is made with regard to sex, caste, creed between male and female employees. Persons doing similar nature of job get equal remuneration.

13.2 Equality of opportunity in employment and recognition of the right to work as fundamental right guaranteed by the Constitution.

13.2.1 As per Mines Act,1952, employment of women in underground mine is prohibited. In other cases, employment to women is provided. In HCL equal opportunity is provided and no discrimination is made between male and female employees. In promotion no discrimination is made and women are considered at par with men in the Recruitment and Promotion Rules of the Company.

13.3 Provision of Maternity Benefit Act are strictly followed in HCL.

13.4 Women employees are provided with necessary training to equip themselves to operate the new machines like computers etc.

13.5 Women employees are provided various in-Company training on adult education, workers development seminars and general development programmes periodically at unit training centres. Women are also given in-service training.

13.6 Creche facilities wherever necessary are provided to the women at the Projects.

13.7 Committees headed by women employees for looking into the grievance of women particularly in regard to sexual harassment at work place are functioning.

WELFARE OF TRIBALS AND MINORITIES

14.1 The main welfare activities in respect of Tribal and Minorities are the part of 20 Point Programme of the Company. The activities undertaken during the period from April to December, 2000 and anticipated from January 2000 to March, 2001 are given at Table 5.

TABLE-5

		Actual (during April-Dec, 2000)	Anticipated (during January-March, 2001)
(a)	Number of SC & ST employees given training		
	- SC	179	65
	- ST	260	76
	- Total No. of trainees	2373	509
(b)	Vocational Training (Number of Families)	20	20
(c)	Safe Drinking Water (Number of beneficiaries)	686	612
(d)	Family Planning (Number of beneficiaries)	94	94
(e)	Health for All (Number of beneficiaries)		
	- Pulse polio	5458	3183
	- Hepatitis 'B'	1400	600
	- Medical Camps	694	Nil
(f)	Plantation of trees	25740	200

HUMAN RESOURCES

15.1 Employment in the Company including SC/ST as on 31-12-2000 is given at Table 6.

TABLE-6

Group of Post	No. of Employees	No. of SC	% of SC	No. of ST	% of ST
Group A	1093	86	7.87	26	2.38
Group B	315	50	15.87	18	5.71
Group C	9722	1276	13.12	1412	14.52
Group D	1304	369	28.30	320	24.54
Total	12434	1781	14.32	1776	14.28

PROGRESS ACHIEVED WITH REGARD TO THE WELL BEING OF THE OLDER PERSONS DURING THE YEAR

16.1 In HCL, employees immediately after superannuation are paid their retirement benefits which include Provident Fund, Gratuity, Leave Salary etc as per provisions of the statutes.

16.2 Under the Employees' Pension Scheme,1995 which has replaced the employees' Family Pension Scheme,1971, employees and their spouses including the dependent minor children in case of death of the employees/spouses are entitled to pension after the retirement of the concerned employees/premature death on the basis of the length of their pensionable services and last drawn pay in accordance with the provisions of the Scheme.

16.3 Under the Hindustan Copper Limited Post Retirement Medical Scheme,1996 (HCL PRMS), all regular employees of the Company, who opt for membership, are entitled to medical benefits for themselves and their spouses subsequent to their retirement on superannuation/completion of tenure as per Unit Trust of India Senior Citizens' Union Plan. Under the Scheme the employees are also entitled to domiciliary treatment benefits from the Company.

16.4 Employees, not covered under the above Scheme, after retirement are eligible for free treatment in the Company's hospital/dispensary for self and spouse in case they present themselves for such treatment. The facility is also available to workmen who cease to be in employment on account of permanent total disablement and also to the spouse of workman who dies while in service.

THE STATUS OF IMPLEMENTATION OF THE PERSONS WITH DISABILITY ACT,1995

17.1 The statutory returns as per Persons with Disability Act, 1995 are sent to the Ministry. Though 100 point roster and 3% reservation in respect of the physically handicapped are maintained in the Company, the status of implementation of the PWD Act, specially on implementation of Section 33 regarding reservation of vacancies for persons with disability for Groups B, C and D may be treated as nil due to non-

recruitment during April to November,2000 for precarious financial position of the Company and the same is expected to continue during the next part of the year.

MOU RATING

18.1 The MoU rating for the last three years is given at Table 7.

TABLE-7

Year		MOU Rating
1997-98	-	Fair
1998-99	-	Fair
1999-2000	-	Very Good

PROGESSIVE USE OF HINDI IN OFFICIAL WORK

19.1 Concerted efforts were made to achieve the targets prescribed by the Govt. of India in respect of progressive use of Hindi. Employees were motivated to utilize their working knowledge of Hindi in day to day official work. Special emphasis was given to 100% compliance of Section 3(3) of the Official Language Act. Letters received in Hindi were replied to in Hindi only.

19.2 Incentive scheme for the promotion of originating correspondence in Hindi continued during the year. Hindi Diwas/Fortnight and workshops were organised among all of our projects/units including Head Office. All the documents pertaining to the Parliamentary Committee's visit were prepared bilingually. Our Head Office was awarded with a shield by CALTOLIC for remarkable compliance of the Official Language Policy.

19.3 Official Language Implementation Committees under the chairmanship of Chairman-cum-Managing Director in Head Office and in the units under the unit Head reviewed the progress of Hindi and its constraints. More than 80% proceedings in the appex level meetings of the Company were carried out in Hindi.

CHAPTER VI-E

BHARAT GOLD MINES LIMITED

BACKGROUND

1.1 History of the Kolar Gold Field mines records that organised mining for gold has been carried out over 120 years. The systematic mining in KGF was started by M/s John Taylor & Sons in 1880. In 1949, each of the gold mining companies was directed to incorporate a public Company in the State of Mysore to take over the operations of the undertaking and its assets. Accordingly, the four Sterling Companies sold their mining properties to the newly incorporated Rupee companies, having a total capital base of Rs. 2.1 crore as on 1st April 1951. The Oorgaum Mine was found to be unremunerative and the Oorgaum Mine Company ceased to be operative from Oct., 1953 and its assets were transferred to the Champion Reef Mine. In effect, there were three companies for the three working mines. The State Government nationalised all the three mines with effect from 29th November, 1956 and paid a compensation of Rs. 1.64 crore. In June 1958, the Government of India decided to strengthen the gold reserves and directed that the gold produced by the Kolar mines be made over to it. It was agreed in December 1962 that the mines be transferred to the Central Government for operation under the Kolar Gold Mining Undertakings (KGMU), as a subordinate office of the Ministry of Finance. The Administrative control was passed on to the Ministry of Steel & Mines in August 1971. It was incorporated as Bharat Gold Mines Limited (BGML) w.e.f. 1.4.1972 under Companies Act. 1956.

PRESENT SCENARIO

2.1 Ever since its inception, BGML has been incurring loss and the Government has been helping the Company to continue its operations. However, when the net worth of the Company became negative, BGML was referred to BIFR in 1992. The BIFR held an inquiry under Section 16 of the SICA and by its order dated 28.8.1992 declared the Company a sick Company as defined under Section 3(1)(O) of SICA, 1985. BIFR appointed the Industrial Credit and Investment Corporation of India (ICICI) as the Operating Agency. In June 1997, Government, did not accept the rehabilitation scheme prepared by ICICI as even after infusion of large amount of fresh funds, the viability of the Company was doubtful. Instead, the Government decided to explore the possibility of rehabilitating BGML through joint venture route and also opened Voulantry Retirment Scheme upto 31.8.1997. The efforts made to identify a global partner failed as none of bidders in response to the tender invited for the purpose was technically, financially or otherwise capable of undertaking the revival of the Company. BIFR after following the provisions of SICA 1985, passed the final order on 12.6.2000 concluding that the Company is not likely to make its net worth exceed its accumulated losses within a reasonable time while meeting its financial obligations and hence, not likely to become viable in future. Therefore, it was just, equitable and in public interest to wind up BGML under section 20(1) of SICA, 1985. BIFR forwarded its opinion to the Registrar of Karnataka High Court on 30.6.2000.

2.2 The employees of BGML moved Appellate Authority for Industrial and Financial Reconstruction (AAIFR) against the order dated 12.6.2000 passed by BIFR. The AAIFR has dismissed the appeal filed by the employees up holding the verdict of the BIFR. The employees unions have filed a number of Writ Petitions against the BIFR/AAIFR orders.

2.3 The Company also approached Ministry of Labour, Government of India for its closure under section 25(o) of the Industrial Dispute Act. 1947. After hearing the case, Ministry of Labour vide their letter dated 29.1.2001 have granted permission for the closure of the Company under section 25(o) of Industrial Dispute Act, 1947 w.e.f. 1.3.2001 and has indicated that VSS would be operated in accordance with the decision given by the Courts.

PRODUCTION PERFORMANCE

3.1 In view of the precarious condition of BGML, it was decided that during 2000-2001 the Company would be provided financial support for salary of employees and safety considerations. Accordingly, funds were released for salary and safety requirments etc. However, gold has been extracted from the residual ore brought to surface for milling by the Company. This activity came to an end in September, 2000. The quantity of ore milled, gold and silver extracted during 2000-2001 (April-September, 2000) are given at Table 1.

TABLE-1

	Unit	Actual 1999-2000	April-September 2000 (Actual)
Ore Milled	(tonnes)	138925	21400
Gold Extracted	(kg)	433.51	65.06
Extraction Grade	(g/t)	3.01	2.98
Silver Extracted (by-product)	(kg)	35.02	5.39

FINANCIAL PERFORMANCE

4.1 The authorised share capital of the Company as on 31.3.2000 is Rs.60 crore and paid up share capital is Rs.51.06 crore. The working results of the Company for the last three years alongwith current financial year (April-September, 2000) are shown at Table 2.

