GOVERNMENT OF INDIA

Ministry of Coal & Mines

DEPARTMENT OF MINES

ANNUAL REPORT

2001-2002
Department of Mines

Web Site Address: http://www.nic.in/mines

other important websites

GSI — http://www.gsi.gov.in
IBM — http://ibm.nic.in
NALCO — http://www.nalcoindia.com
HZL — http://www.hzlindia.com
HCL — http://www.hindustancopper.com
MECL — http://www.meclindia.com/
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**Annexures**
Chapter I

HIGHLIGHTS OF 2001-2002

MINING POLICY AND FOREIGN INVESTMENT

1.1 The Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act) and rules framed there under were amended in 2000-2001, to make the statutory provisions on par with international best practices, and investor friendly. The policy changes have attracted private investment in exploration of base-metals, noble metals and other scarce minerals. Since 1.1.2001, till 31.1.2002, reconnaissance permits in 67 cases involving an area of more than 83,000 square kilometre have been approved so far, of which 29 reconnaissance permits involving 31 thousand square kilometre were approved in 2001-2002.

1.2 Since February 2000, foreign direct investment (FDI) up to 100 per cent is allowed in the mining and mineral sector through the automatic route, except for diamond and precious stones, for which the limit for automatic approval is 74 per cent foreign equity. During the year 2001-2002, three proposals involving foreign direct investment to the tune of Rs 29 crore were approved through the FIPB (Foreign Investment Promotion Board) route, which takes the total number of FIPB approvals to 70, indicating an expected FDI inflow of Rs 3,963 crore.

FORUM FOR INTERACTION

1.3 A Conference of the State Ministers of Mining and Geology was held on 14.7.2001. Many important issues such as requirement for fixing the time limit for grant of mineral concession, time limit for approval of mining plan, release of reserved mineral bearing areas, provisions for prevention of illegal mining, preparation of mineral maps with forest outlays etc. were discussed.

Box 1.1

<table>
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<tr>
<th>Statutory Initiatives During 2001-2002</th>
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<tbody>
<tr>
<td>1. Time limits prescribed for decision on applications for mineral concessions</td>
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<tr>
<td>2. Time limits prescribed for approval of mining plans</td>
</tr>
<tr>
<td>4. Off shore Areas Mineral (Development and Regulation) Bill 2001 introduced in Parliament</td>
</tr>
</tbody>
</table>

1.4 A tripartite meeting of Central Government, State Governments and the investors in the mining sector for discussing redressal of problems being faced by the investors was held in New Delhi on 12.11.2001. Many important issues such as prescribing time limit for grant of mineral concessions, simplification of procedure for grant of permission for airborne geophysical surveys, problems in gaining access to geo-physical data, policy regarding captive mines, restriction on trade policy, environment and forestry related issues were discussed.


PERFORMANCE OF MINERAL SECTOR

1.6 The national mineral sector recorded a positive growth (1.07 per cent) during the period April 2001-December 2001, as compared to the corresponding period in 2000-2001.

PUBLIC SECTOR UNDERTAKINGS

1.7 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 2001-2002 with National Aluminium Company Limited (NALCO), Hindustan Zinc Limited (HZL), Hindustan Copper Limited (HCL) and Mineral Exploration Corporation Limited (MECL). Greater autonomy is expected to result in quicker decision making, enhance efficiency and increase productivity of the MOU signing PSUs.

1.8 NALCO has commissioned the first phase of the expansion of its alumina refinery in June, 2000 which has taken the production capacity of Refinery from 8,00,000 tonnes per annum to 10,50,000 tonnes per annum. The final phase of expansion to the level of 15,75,000 tonnes per annum has been completed during December 2001. After expansion, NALCO becomes the largest alumina producer in Asia with an exportable surplus of one million tonnes per annum after meeting the internal demands of its expanded smelter at Angul. The expansion programme in mines and refinery envisaged 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 biddings, NALCO is likely to save around Rs 200 crore on the projected cost of expansion.

1.9 HZL has completed expansion of existing smelters at Debari and Vishakhapatnam on schedule by 10,000 tonnes per annum and 7000 tonnes per annum respectively. The zinc production capacity of the Company now has been augmented from 152,000 tonnes per annum to 169,000 tonnes per annum.

DISINVESTMENT

1.10 In case of Hindustan Zinc Limited (HZL) the Government of India holds 75.92% equity and at present the proposal to further disinvest 26% of equity is being pursued again after the lone bid received has been rejected, as it was below the reserve price.