TABLE-2

		Net Loss (Rs. in Lakh)
1997-98	.	3983.40
1998-99	.	6531.29
1999-2000	.	9336.61
2000-2001 April-Sept. (estimated)	.	4115.15

4.2 Sources of Funding

4.2.1 The Company is continuously incurring losses and not able to generate any internal resource. However, the Government has provided non plan loan and grant-in-aid to support the salary, wages and statutory payments by the Company, etc.

DIVERSIFICATION

5.1. Shaft Sinking & Mine Construction

5.1.1 The Projects & Contracts Division established in 1973 has been taking contract jobs in shaft sinking and mine construction activities for various mining companies in both coal and metal mines in the country. The Company was asked to expedite the completion of the contracts. Two projects in mine construction wing - one in MOIL (shaft sinking/excavation/concreting) is likely to be completed by February 2001. The another project at HCL site would be continued upto 31st March 2001 to meet the contractual obligations of contract labour.

5.2 In respect of Engineering Services, the contracts of BEML and SECL are likely to be completed before March 2001

ACHIEVEMENT DURING 2000-01

6.1 The Sales made upto December 2000 and orders position on hand by end of December 2000 are as given at Table 3.

TABLE-3

(Rupees in Lakhs)

Description	Orders on hand	Sales	Work in progress
T.C.T. Drill Rods	-	17.15	-
Workshop Sales	121.67	17.85	The job is likely to be completed shorty

ENVIRONMENTAL PROTECTION

7.1 The tailing sands which are dumped near Heap Leaching Plant and Nundydroog Mill are prevented from being washed away by making bunds. In addition to this, gravel was spread over the Kennedy's tailing sand dump to prevent air pollution. Tree plantation has also been made on number of dumps.

POLLUTION CONTROL

8.1 Domestic Water Treatment

8.1.1 The sewage and effluent water generated from the residential houses are collected in three oxidation ponds located at strategic points in Nundydroog, Champion Reef and Nundydroog Mine areas. These works have been carried out as per the recommendations of Karnataka State Pollution Control Board and National Environmental Engineering Research Institute.

8.2 Industrial Effluent Treatment

8.2.1 The metallurgical Plant at Mysore Mine is not generating any effluent since the plant is closed. The effluent from Metallurgical Plant at Nundydroog Mine is now deposited at a lower level and hence no effluent is being allowed to flow. After settlement, water is recovered from the effluent.

INDUSTRIAL RELATIONS

9.1 There have been protests against closure of BGML. However, there had been no untoward incident creating law & order situation in KGF.

WELFARE OF SC/ST TRIBALS AND MINORITIES

10.1 There are directives/guidance from the Ministry of Welfare with regard to preparation of sub-component plan for Schedule Caste and tribal plan for Schedule Tribe. This is linked with rehabilitation of tribals on account of land acquired for project. BGML has not acquired any land causing displacement of tribals for the construction of projects and hence no plan for rehabilitation has been drawn.

HUMAN RESOURCES

11.1 Number of personnel in the Company as on 31.12.2000 is given at Table 4.

TABLE-4

Group	Total Employees	SC	%	ST	%
A	101	25	24.75	4	3.96
B	22	7	31.81	-	-
C	1987	770	38.75	17	0.85
D	1763	1050	59.55	22	1.24
Total	3873	1852	47.81	43	1.11

POWER CONSUMPTION

12.1 The power has been consumed by the Company for hoisting the already mined ores to the surface, milling of the ore, extraction of gold upto October 2000, workshop activities, etc.. Even after ceasing of economic activities pumping of water from the mines has been continued for supplying of water to the town ship of BGML.

PROGRESS MADE IN THE USE OF HINDI IN THE ENTERPRISE

13.1 The Company has made satisfactory progress in the propogation of Hindi as per the provisions of Official Language Act and Rules made thereunder. To popularise Hindi among employees competitions in Hindi Shorthand, Noting and Drafting, Translation, Comprehension, Hindi Typewriting, Letter writing and Essay were

conducted. The Hindi Diwas was celebrated with a colourful cultural programme on 14.9.2000, which was preceded by a month long programme consisting of Hindi Typewriting, Hindi shorthand, Hindi Incentive and Hindi Speech competitions and other attractive programmes viz., Hindi Vocabulary, Katha Suman and Sangeeth Sandhya. The Annual Inter-departmental Hindi competition was conducted during December, 2000.

CHAPTER VI-F

SIKKIM MINING CORPORATION

INTRODUCTION

1.1 The Sikkim Mining Corporation (SMC) was established under the Proclamation of then Darbar of Sikkim dated 27th February, 1960, as a joint venture of Govt. of Sikkim and Govt. of India with equity Share Capital ratio of 51:49 for exploration and exploitation of mineral deposits of the State. Since inception, the Corporation has been experiencing several ups and downs in its performance for various reasons. Soon after installation and starting of Concentrator plant at Bhotang Mine, it got submerged with mud/sludge of floods in 1968 and recovery of the plant took about one year. Thereafter, production of complex sulfide ore containing copper-lead-zinc started and segregated into three concentrates accordingly. The extration of other associated minerals like gold, silver etc. is not being done due to process plant limitation of SMC.

1.2 The authorised capital of the Corporation is Rs. 10 Crore comprising of Rs. 10 lakh share of Rs. 100 each. As on 31st December 2000, the total paid up share capital for the Corporation is Rs. 7.43 crore out of which Govt. of Sikkim

Panoramic View of Stowing Plant at Bhotang Mine, Sikkim

has paid Rs. 3.41 crore and Govt. of India has paid Rs. 4.02 crore.

1.3 The Management of the Corporation is vested in a Board of Directors which is headed by a Chairman. There are 7 directors on the Board, 3 directors including Managing Director and additional director are nominated by the Central Govt. and remaining 3 directors and Chairman are nominated by the State Govt. Managing Director is the Chief Executive of the Corporation and he has been delegated administrative powers for carrying out day-to-day affairs.

1.4 The bhotang mine operation was earlier confined to Hill Section but the plunge of ore body has now led to active mining operation below river Tista with safe pillar barrier of about 60 m. In view of the above, the mine has been instrumented with sophisticated geo-technical instrument like LVDT, Extensometer, load cells, vibrating wire stress meter etc. under the technical guidance of M.R. Cell, IBM, Nagpur and NIRM, Kolar (Karnataka).

1.5 Combined ROM production from the mines (Bhotang & Pacheykhani) is about 75 TPD (Table 1). The Stowing Plant was commisioned in June, 2000. One Core drill machine has been deployed in Pacheykhani mine to detect erratic nature of ore body for ensuring production/ development.

TABLE-1

(In tonne per day)

Location of Mines	Ore capacity (TPD)	2000-01
1. Bhotang Multimetal Mine	100	63.46
2. Pacheykhani Copper Mine	20	13.33
(Both located in East Sikkim)		

PHYSICAL PERFORMANCE

2.1 The production of SMC, as against the targets from 1998-99 onwards is given at Table 2.

TABLE-2

(In tonne)

Product :	1998-99 Actual	1999-00 Actual	2000-2001 Target	Actual (up to 31-12-2000)
Ore :	15438	15901	23040	16330
Concentrate :				
(i) Copper	00920	00718	01388	853.50
(ii) Lead	00115	00284	00150	195.00
(iii) Zinc	00044	00626	00180	176.00

FINANCIAL PERFORMANCE

3.1 Operating Results are at table 3.

TABLE-3

(Rs. in lakh)

Details	Actual (1998-99)	Actual Budget 1999-00	Target for Budget (2000-01)	Actual (up to 31-12-2000)
Income	120.93	162.00	200.00	131.95
Operating Cost	119.00	168.50	170.82	156.21
Interest & transaction	009.59	009.18	009.18	006.84
Depreciation and Amortization	018.97	018.00	020.00	013.36
Net Profit/ Loss before income tax & dividend	(-) 026.62	(-) 033.68	Nil	(-) 44.46

ON-GOING PROJECTS

4.1 The Stowing Plant with imported Kreb cyclones has been commissioned and in operation w.e.f. 12.6.2000 effectively.

4.2 The Shaft deepening and Equipping work from 3rd to 4th level of Bhotang mine has been completed and in use from 26.4.2000.

4.3 Mine development works are continuing below 5th level to enhance reserve base of ore deposit below river Tista.

4.4 RRL, Bhubneswar has put one Vertical

Column Flotation Cell at SMC during November, 2000 for amenability test to up grade the concentrates with higher recovery and the test has been conducted successfully.

EXPANSION AND DIVERSIFICATION

5.1 Expansion

5.1.1 One Stone Crusher will be set up shortly and is expected to produce commercial stones chips from Tista river stones from January 2001 generating additional revenue for the Company.

5.2 Conversion of zinc concentrate into commercial ZnSO4 crystal by solar heating would be considered after successful R&D works on leaching by RRL, Bhubaneswar. Similarly, hydrometallurgical route of extracting copper metal from copper concentrate would be considered after successful leaching of the concentrate. RRL, Bhubaneswar, indicated that leaching work in respect of Zinc concentrate appears to be encouraging because it is dissolving upto 90%.

ENERGY CONSERVATION

6.1 After installation of one 600 KVA L.T. Voltage Controller, significant saving in diesel has been witnessed.

INDUSTRIAL RELATIONS

7.1 Cordial, peaceful and harmonious industrial relations prevailed between the Management and the workers of the Corporation. So far there has not been any strike and the employees and workers are quite satisfied.

WOMEN WELFARE

8.1 Women workers/employees are generally posted on surface works only in Sections like Administration, Finance, Store etc. and not employmed below ground which demands high physical endurance and has confined environment.

WELFARE OF THE TRIBALS AND MINORITIES

9.1 The interests of the tribals and minorities working in the Corporation are protected.

HUMAN RESOURCES

10.1 Employment of SC/ST/Ex-servicemen and others as on 31.12.2000 is given at Table 4.

TABLE-4

Group	Total No. of employees	SC	ST	EX-SM	Others
Executive	005	-	02	-	003
Non-Executive	240	35	59	4	142
Trainees	001	-	-	-	001
Total	246	35	61	4	146

POLLUTION CONTROL AND ENVIRONMENT MANAGEMENT EFFORTS

11.1 Mill tailing is used as Stowing material for filling up the mined out areas which prevents environmental degradation. 1800 trees on the surface have been planted.

SALIENT ASPECTS OF THE WORK BEING DONE BY ADVISORY BOARD/COUNCIL

12.1 Actively pursued with the State Government to relases Equity Share Capital to SMC to match the ratio of ownership and to carryout the earmarked capital works without any hitch.

12.2 Approved the proposal to diversify the mining activity into related areas like setting up of a Stone Crusher for generating additional internal revenue.

12.3 Suggested to conduct Monthly Review meetings of the Managing Director, Chairman and the Secretary, Department of Mines & Geology and Qarterly Review Meeting with participation of one more Director from Govt. of India for better performance and updating of progress made by the Corporation.

COMPUTERISATION

13.1 At present one computer has been installed and it is planned to install 2 more computers with E-mail and Internet connection at Managing Director's office and Finance section to improve productivity and speed.

CHAPTER VII

SCIENCE AND TECHNOLOGY PROGRAMME

INTRODUCTION

1.1 The Science and Technology (S&T) programme of the Ministry of Mines was initiated in 1978. Since then a total of 98 projects have been completed and 28 are ongoing. The acitivities under the Science and Technology programme of the mineral and non-ferrous metal sectors cover the fields of Geology, Exploration, Mining and Environment, Bioleaching, Beneficiation, Rock Mechanics, Ground control and Non-Ferrous Metallurgy.

1.2 The projects are based on (a) National requirement, (b) Industry requirement, and (c) Requirement of Public Sector Undertakings. The projects are approved by the Standing Scientific Advisory Group (SSAG) of the Ministry under the Chairmanship of Secretary (Mines). The Ministry of Mines provides support to different organisations as well as the Public Sector Undertakings for implementing the S&T Programme.

FINANCIAL OUTLAY

2.1 The Outlay for the S&T Programme is Rs. 9.00 crore (Budget Support Rs. 5.50 crore) for 2000-01. This has been revised to Rs. 8.05 crore (BS Rs. 5.00 crore) in the RE for 2000-01. An outlay of Rs. 9.00 crore (BS Rs. 5.50 crore) has been proposed for 2001-02.

CENTRES OF EXCELLENCE

3.1 Three Centres of Excellence were set up under the S&T Programme of the Ministry in the areas of (i) Bauxite, Aluminium and Alumina technology, (ii) Rock Mechanics and Ground control and (iii) Occupational health hazards faced by miners due to their long exposure to the mining environment. These centres are:

- Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur.
- National Institute of Rock Mechanics, Kolar Goldfield.
- National Institute of Miners' Health, Kolar Goldfield.

JAWAHARLAL NEHRU ALUMINIUM RESEARCH DEVELOPMENT AND DESIGN CENTRE (JNARDDC)

4.1 JNARDDC was registered as a society in 1987. The objectives of the Institute are to assimilate the technology available in the country for production of alumina and aluminium including aluminium alloys and to develop technical knowhow and basic engineering. The centre is presently involved in a number of projects related to bauxite, alumina and aluminium.

4.2 Till December, 2000 three projects have been completed. Eight projects are ongoing. Seventeen papers were published in national journals/seminars.

4.3 JNARDDC has offered services to BALCO, NALCO, L&T, Premier Spares Pvt. Ltd., DMRL, Silver and Barytes Mining Co., Greece and Saurashtra Calcine and Allied Industries Ltd., Gujarat.

4.4 Three projects approved by the Ministry of Mines are highlighted below:

Deironing of Eastern Ghat Bauxite :

4.4.1 To encourage the use of the deironed bauxite as a sweetener in Central India for aluminium production, the project is under implementation at the cost of Rs. 53 lakh. The reduction of iron content would be achieved by the use of high intensity magnetic sepration. The equipment procurement is in progress and the representative samples have been collected.

Improvement of digestion efficiency of East Coast Bauxite and enhancement of Alumina productivity :

4.4.2 The project at a cost of Rs. 25.15 lakh was approved to study and optimise the plant operation to enhance digestion efficiency and aluminate liquor productivity. On successful completion, the project will help in improving the capacity of alumina refineries without incurring substantial capital expenditure. The equipment procurement is in progress.

Extraction characterisation and removal of Organic impurities in the Bayer Process :

4.4.3 The concentration of the organic impurities in the aluminate liquor in the alumina refinery goes on continuously building up. These affect the precipitation of alumina and reduce the quality of metal produced. Hence, the project on the development of technique/expertise to control the impurities has been approved at the cost of Rs. 35 lakh. The equipment procurement is in progress.

4.5 The actual expenditure of JNARDDC for 1999-2000 was Rs. 198.22 lakh. The approved outlay for 2000-2001 is Rs. 215 lakh (B.S. Rs. 65 lakh). In RE 2000-2001, Rs. 210.90 lakh (B.S. Rs. 80.90 lakh) has been recommended. An outlay of Rs. 240 lakh (B.S. Rs. 90 lakh) has been proposed for 2001-02.

4.6 It is envisaged to have internal generation of Rs. 65 lakh in 2000-2001 and Rs. 75 lakh in 2001-2002 respectively as income. An income of Rs. 35 lakh was generated till 31.12.2000.

NATIONAL INSTITUTE OF ROCK MECHANICS (NIRM)

5.1 The National Institute of Rock Mechanics (NIRM) was established as an autonomous research Institute under the Ministry of Mines, Government of India in 1988. The objective for NIRM is to provide enabling technology to mining and civil engineering sectors and construction industries and develop state-of-the-art tools and techniques of rock mechanics and rock engineering, to achieve improved production, productivity and product quality, with enhanced safety and economy. The liberalisation and globalisation of the Indian economy has opened up new opportunities for the energy and raw materials sectors, encompassing mining, hydro-power and infra-structure industries. This in turn has posed new challenges to research institutes related to these industries. NIRM is one such organisation that is in the vanguard of research initiatives in the field of rock engineering.

5.2 The Instititue has structured the R&D programmes in (i) Non-coal mines, (ii) Coal mines, (iii) Hydel projects, (iv) Excavation projects.

5.3 In non-coal mines, the major areas of research include (i) Optimum design of mining operations, and (ii) Monitoring and evaluation of stability of excavations for improving safety, conservation and productivity. The Institute has developed expertise in numerical modelling, geo-physical investigations and ground control. NIRM carried out mapping of ore-pass and damage zones in shaft walls, along with analysis of deterioration of the lining, of main shaft at Mochia mine (HZL) and stress monitoring in the crown pillar at Bhotang Mine (SMC). Ground stability evaluation studies were carried out at Zawarmala and Rajpura-Dariba Mine (HZL). The Ground Penetrating Radar (GPR) mapping was done to evaluate the stability of tailing dams at Rampura-Agucha Mines. The slopes for foot wall benches were designed for safe and optimum extraction

of ore at Rampura-Agucha Mine (HZL). Studies on control of fly rock, vibration and air over-pressure were carried out at the mines of India Cements and Prism Cements. Studies for scientific design of drilling and blasting parameters to improve the recovery of optimum size of saleable blocks were carried out at the granite quarries of TAMINS and novel Granites.

5.4 In coal mines, the areas of research include (i) Design and evaluation of support systems for bord-and-pillar and longwall workings, (ii) Application of fast roof bolting technology, (iii) Mapping of barriers and study of cavability of roof strata, (iv) Design of pillars, (v) Subsidence predications, (vi) Design of methods for speedy extraction of standing pillars, (vii) Study on influence of total charge on ground vibrations, assessment and control of ground vibrations. The Institute undertook studies in the mines of SCCL, WCL, etc.

5.5 In the hydro-electric projects, the Institute has the expertise in (i) Geo-technical and geo-physical investigations, (ii) Design of support systems and instrumentation, (iii) 2D and 3D stress analysis, (iv) Controlled blasting. Investigations were carried out at various projects including Tala hydro-electric project (Bhutan), Sardar Sarovar project (Gujarat), Ghatghar underground power house (Maharashtra), Pykara hydro-electric project (Tamil Nadu), Nathpa Jhakri Power Corporation Ltd. (Himachal Pradesh), Yeleru reservoir project (Andhra Pradesh), Upper Tunga project (Karnataka), Athirappilly hydel project, Pallivasal hydel project and Thottiyar scheme (Kerala).

5.6 In excavation projects, the Institute is engaged in R&D in the areas of (i) Numerical modelling, (ii) Foundation evaluation studies, (iii) Characterisation of sub-surface flaws and determination of in-situ stress, (iv) Assessment of stability and design of slope angles, (v) Controlled blasting close to critical structures, (vi) Studies on safe, economical and smooth blasting. The Institute conducted studies at Almatti Dam (Karnataka), Badagara project (Kerala), Krishna Bhagya Jala Nigam Ltd. (Karnataka), Underground oil storage project site at Mora (Maharashtra), Mangolore Refineries and Petro-chemicals Ltd. (Karnataka).