1.11 In National Aluminium Company Limited (NALCO), the Government of India holds 87.15% equity and the Government of India has taken a decision to further disinvest 30% of NALCO's equity through market route by June 2002.

1.12 The Government of India has decided that the disinvestment process in Mineral Exploration Corporation Limited (MECL) will be taken up in 2002-2003.

1.13 The Government of India has decided to disinvest its total shareholding (98.95%) in Hindustan Copper Limited (HCL) to an interested buyer. Expressions of interest have been invited for engaging an Adviser to assist the Government in the disinvestment process. An Inter-Ministerial Group for disinvestment of HCL has been constituted under the Chairmanship of Secretary, Department of Disinvestment.

INTERNATIONAL CO-OPERATION
1.14 The second meeting of the India-Australia Joint Working Group on Energy and Minerals was held in New Delhi on 23-24 May, 2001. The meeting of the Joint Working Group reviewed the Protocol of the first meeting and also identified new project proposals in the fields of mining, Petroleum and Natural Gas and Non-conventional energy sources and decided to work together to develop the collaborative projects discussed during the meeting.

1.15 The fifteenth meeting of the Indo-French Working Group on Mineral Exploration and Development was held in New Delhi on 13-15 December, 2001. The Working Group meeting reviewed the status of the completed projects, progress of ongoing projects and also identified and prioritised six new projects for future co-operation. Agreements for implementation of two projects which were included in the Financial Protocol between Geological Survey of India and Indian Bureau of Mines on the Indian side and BRGM on the French sides were also signed during the meeting.

1.16 The eighth session of the Indo-Russian Working Group on Ferrous and Non-Ferrous Metallurgy was held in New Delhi on 6th February, 2002. The protocol signed at the conclusion of the Working Group Meeting envisages strengthening co-operation in the ferrous and non-ferrous metallurgical sectors.

1.17 The Ministry of Coal and Mines and the Ministry of Energy and Mines of the Kingdom of Morocco signed a Memorandum of Understanding in the fields of Geology and Mining. The Memorandum of Understanding envisages cooperation in the fields of Geology and Mineral Exploration, particularly in computer processing, advanced laboratory techniques, digital image processing, etc. The Hon’ble Minister of Mines, Energy, Trade, Industry and Commerce of the Kingdom of Morocco visited India and met the Hon’ble Minister of Mines and Hon’ble Minister of State for Mines. During these meetings the visiting dignitary expressed desire for strengthening the bilateral cooperation between the two countries in the minerals sector and also outlined the fields of cartography, training of Moroccan personnel in India and geological mapping as their priority areas for mutual cooperation.

1.18 The forty-sixth annual session of the International Lead and Zinc Study Group (ILZSG) was held in India for the first time from 16th to 18th October 2001. India is founder member of ILZSG, which was formed in 1959 under the UN Charter to provide a forum for inter governmental consultation on international trade in lead and zinc, and related matters.

REGULATION AND CONSERVATION

1.19 During 2001-2002, till December 2001, the Indian Bureau of Mines had taken action under the mining statutes for regulation and conservation of mines as in Table 1.1

<table>
<thead>
<tr>
<th>Table 1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining Plans approved : 481</td>
</tr>
<tr>
<td>Mines inspected : 1653</td>
</tr>
<tr>
<td>Violations pointed out : 1644</td>
</tr>
<tr>
<td>Violations fully rectified : 613</td>
</tr>
<tr>
<td>Updated National Mineral Inventory : 27 Minerals as obtaining on 1.4.2000</td>
</tr>
<tr>
<td>Area covered in Mineral Maps : 21000 hectare.</td>
</tr>
</tbody>
</table>

SURVEY AND EXPLORATION

1.20 Highlights of performance of the Geological Survey of India during 2001-2002 were as follows:

Ø 4583 square kilometer of Specialised Thematic Studies have been undertaken;
Ø 15,347 line km of Multi-sensor surveys were conducted by Twin Otter Aircraft of GSI;
Ø As many as 206 villages of Assam, Meghalaya and Tripura and 35 villages in Beed district, Maharashtra were studied for resource appraisal (project DOVEMAP).