5.7 The actual expenditure of NIRM for 1999-2000 was Rs. 288.66 lakh. The budget estimate for the year 2000-01 was Rs. 250 lakh (Budget Support Rs. 75 lakh). The revised estimate for the year 2000-01 is Rs. 266.54 lakh (Budget Support Rs. 91.54 lakh). The outlay for the year 2001-02 has been proposed for Rs. 300 lakh (Budget Support Rs. 100 lakh).

5.8 NIRM completed 38 sponsored Projects till December, 2000. The scientists contributed 48 papers (23 in international journals/conferences and 25 in national journals/conferences). An external cash flow of Rs. 440 lakh was generated till December, 2000.

NATIONAL INSTITUTE OF MINERS' HEALTH (NIMH)

6.1 National Institute of Miners Health was registered as an outonomous society in February, 1990 to address exclusively the Occupational Helath problems of miners due to their long exposure to the mining environment.

6.2 The Institute has generated an income of Rs. 1.5 lakh till 31.12.2000. It has extended services to NALCO, HZL, BGML, NMDC, etc. to monitor the Pollution Control efficacy in the mines and also to monitor the health of the miners.

6.3 Against a provision of Rs. 70 lakh in BE 2000-01 and RE 2000-01, an outlay of Rs. 50 lakh (Budget Support) has been proposed for 2001-02 to provide for procurement of equipment.

ONGOING SCIENCE AND TECHNOLOGY PROJECTS

7.1 A total of 28 projects are presently under implementation out of which 2 have been approved in 2000-01. Twelve projects are likely to be approved by the Standing Scientific Advisory Group of the Ministry by 31.3.2001.

7.2 Highlights of some of the ongoing projects are given hereunder.

Setting up of technology proving plant for nickel extraction-Hindustan Zinc Limited (HZL) and Regional Researh Laboratory (RRL), Bhubaneswar.

7.2.1 The technology-proving plant has been commissioned in all respects. The revised project cost of Rs. 10.5 crore against the original Rs. 10 crore has been approved. The reduction in roasting of the ore commenced on Ist September, 2000. The generation of process data on different parameters is in progess. Approximately, 1.76 MT of nickel-carbonate has been produced till December, 2000. The complete results of the operations of the plant are expected by the end of March, 2001. The know-how package preparation will be taken up subsequently.

Development of advanced process control and optimisation technology for mineral processing plants.

7.2.2 The project at the cost of Rs. 281 lakh has a specific target of achieving 1 per cent improvement in lead and zinc metal recoveries individually at Agucha mine of HZL assuming no significant changes occur in feed mineralogy, flotation chemistry or other factors that impact plant base line performance. The additional benefits anticipated include (i) savings in reagents consumption, (ii) savings in energy consumption during grinding, (iii) lower variability in plant operation, (iv) smoother running of the plant resulting in savings, maintenance and production cost. The project completion date has been preponed by about 11 months. The grinding circuit advanced process controller has been commissioned successfully in November, 2000 on all three grinding circuit at the plant site of HZL. The commissioning of the controllers has shown an immediate impact by increasing throughput significantly (from 4500 TPD to 5000 TPD) besides consistently meeting grinding circuit quality requirements vis-a-vis product size distribution and percent solid ratio. This itself will bear a strong positive influence in appreciably increasing the overall productivity of the plant including individual recoveries of Lead and Zinc. Simultaneously, flotation circuit modelling and control design is underway and is expected to go on line by March, 2001.

Development of Electro-magnetic Tomography and buried electrode method for Geotechnical studies and base metal explorations, MECL.

7.2.3 The project was approved at a cost of Rs. 94 lakh to develop expertise for deciphering the shape and size of ore body/fracture and fissures and configuration between two bore-hole points. The gravimeter, resistivitimeter and vehicle for the project have already been procurred in July, 2000. The equipment has also been commissioned by the engineers of foreign suppliers. The upgradation of cross-hole tomography system is in progress.

Evaluation of metal content in base metal sulphide ores by boreholes geophysical logging, MECL.

7.2.4 The project has been completed in September, 2000. The conclusions drawn from the outcome of the work are : (i) A new dimension is added to the geophysical equipment in the country, (ii) The result obtained from the study of five boreholes for fuel minerals clearly indicated that the percent abundance of different constituent elements of the coal seams encountered in different drill holes of the same block are well corroborated with the chemical analysis data and in the other blocks with little variation, (iii) The limited study for fuel mineral by gammagamma back scattered technique and neutrongamma activation technique have clearly brought out that the neutron activation logging has definitely have an edge over back scattered logging for evaluation of in-situ elemental abundance in the borehole, (iv) Determination of physical and petro-physical parameters like density, porosity, ash percentage, etc., are more effective from back scattered gamma logging in camparision to neutron activation logging. The field work in different mineral districts in the country to achieve expertise in processing and interpretation of the data generated by the geo-physical equipment is in

progress. The same is likely to be completed by December, 2001.

Performance evaluation of water-injection cyclone for classification-Regional Research Laboratory, Bhopal.

7.2.5 The project has been completed at the cost of Rs. 22 lakh and the completion report has been received. The efforts are underway for industrial applications of the results obtained. The studies on ground lead-zinc ore from the operating plant at Rampura-Agucha mines have indicated the following benefits of water-injection cyclone over hydrocyclone : (i) Higher recovery of 25 micron size material in the overflow product, (ii) Higher recovery of zinc in fines below 25 microns in the ovedrflow product, (iii) Higher recovery of lead in fines below 25 microns in the overflow, (iv) Higher separation efficiency values at 25 microns cut size, (v) Higher overflow densities, (vi) Lower imperfection numbers, (vii) Lower circulation load ratios.

Development of energy and cost effective materials for mining industries.

7.2.6 The project has been completed at the cost of Rs. 50 lakh contributed by the Ministry of Mines Rs. 20 lakh, Department of Science and Technology Rs. 20 lakh and Council of Scientific and Industrial Research Rs. 10 lakh. The completion report has been received. Two new materials, viz., aluminium hard particle composite and SLIZ alloy have been developed. The Apex liner made of aluminium hard particle composite material has been tested successfully in D-15 cyclone of HZL. Similarly, the bushes made of SLIZ alloy have been tested successfully in reciprocating feeders of HZL. The efforts are on for industrial applications of both these items.

Development of a process for electro-refining of aluminium metal—Central Electrochemical Research Institutue, Karaikudi.

7.2.7 The project has been approved at a cost of Rs. 43.8 lakh to develop further, for industrial application, a two-layer process for electrorefining of aluminium to attain the purity levels higher than that obtained conventionally. At present, the worldover three layer process, called Hoops process, is in vogue commercially. The projects has started in December, 2000.

CHAPTER VIII

INTERNATIONAL COOPERATION

INTRODUCTION

1.1 International co-operation continued to be a thrust area in the Ministry of Mines during the year 2000-2001. Concerted and continued efforts were made to project the mineral sector as an attractive investment destination. The key objectives being to further strengthen areas of bilateral cooperation with countries where bilateral agreements already exist, and also to enter into fresh agreements with countries that are technologically advanced, and to offer India's assistance in developing the mineral resources of other countries. Attracting foreign direct investment and facilitating inflow of state-of-the-art technologies, was another area where emphasis was laid. During the year the Foreign Investment Promotion Board approved seven proposals involving Foreign Direct Investment to the tune of Rs. 230 crore in the mining sector. This take the total number of FIPB approvals to 67, indicating an expected FDI flow of Rs. 3,697 crore.

INDO-FRENCH WORKING GROUP ON MINERAL EXPLORATION AND DEVELOPMENT

2.1 The 14th Meeting of the Indo-French Working Group on Mineral Exploration and Development was held in Paris, France on 8-9.11.2000. The meeting reviewed the progress of on-going projects, and expressed satisfaction at the pace at which the projects and programmes were moving. The meeting also discussed new project proposals and identified and prioritised the following nine projects for future cooperation, viz. : (1) Supply of one Electron Probe Microanalyser (EPMA) to Geological Survey of India; (2) Supply of laboratory equipment for physico-chemical characterisation of minerals to Indian Bureau of Mines; (3) Capacity building at State Level for Mineral Development and Environmental Management; (4) Contribution to a sustainable socio-economic development of Manipur State : Supply of equipment along with related technical assistance to Department of Geology and Mining of Government of Manipur; (5) Supply of oceanographic equipment and technical and scientific assistance to the Indian programme of seabed investigations in the Exclusive Economic Zone of India (Geological Survey of India); (6) Management of Mining Wastes (Indian Bureau of Mines); (7) Implementation of United Nations Framework Classification for mineral resources management in India (IBM); Collaboration of Harnessing Geothermal energy (Geological Survey of India); and (9) Use of seismic technology for Mineral Exploration.

2.2 The 14th Meeting of the Indo-French Working Group on Mineral Exploration and Development concluded with the signing of a Protocol between the Secretary, Ministry of Mines and the Director General, Energy and Raw Materials, Minstry of Economy, Finance and Industry, Government of France on the 9.11.2000.

INDIA-AUSTRALIA JOINT WORKING GROUP ON ENERGY AND MINERALS

3.1 Australia has a highly developed and competitive mineral exploration and mining

industry using advanced geological concepts and technology and has a comperhensive and high quality Geoscientific knowledge base. There has been a very rapid growth of mineral industry in Australia and their exploration techniques have been innovative and successful. It is known to have a largest economically proved resources for diamonds, lead, silver, zinc and mineral sands and have substantially rich resources of bauxite, coal, lignite, cobalt, copper, gold, iron ore and manganes. Australia is one of the top six mineral producing countries for bauxite, gold iron ore, lead, zinc, mineral sands and uranium.