Mineral Finds

Ø 1239 million tonnes of additional coal resources from MP, Chhattisgarh, Orissa and Maharashtra bringing the total reserve at 213.91 billion tonnes.
Ø 64 million tonnes of lignite in West Coast Lignite field. Total reserve of lignite stands now at 29.45 billion tonnes.
Ø 95 million tonnes of iron ore with an average grade of 60 % Fe in Koir - Pathiriposi deposit, Kendujhar district, Orissa.
Ø 2,23,362 tonnes of gold ore with an average grade of 2.88 ppm at Dugocha main block, Udaipur district, Rajasthan.
Ø 440 million tonnes of probable category of all grades of limestone in Litang river Valley, Jaintia Hills district, Meghalaya.
Ø Over 23.23 million tonnes of commercial grade clay at Kasargod district, Kerala.

CELEBRATION OF 150 YEARS OF GSI

1.21 GSI celebrated a year long programme to commemorate and celebrate the one hundred and fiftieth anniversary of the organisation. The celebration was inaugurated by the Hon’ble Governor of West Bengal on 4th March, 2001 at Kolkata. A Publication "Story of GSI" was released during the inauguration of 150 year celebration. An international seminar was held at Kolkata on 5th & 6th March, 2001 on "Role of Geological Surveys in the 21st Century". This was followed by a series of national seminars, including at Mangalore, Shillong, Bhopal, Hyderabad, Nagpur, Lucknow and Jaipur.

NATIONAL MINERAL AWARDS
There are five PSUs under the Department of Mines in 2001-2002, namely:

- **Public Sector Undertakings (PSUs)**

The Department of Mines held equity shareholding in two undertakings during 2001-2002. There are three research institutions which are also funded by the Department of Mines.

### Role and Organization of the Department of Mines

#### ROLE OF THE DEPARTMENT OF MINES

1.22 National Mineral Awards are presented every year to scientists and technologists working in the field of earth sciences for striving towards excellence. National Mineral Awards for 2000 were presented on 27th February 2002 by the Coal and Mines Minister to 29 Geoscientists and technologists for outstanding contribution in the field of Earth Sciences and Mining Technology. The National Mineral Award For Excellence, 2000 was awarded to Padmashri Dr B.P. Radhakrishna. The prize money was increased from Rs 1 lakh to 3 lakh for The National Mineral Award For Excellence and from Rs 50,000 to Rs 1 lakh for other awards.

### Chapter II

#### ROLE AND ORGANIZATION OF THE DEPARTMENT OF MINES

2.1 The Department 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 administration of the Mines and Minerals (Development and Regulation) Act, 1957 in respect of all mines and minerals (other than coal, natural gas and petroleum). The Department is also responsible for 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, for which an appropriate legislation is under consideration of the Parliament.

### Box 2.1

**LIST OF SUBJECTS ALLOCATED TO THE DEPARTMENT OF MINES**

- 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 the 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 Department.

### ORGANISATIONAL STRUCTURE

2.2 The Organisational Chart of the Department of Mines is given at Annexure I. Headed by the Secretary, the Department of Mines comprises an Additional Secretary, two Joint Secretaries, and one Joint Secretary and Financial Adviser common for the Ministry of Coal and Mines. These officers are assisted by six Directors, two Deputy Secretaries (one post has been upgraded under in-situ promotion), four 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 Department has a technical wing comprising one Industrial Adviser, one Additional Industrial Adviser and two Development Officers. The total number of sanctioned posts for the Secretariat of the Department of Mines is 50 Gazetted and 193 Non-Gazetted. As against the sanctioned posts, the personnel employed in the Department of Mines under all categories (Group-wise), including General category/Scheduled Castes (SC)/Scheduled Tribes (ST)/Other backward class (OBC)/ Minority/Women is given at Table 2.1.

### Table 2.1

#### EMPLOYMENT OF PERSONNEL IN THE DEPARTMENT OF MINES

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>SC</th>
<th>ST</th>
<th>OBC</th>
<th>Minority</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group-A</td>
<td>26</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Group-B Gazetted</td>
<td>24</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Non-Gazetted</td>
<td>49</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>Group-C</td>
<td>85</td>
<td>14</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Group-D</td>
<td>59</td>
<td>18</td>
<td>1</td>
<td>-</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>243</td>
<td>44</td>
<td>8</td>
<td>7</td>
<td>3</td>
<td>41</td>
</tr>
</tbody>
</table>

2.3 In addition, there is a Chief Controller of Accounts assisted by a Pay and Accounts Officer and 36 Non-Gazetted Staff in the Pay and Accounts Office.

### Subordinate Offices, Public Sector Undertakings, Joint Sector Undertakings, and Research Institutions UNDER DEPARTMENT OF MINES

2.4 The Department of Mines has two subordinate offices, and five public sector undertakings under its administrative control. In addition, the Department of Mines held equity shareholding in two undertakings during 2001-2002. There are three research institutions which are also funded by the Department of Mines. The details of these bodies is as follows:

A. Subordinate Offices

1. Geological Survey of India (Head Quarter: Kolkata)
2. Indian Bureau of Mines (Head Quarter: Nagpur)

B. Public Sector Undertakings (PSUs)

There are five PSUs under the Department of Mines in 2001-2002, namely:

1. National Aluminium Company Limited (NALCO), Head Quarter: Bhubaneswar;
2. Hindustan Zinc Limited (HZL), Head Quarter: Udaipur;
3. Hindustan Copper Limited (HCL), Head Quarter: Kolkata;
4. Hindustan Zinc Limited (HZL), Head Quarter: Udaipur;
5. National Aluminium Company Limited (NALCO), Head Quarter: Bhubaneswar;
C. Joint Venture Undertakings

There are two Companies in which the Department of Mines held equity shareholding during 2001-2002.

1. Bharat Aluminium Company Limited (a Company jointly owned by Sterlite Industries Ltd. and Government of India); and
2. Sikkim Mining Corporation (a Company jointly owned by the State Government of Sikkim and the Government of India).

The allocation of business relating to Sikkim Mining Corporation (SMC) has been transferred to the Department of Development of North Eastern Region on 21.12.2001.

D. Research Institutions

There are three Research Institutions under the Department of Mines, namely:-

(i) Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur;
(ii) National Institute of Rock Mechanics, Kolar Gold Fields, Karnataka; and
(iii) National Institute of Miners' Health, Kolar Gold Fields, Karnataka.
Chapter III

MINING POLICY, REGULATION AND CONSERVATION

MINING LAW AND POLICY

3.1 The Central Government enjoys the power for regulation of mines and mineral development to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest, as per Entry 54 of List-I of the Seventh Schedule to the Constitution of India. The State Governments on the other hand have been given powers under Entry-23 of List-II for regulation of mines and mineral development subject to the provisions of List-I with respect to regulation and development under the control of the Union. Parliament has enacted the Mines and Minerals(Dvelopment & Regulation)Act,1957(MMDR Act,1957) under Entry 54 of List-I to provide for the regulation of mines and development of minerals under control of the Union.

3.2 In pursuance of the basic structural reforms initiated by the Government of India in July, 1991 in fiscal, industrial and trade regimes, the National Mineral Policy was announced in March, 1993. The National Mineral Policy recognised the need for encouraging private investment including foreign direct investment and attracting state-of-the-art technology in the mineral sector. Further, the policy stressed that the Central Government in consultation with the State Governments, shall continue to formulate the legal measures for the regulation of mines and the development of mineral resources to ensure basic uniformity in mineral administration and to ensure that the development of mineral resources keeps pace, and is in consonance with the national policy goals.

3.3 In furtherance of the objective of the National Mineral Policy, the MMDR Act, 1957 has been amended in 1994 and 1999. The Mineral Concession Rules, 1960 (MCR) and the Mineral Conservation and Development Rules 1988 (MCDR), framed under the MMDR Act, 1957 have been also modified. Salient features of the amended mining legislation are as follows:

(i) There is no restriction on foreign equity holding in mining sector companies registered in India.

(ii) There is a greater stability on tenure of mineral concessions, since the minimum period of a mining lease is twenty years with a maximum period of thirty years. The period of prospecting license is now three years, with possibility of renewal by a further period of two years.

(iii) Thirty minerals like iron ore, manganese ore, chrome ore, sulphur, gold, diamond, copper, lead, zinc, molybdenum, tungsten, nickel and platinum group of minerals which were reserved exclusively for public sector exploitation have been thrown open for exploitation by private sector.

(iv) With the 1999 amendment, a concept of reconnaissance operations as a stage of operation distinct from and prior to actual prospecting operations was introduced. The period of reconnaissance permit is three years. A reconnaissance permit holder enjoys preferential right for grant of prospecting license.

(v) Area restrictions notified for reconnaissance permit, prospecting license, mining lease have been made applicable state-wise, instead of the country as a whole.

(vi) In 1994, thirteen minerals were removed from the list of minerals included in the First Schedule to the MMDR Act, 1957. With further amendments in 1999, which deleted the mineral limestone from the First Schedule, only for 10 non fuel and non atomic minerals permission of the Central Government is required for grant of mining lease, prospecting license, and reconnaissance permit. These minerals are asbestos, bauxite, chrome ore, copper ore, gold, iron ore, lead, manganese ore, precious stones and zinc.