3.2 The sixth meeting of the India-Austrailia Joint Ministerial Commission held on 26.2.1999 at New Delhi reiterated the need top establish a Joint Working Group on Energy and Minerals. It was also decided that the Ministry of Mines, Ministries of Coal, Power, Petroleum & Natural Gas and Department of Non-Conventional Energy Resources would form the Indian Side for the Joint Working Group.

3.3 The First Meeting of the India-Australia Joint Working Group on energy and Minerals was held in Sydney, Australia on 10.4.2000. The meeting adopted Terms of Reference for the future work of the Joint Working Group. The meeting enabled both sides to develop a better understanding of each other's energy and mineral supply and demand situation and future policies. Indian side advised of improved policies for investment in power, mining and petroleum sectors in India. The Australian side outlined their capabilities and technologies for mineral processing and coal handling and utilisation. The meeting supported further cooperation on existing coal ports study to assist more efficient preparation of coal (blending and washing). Both sides also examined opportunities for cooperation in non-conventional energy sources.

INDO-SOUTH AFRICAN CO-OPERATION

4.1 South Africa is one of the major mineral producing and exporting countries in the world, with the largest known reserves of gold, chromium, platinum and vanadium. The country also has substantial deposits of minerals like coal, uranium, diamonds, iron, zirconium, titanium, feldspar, nickel, phosphates, etc. South Africa has an impressive track record of mineral development and holds great potential for meaningful and mutually beneficial cooperation in the mineral sector. Ever since diplomatic ties with South Africa have been established in November 1993 the Ministry of Mines has been exploring the possibility of cooperation with South Africa as both countries have some geological similarities.

4.2 India and South Africa entered into an Agreement for cooperation in the field of Geology and Mineral Resources on the 7.10.1997. For the implementation of this Agreement a Joint Working Group was formed, and the First Meeting of the Working Group was held at Johannesburg, South Africa in August 1998 and a Protocol was signed in Cape Town on the 18.8.1998, identifying six projects for mutual cooperation. The six projects identified for cooperation are : (1) Establishment of a detailed correlation on a formation level between the Karoo sequences in Southern Africa and the Gondwana sequences in India; (2) Geoscience Mapping in the near-shore environment along the eastern Indian coastal margin for the purpose of identifying off-shore diamond deposits; (3) Development of a pre-Gondwana precambrian crustal evolution and metallogenic map for India and Southern Africa; (4) Evaluation of stability of underground mine workings through micro-seismic techniques; (5) Hydro-fracturing for street measurement; and (6) Characterisation and processing of gold, diamond and platinum group of metal ores and to evolve suitable beneficiation processes.

4.3 The 2nd Meeting of the Indo-South African Working Group on Geology and Mineral Resources was held in New Delhi in November 1999 and reviewed the progress of on-going projects. The meeting also discussed new project proposals and identified eight projects for future cooperation, viz. : (1) Bacterial Leaching of Low Grade Gold Ores; (2) Development of suitable underground

mining methods for exploitation of chromite deposits of Sukinda, Orissa; (3) Retreatment of Tailings at K.G.F.; (4) Setting up of a pilot training-cum-production centre in South Africa for cutting and polishing of precious and semi-precious stones; (5) Investigations to develop and economically viable flow-sheet for extraction of gold from the gold ore of Bhukia Jagpura Deposit, Near Banswara, Rajasthan; (6) Development of National Institute of Miner's Health, Kolar; and (7) Application of Ground Penetration Radar of Exploration and Location of abandoned Galleries and Water Bodies in mines. A review of the progress of the projects was undertaken during the year between the implementing agencies through correspondence.

VIETNAM

5.1 The 10th Meeting of the India-Vietnam Joint Commission was held in Hanoi from 6-8.11.2000 at Hanoi, Vietnam. Both sides agreed to extend the Memorandum of Understanding for cooperation in the field of geology and mineral resources signed on 18.4.1994, for a further period of three years. Both sides discussed the progress of the joint venture between Hindustand Zinc Limited and VIGEGO, Vietnam for exploitation of gold deposits in Vietnam. The Vietnamese side also welcomed the Indian offer to involve Indian companies in geological mapping, mineral exploration and prospecting activities in the mining sector of Vietnam. Both sided also agreed to cooperate in the expert exchange programme in the field of geology and mineral resources.

5.2 Under ITEC programme of the Ministry of External Affairs the Ministry of Mines organised a study tour for a four-member delegation from the Vietnam National Gems and Gold Corporation (VIGEGO) to India from 15.4.2000 to 25.4.2000. The study team visited various mining and mineral processing installations at Udaipur, Kolar Goldfields, Laboratory and I.T. Center of Mineral Exploration Corporation at Nagpur and the Diamond and Gems Development Corporation at Jaipur.

RUSSIA

6.1 The 7th session of the Indo-Russian Working Group on Ferrous and Non-Ferrous Metallurgy was held in Moscow on 10-11.1.2001. The meeting reviewed the progress on bilateral co-operation in the areas identified by earlier Working Group meetings such as technology transfers in the ferrous and non-ferrous metallurgical sector.

MYANMAR

7.1 A Minstry of Mines delegation visited Myanmar to evaluate the mineral prospect identified for taking up in the mineral sector for cross border cooperation. An Indian Geologist conducted some exploratory drilling and collected rock samples for assessment of petrological, chemical and physical characteristics.

MOROCCO

8.1 The Ministry of Mines and the Ministry of Energy and Mines of the Kingdom of Morocco signed a Memorandum of Understanding (MOU) in the fields of Geology and Mining. The MOU envisages cooperation in the field of Geology and Mineral Exploration. In the field of Geology the cooperation will be particularly in computer processing, advanced laboratory teachniques, application of digital image processing and training facility for Moroccan scientists in India in all fields of geological and geophysical mapping and exploration. In the field of Mineral Exploration the cooperation will focus in mineral processing and development, mining environment and mining regulation. Mutual assistance will also be provided to promote joint ventures between specialised organisations in the fields of Geology and mining.

LAO PDR

9.1 The Department of Mines participated in the 3rd India-Lao PRD Joint Commission Meeting held in Vietnam on 9.11.2000. The Laos side offered to cooperate with India for exploring and mining of Potash deposits in Laos. The Indian

side highlighted the expertise available with Geological Survey of India, Indian Bureau of Mines, Public Sector Undertakings and the Indian mineral industry in the fields of mineral exploration, exploitation and mineral processing. The Indian side also agreed to help impart training of scientific and technical personnel of Laos in exploration, mining and mineral processing.

CANADA

10.1 The Ministry of Mines participated in the 'Mining Millennium 2000 at Toronto, Canada organised by the Prospectors and Developers Association of Canada.

10.2 The Ministry of Mines participated in the 'Vancouver Cordilleran Exploration Round Up' organised by the British Columbia and Yukon Chamber of Mines held in Vancouver, Canada from 23-1-2001 to 26-1-2001. The Ministry of Mines organised a one-day Investors' Seminar on 24th January and also set up an Exhibition Booth on 25-26.1.2001

CHAPTER IX

PROGRESSIVE USE OF HINDI

INTRODUCTION

1.1 As per Article 343 of the Constitution, Hindi is the Official Language of Union of India. There is a Hindi section in the Ministry to ensure the implementation of Official Language policy in the Ministry and in Subordinate offices and PSUs under its control. The Ministry is continuously trying its level best to promote the progressive use of Hindi in the official work as per the Official Language (OL) policy.

COMPLIANCE OF SECTION 3(3) OF OFFICIAL LANGUAGE (OL) ACT

2.1 During the current year General Orders, Notification, Resolution, Administrative and other reports etc. were issued bilingually in compliance of section 3(3) of Official Language (OL) Act, 1963. In order to do maximum, official work in Hindi standard drafts etc. were prepared bilingually. Employees having proficiency in Hindi were issued orders to do their official work in Hindi and four sections of the Ministry have already been specified for doing 100 per cent work in Hindi.

HINDI TRAINING

3.1 Officers/employees are nominated under Hindi Teaching Scheme of MHA to impart training in Hindi, Hindi stenography and Hindi typing. More than 90 per cent of the officers/employees of the Ministry have working knowledge of Hindi. During the year one Hindi Translator was nominated for Translation training in C.T.B. The translator successfully completed the training and got the Gold Medal.

HINDI SALAHAKAR SAMITI

4.1 In order to accelerate the use of Hindi in the Ministry of Mines and its subordinate offices as well as PSUs a Hindi Salahakar Samiti has been reconstituted in the Ministry on 23.10.2000 and a Meeting has been fixed for 16.3.2001. It is a High Powered Committee which reviews the progress made in the use of Hindi in the Ministry and its Subordinate Offices as well as in PSUs. It also recommends effective measures to increase the use of Hindi and ensures the compliance of Official Language Policy.

HINDI FORTNIGHT

5.1 Hindi in Devnagri script was adopted as official language of Union on 14.9.1949. Every year 14th September is celebrated as Hindi Day. In order to ensure the maximum use of official language Hindi in the official work, Hindi Fortnight is celebrated every year. Ministry of Mines also organised the Hindi fortnight from 1-15.9.2000 and during this period various Hindi competitors were organised and provisions of cash Award have been made for the competitors who attain Ist, IInd and IIIrd positions. In addition to this there is also provision of consolation prizes. The Awardees are also given citations.

MEASURES FOR IMPLEMENTATION OF OFFICIAL LANGUAGE POLICY

6.1 For the propagation and enhancement of Official Language it is the policy of the

Government to implement the Official Language through incentive, inspiration and awards. In order to encourage the officers/employees of the Ministry to do their work in Hindi various cash Award Schemes of Department of Official Language were implemented. An Official Language Implementation Policy is also functioning in the Ministry and during the year 2000-2001 the meetings of this Committee were organized as per schedule. In these meetings the progress made in the use of Hindi was reviewed and measures adopted to achieve the target fixed for various items in the Annual Programme for the year 2000-2001 issued by the Department of Official Language.