(vii) State Governments have been delegated powers to grant mineral concessions even for areas, which are not compact or contiguous.

(viii) State Governments have been empowered to permit amalgamation of two or more adjoining mining leases.

(ix) State Governments have been delegated powers to approve mining plans in respect of 29 non-metallic/industrial minerals in case of open cast mines.

3.4 During 2001-2002, MCR, 1960 and MCDR, 1988 have been further amended as follows:

(i) A time limit of ninety days has been prescribed for the Indian Bureau of Mines and the State Governments to convey decision on the mining plan submitted for approval.

(ii) Time limits have been prescribed for conveying a decision on applications for mineral concessions, viz six months for reconnaissance permits, nine months for prospecting licenses and twelve months for mining leases.

(iii) The provisions of penalty under MCDR, 1988 have been made more stringent to ensure systematic and scientific mining. Further, the fee structure for various applications under MCR, 1960 and MCDR, 1988 has also been revised to make these pertinent to the cost of processing the applications.

RESPONSE OF THE INDUSTRY TO THE POLICY MEASURES

3.5 In October 1996, the Department of Mines had issued guidelines to facilitate large area aerial prospecting, in response to which, the entrepreneurs have taken 65 large area prospecting licenses, covering an area of over 90 thousand square kilometer. After the amendment in the MMDR Act, 1957 in 1999, 67 reconnaissance permits covering an area of over 83 thousand square kilometer have been granted till 31.1.2002, of which 29 reconnaissance permits for an area of 31 thousand square kilometer were granted during 2001-2002. The states for which reconnaissance permits have been approved are Andhra Pradesh (27), Karnataka (23), Rajasthan (14), Uttar Pradesh (2) and Haryana (1).

3.6 The restriction on foreign equity holding in the mining sector was removed in 1994. Thereafter, till 31.1.2002, the total number of foreign direct investment proposals approved through the Foreign Investment Promotion Board (FIPB) with most of the leading global mining companies evincing interest in India was 70, indicating an expected FDI inflow of Rs 3,963 crore. During 2001-2002, three proposals involving expected FDI inflow of Rs 29 crore were approved.

MINING REGULATION AND CONSERVATION

3.7 The Department of Mines discharges the function of regulation and conservation through the Indian Bureau of Mines (IBM), which is a subordinate office of the Department. These functions include enforcement of the Mines and Minerals (Development and Regulation) Act 1957, Mineral Conservation and Development Rules 1988, and the relevant provisions of the Mineral Concession Rules 1960. It also undertakes scientific, techno-economic, research oriented studies in various aspects of mining, geological studies, ore beneficiation and environmental studies.
3.8 The performance of IBM in respect of regulation and conservation during the period under review is indicated in Table-3.1. In addition, during the year 2001-2002 (up to December, 2001) 1,644 violations of Mineral Conservation and Development Rules (MCDR) 1988 were pointed out in respect of 986 mines and 613 violations were fully rectified. Fifty one prosecutions were launched in various courts. Thirty three cases were decided in favour of IBM and seven cases were compounded. Besides, mining operations were suspended under Rule 13(2) of MCDR 1988 in respect of 9 mines i.e. 4 in Rajasthan, 3 in Karnataka and 2 in Goa States.

3.9 During the year 2001-2002 (up to December, 2001) 481 mining plans were approved and 56 were rejected. Since its inception, IBM had received a cumulative total of 11002 mining plans for approval till December 2001 out of which, 8,736 mining plans were approved, 1,170 were rejected, 854 withdrawn by the parties and 121 were referred back to the parties for modification. Besides, 115 mining plans were under scrutiny with the IBM at various Regional/Zonal offices and 6 mining plans were pending with the Directorate of Mines Safety for comments.

3.10 The inspections/studies for the enforcement of provisions of MCDR, 1988 also include provisions on protection of mines environment. During inspections it is ensured 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 & noise pollution, restoration of flora etc, in addition to other conservation and develop-mental measures. Necessary guidance to mine manage-ments/operators is also given for systematic and scientific development of mines including protection of environment. While approving the mining plans and the schemes of mining, it is ensured that the environment impact assessment studies have been carried out and to that effect, an environmental management plan has been incorporated for its effective implementation.

3.11 After the enforcement of MCDR, 1988, extensive afforestation has been undertaken in the mines. During the year 2001-2002 (up to December, 2001) about 4.25 million trees have been planted in and around mine areas. Thus, so far, 55.4 million trees have been planted with a survival rate of 70 percent.