6.2 For achieving the annual targets fixed for the use of Hindi by the Department of Official Language various sections of the Ministry were inspected and remedial measures were suggested to overcome the shortcomings noticed.

INSPECTION OF SUBORDINATE OFFICES/ UNDERTAKINGS REGARDING THE USE OF HINDI

7.1 In order to assess the use of Hindi in Subordinate offices/Undertakings of the Ministry of Mines, DD (Official Language) inspected IBM Nagpur on 10.11.2000. Shortcomings noticed were pointed to the concerned office and remedial measures were suggested to overcome the same.

USE OF HINDI IN THE OFFICES/PSUs UNDER THE CONTROL OF THE MINISTRY OF MINES

8.1 In order to ensure the compliance of Official Language Policy in the offices/PSUs, directions were issued by the Ministry from time to time and progress made in usage of Hindi was closely monitored during the year.

8.2 All these offices have their own Hindi sections and are making their best efforts for implementing Official Language Policy of the Government in letter and spirit.

8.3 An Official Language Implementation Committee under the chairmanship of the Head of the concerned office has been set up in every office. Meetings of these committees were held regularly during the year under review.

8.4 The Officer dealing with Hindi in the Ministry was also invited in these meetings who gave valuable suggestions to increase the use of Hindi.

8.5 In order to assess the progress made in the use of Hindi for official purposes and the implementation of Official Language Policy of the Government, a quarterly progress report was called for from every subordinate office and Public Sector Undertaking of this Ministry. The reports were reviewed and shortcomings noticed during the review were intimated to the concerned offices and remedial measures suggested to overcome the same.

RAJBHASHA SHIELD YOJNA FOR PSUs/ SUBORDINATE OFFICES

9.1 A Rajbhasha Shield Yojna for the year 1999-2000 was circulated among the PSUs/Subordinate offices of the Ministry of Mines.

PUBLICATION OF HINDI MAGAZINE

10.1 The Ministry of Mines has been bringing out its House Magazine named Khan Sampada since 1998. RAJBHASHA VISHESHANK of this magazine was brought out on 14.9.1999 i.e. on Hindi Divas. The Kendriya Sachivalaya Hindi Parished New Delhi has awarded Best Magazine Award to this Magazine at a function on 19.11.2000.

INSPECTION OF UNDERTAKINGS BY THE COMMITTEE OF PARLIAMENT ON OFFICIAL LANGUAGE

11.1 During the year 2000-2001 the Committee of Parliament on Official Language inspected offices of NALCO and IBM Goa on 8.11.2000 and 14.1.2001 respectively regarding the progressive use of Hindi in these two undertakings of the Ministry of Mines.

CHAPTER X

WELFARE MEASURES

WELFARE OF SCs, WOMEN AND WEAKER SECTIONS

1.1 The Ministry of Mines, Subordinate offices and the Public Sector Undertakings under its administrative control continued with the efforts to fill up the backlog vacancies in respect of SC/ ST. The PSUs also continued the process of identifying and implementing programmes aimed at upliftment of weaker sections of society in the peripheral areas of their units/locations. A number of activities like community education programme, facilitating availability of drinking water, repair and development of approach roads of surrounding areas, arranging health awareness programmes, school health programmes and medical camps in rural areas, were undertaken by the PSUs for upliftment of the community surrounding their township as part of their social responsibility.

REDRESSAL OF PUBLIC GRIEVANCES

2.1 In pursuance of the instructions and guidelines issued on 1.3.1988 by the Department of Administrative Reforms and Public Grievances to strengthen the internal grievance redressal machinery in each Ministry/Department of the Central Government, the Joint Secretary in the Ministry of Mines has been designated as the Director of Grievances. He has been vested with adequate powers in respect of all matters pertaining to the grievances received in the Ministry. Whenever a grievance is found to be genuine, directives for appropriate corrective measures are given to the concerned executive authorities.

2.2 The Ministry of Mines has under its administrative control two subordinate offices and six public sector undertakings. The Chief Executives of the PSUs and the Heads of the subordinate offices have been entrusted with the responsibility of strengthening the grievance redressal machinery by designating senior level officers to look after the job and to report directly to the respective Chief Executive/Head. Quarterly reports about the grievances received and disposed of are submitted by these Undertakings and Subordinate Offices to the Ministry. These reports are, in turn, sent to the Department of Administrative Reforms and Public Grievances. During the year 2000-2001 (upto December 2000), 24 cases were received, out of which 11 cases have been disposed of. In addition, as per instructions of the Department of Personnel and Training, periodic inspections are also conducted of the working of the Public Grievances Redressal Machinery in the six Public Sector Undertakings and the two sub-ordinate offices viz. (GSI and IBM) under the administrative control of the Ministry. The grievance cases are also being reviewed by Secretary (Mines) in Quarterly Performance Review Meetings of these organisations.

2.3 In order to obviate the tendency of Government employees to seek outside help for redressal of grievances relating to normal service matters, the Government issued instructions in December, 1988 for designating Staff Grievance Officers in the Central Ministries/Departments and their attached and subordinate offices to deal effectively and equitably with the grievances relating to service matters, like fair promotions, proper medical facilities, granting timely pensionary benefits, etc. The Ministry and the subordinate offices including the 6 PSUs under its administrative control had accordingly designated such Staff Grievance Officers also.

1996-97 से 2000-01 तक महत्वपूर्ण खनिजों का उत्पादन
Production of Selected Minerals, 1996-97 to 2000-01

(मूल्य करोड़ रुपए में)
(Value in Rs. Crore)

खनिज	इकाई	1996-97 मात्रा Qty.	1996-97 मूल्य Value	1997-98 मात्रा Qty.	1997-98 मूल्य Value	1998-99 मात्रा Qty.	1998-99 मूल्य Value	1999-2000 (अ) (P) मात्रा Qty.	1999-2000 (अ) (P) मूल्य Value	2000-01 (अनु) (E) मात्रा Qty.	2000-01 (अनु) (E) मूल्य Value	Unit	Mineral
सभी खनिज			**38269.37**		**44094.04**		**44550.44**		**45233.47**		**55041.79**		**All Minerals**
ईंधन			**31689.03**		**36497.80**		**36743.02**		**37226.82**		**46843.62**		**Fuel**
कोयला	मि.टन	286	15129.60	297	17724.16	292	18405.88	300	18950.76	323	20407.18	M.Tonnes	Coal
लिग्नाइट	मि.टन	23	895.81	23	955.84	23	1111.84	22	1035.76	23	1077.00	M.Tonnes	Lignite
प्राकृतिक गैस (प्रयुक्त)	मि.क्यु.मी.	21325	4250.61	24544	6072.46	25706	5874.03	26884	6135.69	26426	7640.16	M.C.M.	Natural Gas (Utilised)
पेट्रोलियम (अपरिष्कृत)	मि.टन	33	11413.01	34	11745.34	33	11351.26	32	11104.62	32	17719.28	M.Tonnes	Peroleum (crude)
धात्विक खनिज			**2717.87**		**3284.11**		**3310.20**		**3419.23**		**3608.08**		**Metallic Minerals**
बॉक्साइट	हजार टन	6076	113.31	6108	110.36	6610	121.68	6854	134.87	7061	141.81	000'tonnes	Bauxite
क्रोमाइट	हजार टन	1456	289.47	1515	304.55	1418	282.34	1696	334.71	2007	373.64	000'tonnes	Chromite
ताम्र सान्द्र	हजार टन	3905@	241.59@	223	385.97	199	337.75	165	295.77	149	251.35	000'tonnes	Copper Conc.
स्वर्ण	कि. ग्राम	2892	163.57	2846	152.98	2683	172.69	2442	148.65	4053	185.38	Kg.	Gold
लोह अयस्क	हजार टन	68161	1479.56	75723	1819.70	72230	1855.95	73475	1965.29	77683	2076.59	000'tonnes	Iron Ore
सीसा सान्द्र	हजार टन	60	57.40	61	68.84	63	70.54	63	69.91	58	65.22	000'tonnes	Lead Conc
मैंगनीज अयस्क	हजार टन	1871	176.07	1642	177.78	1538	173.83	1565	181.00	1580	189.60	000'tonnes	Manganese Ore
जस्त सान्द्र	हजार टन	277	168.47	293	223.88	350	251.54	360	246.88	359	274.60	000'tonnes	Zinc Conc.
अन्य धात्विक खनिज			28.43		40.05		43.88		42.14		49.89		Other met. Minerals
अधात्विक खनिज				**1398.30**		**1591.45**		**1740.52**		**1830.72**		**1833.39**	**Non-Met. Minerals**
ऐपेटाइट	हजार टन	9	1.09	7	0.81	14	1.72	12	1.34	10	1.22	000'tonnes	Apatite
एस्बेस्टास	हजार टन	27	2.13	26	1.93	20	1.90	18	2.20	16	2.23	000'tonnes	Asbestos
बेराइटिस	हजार टन	382	21.45	453	32.04	661	50.26	205	11.30	381	12.98	000'tonnes	Barytes
हीरा	कैरेट	31836	22.03	30994	20.95	34580	21.65	40666	17.93	38287	17.77	Carats	Diamond
डोलोमाइट	हजार टन	3469	70.42	2991	72.11	2922	71.72	2875	67.95	2992	68.92	000'tonnes	Dolomite
अग्निमिट्टी* *	हजार टन	407	3.95	450	4.87	470	5.89	369	4.07	340	4.08	000'tonnes	Fire clay**
फलुओराइट सान्द्र	हजार टन	20	11.23	11	7.67	+ +	0.03	+ +	0.14	2	1.50	000'tonnes	Fluorite Conc.