3.12 Mines Environment and Mineral Conservation (MEMC) Weeks are organized in important mining centres every year through the regional offices of IBM to promote awareness amongst mine owners for minimising environmental pollution. During the year 2001-2002 (up to December, 2001), two such programmes were organised, in which 97 mines participated. The various activities during the MEMC weeks generated enthusiasm, wide publicity and awareness amongst mining community for achieving the better environment and eco-friendly mining.

3.13 In connection with the requirement of scientific mining of iron ore in the Bellary Hospet region of Karnataka, a joint team of officers from IBM and Directorate of Mines and Geology, Karnataka inspected all the 78 iron ore mining leases in 8 ranges of Bellary-Hospet Sector in Karnataka State during 2001-2002, and submitted a report on scientific mining of high grade iron ores for export from Bellary-Hospet, Karnataka to the Ministry of Steel, New Delhi.

3.14 The Department of Mines has got a study done through IBM with involvement of the Central Pollution Control Board and the Industry on standards and guidelines for mine effluents and other parameters required for environmental impact assessment, keeping in view of the specific parameters applicable in different mining areas for bauxite, chromite, iron, manganese, copper, lead and zinc during 2001-2002.

3.15 Applied Mining Research is carried out by IBM 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 on charge basis are also undertaken. During 2001-2002, ten such assignments have been taken on hand and completed.
Table 3.I

Mining regulation and conservation (UP TO DECEMBER, 2001)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Inspection of Mines</td>
<td>2791</td>
<td>2,789</td>
<td>2,200</td>
</tr>
<tr>
<td>2.</td>
<td>Preparation/Updation of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mineral Maps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td>No. of Mining Plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approved</td>
<td>670</td>
<td>751</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Rejected</td>
<td>71</td>
<td>88</td>
<td>56</td>
</tr>
<tr>
<td>(b)</td>
<td>No. of Mining Schemes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approved</td>
<td>177</td>
<td>207</td>
<td>148</td>
</tr>
<tr>
<td></td>
<td>Rejected</td>
<td>23</td>
<td>32</td>
<td>28</td>
</tr>
<tr>
<td>3.</td>
<td>Update of National Mineral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inventory (NMI) as on 1.4.2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td>Finalization of inventories</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(No. of minerals)</td>
<td>-</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td>(b)</td>
<td>Computerization of updated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>inventories (No. of minerals)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Preparation/Update of</td>
<td>18,000</td>
<td>22,700</td>
<td>21,000</td>
</tr>
<tr>
<td></td>
<td>Mineral Maps (Hect)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mineral maps along with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>forest overlays of leaseholds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>leased in Rajasthan and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>bauxite leaseholds in Gujarat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>were in progress. Besides,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>preparation of mineral maps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>of sillimanite &amp; limestone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>leaseholds in Meghalaya State completed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Ore Dressing Investigations</td>
<td>79</td>
<td>64</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>45 completed and 25 in progress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Chemical Analysis</td>
<td>48,055</td>
<td>50,240</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>37,753 completed and 939 in progress</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chapter IV

PERFORMANCE OF THE MINING AND THE MINERAL SECTOR

GENERAL PERFORMANCE

Mineral Production

4.1 The national mineral sector recorded a positive growth during the period April 2001-December 2001, as compared to the corresponding period in 2000-2001. The Index of Mineral Production (Base 1993-94=100) for the period April 2001-December 2001 for all minerals was higher by 1.07 per cent, primarily on account of a positive growth of 3.22 per cent in the coal and lignite sector which has a weight of 32.46 per cent in the index, and a positive growth of 4.86 per cent in the non-fuel major minerals, which has a weight of 12.3 per cent in the index.

4.2 Based on the overall trend so far, the index of mineral production (base 1993-94=100) for the year 2001-2002 is provisionally expected to be 132.30 as compared to 131.73 for 2000-2001, showing a marginal growth of 0.43 percent.

4.3 The total value of mineral production (excluding atomic minerals) during 2001-2002 is estimated to be Rs 57,041 crore, which shows an increase of 0.41 percent over that of the previous year. During 2001-2002, fuel minerals have accounted for Rs 47,495 crore or 83 percent, metallic minerals Rs 3,920 crore or 7 percent and non-metallic minerals (including minor minerals) Rs 5,626 crore or 10 percent of the total value. Information on production of selected minerals from 1997-98 to 2001-2002 is appended as Annexure - II.

Export and Imports

4.4 The value of export of ores and minerals during 1999-2000 was Rs 32,752 crore. Diamond (mostly cut) was the principal item of export during 1999-2000 which accounted for 85 percent, followed by granite with a contribution of 5 percent, iron ore, with contribution of 4 percent and precious and semi-precious stones comprising 2 percent. Marble, chromite and emerald were the other important minerals exported during the year 1999-2000. Data on export of ores and minerals during 1995-96 to 1999-2000 is presented in Annexure III.

4.5 The value of import of ores and minerals during 1999-2000 was Rs 71,878 crore. Petroleum (crude) was the main constituent of mineral imports during 1999-2000, which accounted for 57 percent of the total value of import of ores and minerals followed by diamond (uncut) with 32 percent. Coal, rock phosphate and copper ore and concentrates were the other important minerals imported during 1999-2000. Data on import of ores and minerals during 1995-96 to 1999-2000 is presented at Annexure IV.

4.6 As per provisional estimates for exports and imports of minerals during the period April-September 2001, released by the Directorate General Commercial Intelligence and Statistics, Department of Commerce, exports of ores and minerals(excluding gem stones) were worth US Dollar 539.89 Million(Rs 2543.02 crore). In the same period, imports of minerals (excluding gem stones), was US Dollar 7715.47 million, of which US Dollar 7715.47 million accounted for import of petroleum. Excluding the petroleum imports therefore, imports of mineral (excluding gem stones) were worth US Dollar 162.73 million (Rs 766.50 crore). In addition India imported gems and semiprecious stones worth US Dollar 2191.93 million (Rs 10324.56 crore), and exported gems and jewellery worth US Dollar 3352.93 million (Rs 15793.17 crore).

Price Trend

4.7 The Wholesale Price Index for non-fuel Minerals( Base year 1993-94=100) stood at 120.5 in December 2001, and the corresponding Index for December 2000 was 115.5. The minerals included in the Wholesale Price Index are iron, manganese, bauxite, chromite, limestone, fluorite, gypsum, fireclay, china clay, dolomite, magnesite, asbestos, barites, steatite, silica sand, phosphorite, felspar, ochre, and vermiculite. The Wholesale Price Index for metallic minerals was 122.7 in December 2001, as compared to 122.0 in December 2000, and that for other minerals
was 117.0 in December 2001 as compared to 105.2 in December 2000.

SURVEY AND EXPLORATION

INTRODUCTION

4.8 The Department of Mines discharges the function of survey and exploration through the Geological survey of India (GSI), which is a subordinate office of the Department, and the Mineral Exploration Corporation Limited (MECL), which is a Public Sector Undertaking under the administrative control of the Department.

SURVEY AND EXPLORATION UNDERTAKEN BY GSI

Geoscientific Survey Programmes

4.9 GSI has covered 3090 thousand square kilometer (98.23 %) of the total area of 3287 thousand square kilometer of the country by systematic geological mapping on 1:50,000 scale. An area of 2,63,000 square kilometer has been identified for updating and refining the database generated during systematic geological mapping by applying higher resolution and the emerging concepts to be covered by theme oriented mapping on 1:25,000 scale.

4.10 About 28,538.50 square kilometres of area has been covered by Specialised Thematic Mapping (STM) during the Ninth Plan up to December, 2001 (So, total coverage till date is 78,450.50 square kilometer). Specialised thematic studies have undertaken with a view to resolving problems related to stratigraphy, structure and tectonics, ore localisation and conceptual modelling on various aspects including crustal evolution and metallogeny. The geological database established during the systematic geological mapping on 1: 50,000 scale requires incorporation of additional parameters, enhancement in quality and quantity of existing parameters and also refinement of the database/subset of database itself. This involves integration of airborne geophysical data, regional gravity data (aero-gravity or ground gravity), geological and geochemical data backed by high precision laboratory data.

4.11 A coverage of 4583 square kilometer by specialised thematic mapping was carried out against a total target of 8721 square kilometer in parts of (i) Saurashtra Fold Belt in parts of Maharashtra, Madhya Pradesh; (ii) Southern Extension of Junagarh schist Belt, Julukolva Schist Belt and adjoining granitoids of Peninsular Gneissic complex, A.P. (iii) Marwar Super group, Rajasthan; (iv) Khurja-Ratanpur metamorphic belt, Bilaspur district, Chhattisgarh, (v) Eastern Ghats Mobile Belt and adjoining areas in parts of Guntur, Prakasham districts, A.P. etc.