(अनुबंध I जारी)
(Annex I contd.)

खनिज	इकाई	1996-97 मात्रा Qty.	1996-97 मूल्य Value	1997-98 मात्रा Qty.	1997-98 मूल्य Value	1998-99 मात्रा Qty.	1998-99 मूल्य Value	1999-2000 (अ) (P) मात्रा Qty.	1999-2000 (अ) (P) मूल्य Value	2000-01 (अनु) (E) मात्रा Qty.	2000-01 (अनु) (E) मूल्य Value	Unit	Mineral
फ्लुओराइट श्रेणीकृत	हजार टन	5	1.16	6	1.10	4	0.98	48	15.14	42	15.15	000'tonnes	Fluorite Graded
जिप्सम	हजार टन	2210	29.70	2195	31.31	2267	33.83	3288	53.50	2951	49.36	000'tonnes	Gypsum
केओलिन	हजार टन	775	47.87	791	47.83	741	59.67	752	51.26	872	57.09	000'tonnes	Kaolin
कायनाइट	हजार टन	7	0.34	6	0.32	6	0.41	6	0.41	4	0.30	000'tonnes	Kyanite
चूनापत्थर	मी. टन	103	895.88	110	1036.94	113	1125.00	128	1265.06	127	1256.24	M.tonnes	Lime stone
मैग्नेसाइट	हजार टन	378	34.90	374	38.00	350	38.61	330	34.98	332	35.03	000'tonnes	Magnesite
अभ्रक	टन	1954	2.68	1697	2.38	1484	2.32	1273	2.31	1113	2.22	tonne	Mica
फास्फोराइट	हजार टन	1341	137.21	1142	162.56	1262	191.77	1136	163.01	1089	176.54	000'tonnes	Phosphorite
पायराइट्स	हजार टन	144	7.04	125	7.89	89	9.33	10	0.86	-	-	000'tonnes	Pyrites
सिलिका सैंड	हजार टन	1540	15.33	1451	14.39	1718	18.04	3153	21.32	2602	18.21	000'tonnes	Silica Sand
सिलिमनाइट	हजार टन	9	2.90	12	4.49	12	4.81	15	5.48	13	4.86	000'tonnes	Sillimanite
स्टियटाइट	हजार टन	531	31.20	475	34.05	482	34.55	528	40.92	513	40.08	000'tonnes	Steatite
वोलेस्टोनाइट	हजार टन	97	6.51	98	9.23	95	8.95	117	11.25	117	10.03	000'tonnes	Wollastonite
अन्य अ-धात्विक खनिज			53.28		60.58		59.08		60.29		59.58		Other Non-Met. Minerals
गौण खनिज			**2464.17**		**2720.68**		**2756.70**		**2756.70®**		**2756.70®**		**Minor Minerals**

मि. टन. मिलियन टन, मि.क्यू.मी. मिलियम क्यूबिक मीटर, कि.ग्राम किलो ग्राम

[1] [1] किसी कारणवश कोयला खनन में यदि कोई अग्निमिटी उत्पादन सम्मिलित कर लिया गया तो उसे छोड़कर (अ) अनन्तिम तथा आई.बी.एम. के पास उपलब्ध मासिक विवरणियों पर आधारित (अनु) अप्रैल 2000 से अक्टूबर 2000 तक एकत्रित आँकड़े तथा नवम्बर 2000 से मार्च 2001 तक अनुमानित आँकड़े ® गत वर्ष आँकड़े पुनः दिए गए हैं क्योंकि वर्तमान आँकड़े अभी तक प्राप्त नहीं हुए हैं।

+ + नगण्य @ तांबा अयस्क से संबंधित।

टिप्पणी (1) आँकड़े खान मुहाना मूल्य बताते हैं (2) आँकड़े खनिज संरक्षण एवं विकास नियमावली 1988 के अन्तर्गत मिली विवरणियों पर आधारित हैं कोयला, लिग्नाइट, पेट्रोलियम (अपरिष्कृत), प्राकृतिक गैस (प्रयुक्त) तथा गौण खनिजों को छोड़कर।

स्रोत (क) कोयला एवं लिग्नाइट : कोयला नियन्त्रक, कलकत्ता

(ख) पेट्रोलियम (अपरिष्कृत) तथा प्राकृतिक गैस : पेट्रोलियम तथा प्राकृतिक गैस मन्त्रालय

(ग) गौण खनिज = राज्य सरकार।

(E) Comprise recorded figures from April 2000 to October 2000 and estimated for November 2000 to March 2001.
(P) Provisional and based on monthly returns to the extent available with IBM.
m.t.—Million tonne 000't—Thousand tonnes
m.c.m.—Million cubic metre Kg.—Kilogram + +Negligible
** Excludes the production of fireclay, if any recovered incidental to coal mining
@ — Pertains to Copper Ore
(R)—Previous years figures repeated as current data have not been received yet.

Note : (1) The value figures pertain to pithead value.
(2) Data based on the returns received under MCDR, 1988 except coal, lignite, petroleum (crude), natural gas (utilised) and minor minerals.

Source : (a) Coal and Lignite : Coal Controller, Calcutta
(b) Petroleum (crude) and Natural Gas : Ministry of Petroleum & Natural Gas
(c) Minor Minerals : State Governments.

वर्ष 1994-95 से 1998-99 तक अयस्कों और खनिजों का निर्यात
Exports of Ores & Minerals, 1994-95 to 1998-99

(मूल्य करोड़ रुपए में)
(Value in Rs. Crore)

खनिज	इकाई	1994-95		1995-96		1996-97		1997-1998		1998-1999		Unit	Minerals
		मात्रा Qty.	मूल्य Value	मात्रा Qty.	मूल्य Value	मात्रा Qty.	मूल्य Value	मात्रा Qty.	मूल्य Value	मात्रा Qty.	मूल्य Value		
सभी खनिज			15832		19820		18956		20643		24622		All Minerals
एब्रेसीव (प्राकृतिक)	टन	18984	9	35470	15	30247	17	46709	24	42495	23	tonne	Abrasives (natural)
एल्यूमिना	टन	479569	231	447988	326	560615	375	427184	325	216881	163	tonne	Alumina
बेराइटिस	टन	244643	24	424840	40	140023	17	24373	4	106232	15	tonne	Barytes
बॉक्साइट	टन	97210	3	149968	5	103925	5	86876	3	98943	24	tonne	Bauxite
बेंटोनाइट	टन	147005	17	147856	19	174118	28	183212	33	179314	34	tonne	Bentonite
बोरेक्स		133	+ +	311	1	290	1	714	2	498	1		Borax
इमारती व स्मारकीय पत्थर	टन	307635	47	624863	60	888324	120	2347003	74	295814	84	tonne	Building & Monu stones
क्रोमाइट	टन	490212	103	347705	161	565825	225	438948	149	492540	176	tonne	Chromite
कोयला	हजार टन	673	88	651	96	478	83	540	88	823	141	000 t	Coal
हीरा (मुख्यतः तराशा)		*	12357	*	15374	*	14299	*	16015	*	19977		Diamond (mostly cut)
डोलोमाइट	टन	1264	1	74	+ +	3036	1	6679	1	5541	2	tonne	Dolomite
मरकत		*	133	*	255	*	143	*	179	*	143		Emerald
फेलस्पार	टन	49307	8	84622	14	94717	17	77644	16	52631	11	tonne	Felspar
फेलस्पार (तराशा तथा बिना तराशा)		*	10	*	11	*	8	*	11	*	6		Felspar (cut & uncut)
फुलर्स अर्थ	टन	128	+ +	76	+ +	163	+ +	403	+ +	31660	6	tonne	Fullers earth
गार्नेट (तराशे व बिना तराशे)		*	6	*	3	*	8	*	9	*	13		Garnet (cut & uncut)
गार्नेट (प्राकृतिक)	टन	11956	3	2734	1	1913	1	6661	2	42519	15	tonne	Garnet (natural)
ग्रेनाइट	टन	1133000	906	1277160	1083	1172474	1139	708160	958	778643	1013	tonne	Granite
ग्रेफाइट (प्राकृतिक)	टन	675	2	660	2	248	+ +	265	+ +	556	1	tonne	Graphite (Natural)
जिप्सम व प्लास्टर	टन	28428	1	43770	3	67104	6	20197	2	38735	4	tonne	Gypsum & Plaster
इलेमनाइट	टन	177674	49	207812	72	42961	22	109312	37	64955	30	tonne	Ilmenite

(अनुबंध II जारी)
(Annex II contd.)

खनिज	इकाई	1994-95 मात्रा Qty.	1994-95 मूल्य Value	1995-96 मात्रा Qty.	1995-96 मूल्य Value	1996-97 मात्रा Qty.	1996-97 मूल्य Value	1997-1998 मात्रा Qty.	1997-1998 मूल्य Value	1998-1999 मात्रा Qty.	1998-1999 मूल्य Value	Unit	Minerals
लौह अयस्क	ह. टन	26062	1298	31719	1721	27627	1706	29496	1770	22274	1615	000 t	Iron Ore
केओलिन	टन	8660	2	6241	2	10469	3	10139	3	7810	3	tonne	Kaolin
चूना पत्थर	टन	299584	4	199855	4	46640	7	231693	8	219319	8	tonne	Lime stone
मैग्नेसाइट	टन	1652	1	866	1	2227	2	615	1	1669	1	tonne	Magnesite
मैंग्नीज डाय आक्साइड (विद्युतदंशी)	टन	2005	5	1896	3	1875	2	1384	1	1380	1	tonne	Mang. Dioxide (elect.)
मैंगनीज अयस्क	टन	276598	35	236529	30	309846	48	259194	43	166963	19	tonne	Manganese Ore
संगमरमर	टन	73252	92	59312	90	66839	108	74694	130	69800	111	tonne	Marble
अभ्रक	टन	30074	39	33776	47	29360	47	47892	63	50245	70	tonne	Mica
प्राकृतिक गैस	टन	-	-	-	-	-		52630	27	25708	12	tonne	Natural gas
बहुमूल्य व अर्ध बहुमूल्य जड़ाऊ पत्थर (अविन)		*	217	*	245	*	346	*	438	*	685		Prec. & semi prec. stones NES
क्वार्टज (प्राकृतिक)	टन	37982	7	72327	14	42172	10	16224	5	32045	9	tonne	Qartz (Natural)
रेड ऑक्साइड	टन	898	1	1473	3	1375	1	1083	2	2034	2	tonne	Red Oxide
रॉक फॉस्फेट	टन	200	+ +	145	+ +	221	+ +	153	1	5880	1	tonne	Rock Phosphate
रुटाइल	टन	9603	12	11240	16	7399	17	8955	7	6744	16	tonne	Rutile
नमक (आम नमक के अलावा)	टन	141107	10	57759	4	19037	3	35822	4	21254	4	tonne	Salts (other than common salts)
बालू (धातुमय बालू को छोड़कर)	टन	24315	7	32523	5	26478	4	18364	5	13367	4	tonne	Sand (excl. metal bearing)
सिलिका सैंड	टन	9687	3	25756	7	36137	11	25356	12	15595	10	tonne	Silica sand
स्लेट	टन	50484	32	97245	45	69755	54	66045	57	88131	87	tonne	Slate
सोडियम नाइटरेट	टन	2333	3	2066	3	2059	3	2428	4	1547	3	tonne	Sodium Nitrate
स्टीयटाइट	टन	27783	10	30413	13	99200	14	27360	12	32226	15	tonne	Steatite.
गंधक	टन	1238	1	1711	2	1581	2	1604	5	3611	14	tonne	Sulphur
वोलेस्टोनाइट	टन	9800	7	6743	5	11582	8	16977	11	7939	6	tonne	Wollastonite.
जस्त अयस्क व सान्द्र	टन	20500	19	140	+ +	31239	30	92364	92	30921	27	tonne	Zinc ores & conc.
अन्य खनिज			29		19		17		10		17		Other Minerals

*मात्रा के आँकड़े अंशतः समाहित किए जाने के कारण नहीं दिए गए हैं, परन्तु मूल्य के आँकड़े पूर्णतः समाहित हैं।

*Quantity figures are not given due to partial coverage, Value, figures, however, have full coverage.

अविन : अन्यत्र विनिर्दिष्ट नहीं

N E S : Note Elsewhere Specified.

स्रोत : डी. जी. सी. आई व एस. कलकत्ता।

Source : Directorate General of Commercial Intelligence & Statistics, Calcutta.

वर्ष 1994-95 से 1998-99 तक अयस्कों और खनिजों का आयात
Imports of Ores & Minerals, 1994-95 to 1998-99

(मूल्य करोड़ रुपए में)
(Value in Rs. Crore)

खनिज	इकाई	1994-95 मात्रा Qty.	1994-95 मूल्य Value	1995-96 मात्रा Qty.	1995-96 मूल्य Value	1996-97 मात्रा Qty.	1996-97 मूल्य Value	1997-1998 मात्रा Qty.	1997-1998 मूल्य Value	1998-1999 मात्रा Qty.	1998-1999 मूल्य Value	Unit	Mineral
सभी खनिज			**19366**		**23660**		**34286**		**34655**		**37349**		**All Minerals**
एल्यूमिना	टन	7771	22	11527	28	9920	26	13849	39	11030	34	tonne	Alumina
एस्बेस्टॉस	टन	70171	116	81924	145	77498	146	61474	121	76094	159	tonne	Asbestos
बाल क्ले	टन	3197	2	3397	3	2883	3	8596	5	4414	4	tonne	Ball clay
बॉक्साइट	टन	21634	7	71590	26	27177	14	32245	16	59026	20	tonne	Bauxite
बोरेक्स	टन	25655	29	38031	45	22667	32	31794	39	39097	55	tonne	Borax
कोयला	ह. टन	10739	2036	12513	2691	3175	3106	6439	3709	16537	3556	000 t	Coal
कोबाल्ट अ. तथा सान्द्र	टन	2	++	13	1	252	4	606	9	2465	28	tonne	Colbalt Ore & Conc.
कोक	टन	652357	189	1177493	405	1237320	426	2275274	721	1569401	565	tonne	Coke
तांब्र अ. तथा सान्द्र	टन	448	2	19384	66	60096	132	87934	159	296110	570	tonne	Copper Ore & Conc.
क्रायोलाइट तथा चिलाइट	टन	1439	2	1384	3	815	2	393	1	2410	5	tonne	Cryolite & Chiolite
हीरा (बिना तराशा)		*	4960	*	6874	*	10183	*	12087	*	15556		Diamond (uncut)
डोलोमाइट	टन	1094	++	2651	1	202	++	319	++	21764	6	tonne	Dolomite
मरकत		8091	54	*	67	*	2	*	92	*	42		Emerald
फलूओस्पार	टन	61781	19	53627	25	54666	28	39135	19	72352	38	tonne	Fluorspar
ग्रेफाइट (प्राकृतिक)	टन	960	2	774	2	823	4	1081	3	694	3	tonne	Graphite (Natural)
ग्रेनाइट	टन	477	1	588	1	1037	1	913	1	2577	3	tonne	Granite
जिप्सम व प्लास्टर	टन	13132	1	23185	2	10146	3	16254	4	14627	10	tonne	Gypsum & Plaster
लौह अयस्क	ह. टन	1523	214	879	145	853	125	372	77	149	25	000 t	Iron Ore
केओलिन	टन	553	1	424	1	1429	2	3104	4	4826	6	tonne	Kaolin
सीसा अयस्क एवं सान्द्र	टन	32269	29	14625	19	52428	72	40289	49	10679	15	tonne	Lead Ore & Conc.
चूना पत्थर	टन	631918	32	964436	55	1030581	69	1186240	79	1377594	98	tonne	Limestone

(अनुबंध III जारी)
(Annex III contd.)

खनिज	इकाई	1994-95 मात्रा Qty.	1994-95 मूल्य Value	1995-96 मात्रा Qty.	1995-96 मूल्य Value	1996-97 मात्रा Qty.	1996-97 मूल्य Value	1997-1998 मात्रा Qty.	1997-1998 मूल्य Value	1998-1999 मात्रा Qty.	1998-1999 मूल्य Value	Unit	Mineral
मैंग्नेसाइट	टन	103416	107	117974	137	66954	82	57188	73	42102	57	tonne	Magnesite
मैग्नीज डायआक्साइड (इलैक्ट्रोलाइटिक)	टन	1020	3	509	3	818	4	1346	7	1699	10	tonne	Manganese Dioxide (electrolytic)
मैंगनीज अयस्क	टन	3607	4	3689	4	2760	3	5065	6	4343	5	tonne	Manganese Ore
संगमरमर	टन	19464	11	32133	19	46291	39	23136	20	21956	23	tonne	Marbal
अभ्रक	टन	124	7	214	9	442	7	346	9	405	8	tonne	Mica
प्राकृतिक गैस	टन	0	0	0	0	0	0	2	+ +	1761	4	tonne	Natural Gas
निकेल अयस्क और सान्द्र	टन	2075	35	1983	48	1418	36	2015	46	1131	19	tonne	Nickel Ore & Conc.
पेट्रोलियम (अपरिष्कृत)	हजार टन	27349	10316	27357	11540	33710	18555	34399	15825	39686	14906	000 t	Petroleum (crude)
बहुमूल्य व अर्ध बहुमूल्य जड़ाऊ पत्थर (अविन)		*	99	*	116	*	186	*	188	*	195		Precious & Semi-precious stones NES
रॉक फास्फेट	टन	2540138	468	2443753	524	2038153	477	2667811	661	3099453	834	tonne	Rock phosphate
बालू (धातुमय बालू को छोड़कर)	टन	602	1	1745	4	903	1	1432	3	1697	3	tonne	Sand (excl. metal bearing)
सोडियम नाइटराइट	टन	1501	2	520	1	815	1	3925	5	2893	4	tonne	Sodium Nitrite
गंधक	टन	1600811	428	1543503	484	1543503	325	1617847	353	1583361	282	tonne	Sulphur
टिन अयस्क व सान्द्र	टन	1149	11	1441	16	2478	30	5016	27	144	2	tonne	Tin Ore & Conc.
टंगस्टन अयस्क व सान्द्र	टन	838	8	481	7	315	5	440	4	210	3	tonne	Tungston Ores & Conc.
वेनेडियम अयस्क व अन्य	टन	3751	52	6290	77	7791	57	11545	86	7504	68	tonne	Vanadium Ores & Others
जस्त अयस्क व सान्द्र	टन	49905	60	39516	40	42661	56	31776	51	62668	88	tonne	Zinc Ores & Conc.
अन्य खनिज			36		26		42		57		40		Other Minerals

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* Quantity figures not given due to partial coverage, value figures, however, have full coverage

अविनः अन्यत्र विनिर्दिष्ट नहीं

N E S : Not Elsewhere Specified

स्रोत : डी. जी. सी. आई व एस. कलकत्ता।

Source : Directorate General of Commercial intelligence & Statistics, Calcutta