4.12 The Twin Otter Airborne Survey System (TOASS) was deployed to acquire aerogeophysical multi-sensor data in (a) Narayananpet-Raichur areas of Andhra Pradesh and Karnataka for the Kimberlitic pipe rocks, (b) Hingcupp block of Karnataka to trace the extension of schist belt underneath the Deccan Trap and (c) Jhansi block of Bundelkhand Granitoid Complex in parts of Uttar Pradesh and Madhya Pradesh for possible multi mineral potentiality.

4.13 Since the acquisition and induction of TOASS by GSI in 1986, a total of 2,68,627 line kilometer (lkm) over an area of 1,32,041 square kilometres was covered by multisensor surveys, involving magnetic, spectrometric and electromagnetic (partly) till the end of 2000-2001. Processing of aerogeophysical data is carried out in the Geophysical mapping Centre (GMC) of AMSE for generation of total intensity magnetic maps, electromagnetic contour maps and elemental distribution maps. Processing of multi sensor airborne data acquired during the Flying Season (FS) 2000-01 over 30,732 lkm, and preparation of International Geomagnetic Reference File (IGRF) corrected aeromagnetic map of data acquired during FS 1986-87 and 1987-88 using VAX-11/750 are in progress. Betul block magnetic imaging is in the process of finalisation. Conversion of VAX database into personal computer compatible format and copying on compact disk has also been taken up.

4.14 The Marine Wing of GSI continued its offshore geoscientific survey programme within the Exclusive Economic Zone (EEZ) of Bay of Bengal, Arabian Sea, Andaman Sea and beyond the EEZ in the Indian Ocean. The Marine Wing of GSI has mapped, out of 2.015 million square kilometer area of EEZ of India including territorial water zone, 1,938 square million square kilometres. Besides mapping, marine studies included identification and assessment of minerals in off-shore areas apart from successfully carrying out sponsored commercial investigation studies. In the light of extension of the EEZ area, another about 1 million square kilometre area will be added within India's jurisdiction which will be taken up for systematic marine surveys in future. The Marine Wing of GSI continued its offshore geoscientific survey programme within the EEZ of Bay of Bengal, Arabian Sea, Andaman Sea and beyond the EEZ in Indian Ocean. Marine surveys were carried out with a deep sea going research vessel R.V. Samudra Manthan, deployed beyond territorial waters and two coastal research vessels viz. R. V. Samudra Kaustubh and R. V. Samudra Soudhikama, deployed within the territorial waters along east and west coasts respectively. The nearshore zones (0-10m depth) were surveyed by vessel R.V. Samudra Manthan, deployed beyond territorial waters and two coastal research vessels viz. R.V. Samudra Kaustubh and R.V. Samudra Soudhikama, deployed within the EEZ of India including territorial water zone, 1.938 million square kilometres. Besides mapping, marine studies included identification and assessment of minerals in off-shore areas apart from successfully carrying out sponsored commercial investigation studies. In the light of extension of the EEZ area, another about 1 million square kilometre area will be added within India's jurisdiction which will be taken up for systematic marine surveys in future. The Marine Wing of GSI continued its offshore geoscientific survey programme within the EEZ of Bay of Bengal, Arabian Sea, Andaman Sea and beyond the EEZ in Indian Ocean. Marine surveys were carried out with a deep sea going research vessel R.V. Samudra Manthan, deployed beyond territorial waters and two coastal research vessels viz. R. V. Samudra Kaustubh and R. V. Samudra Soudhikama, deployed within the territorial waters along east and west coasts respectively. The nearshore zones (0-10m depth) were surveyed by deploying small hired mechanised boats utilising portable echosounder.

4.15 About 8565 lkm bathymetric and 4938 lkm magnetic surveys were carried out along with collection of 798 samples in six cruises of R.V. Samudra Shaudhikama, deployed within the territorial waters along east and west coasts respectively. The nearshore zones (0-10m depth) were surveyed by vessel R.V. Samudra Manthan, deployed beyond territorial waters and two coastal research vessels viz. R.V. Samudra Kaustubh and R.V. Samudra Soudhikama, deployed within the EEZ of India including territorial water zone, 1.938 million square kilometres. Besides mapping, marine studies included identification and assessment of minerals in off-shore areas apart from successfully carrying out sponsored commercial investigation studies. In the light of extension of the EEZ area, another about 1 million square kilometre area will be added within India's jurisdiction which will be taken up for systematic marine surveys in future. The Marine Wing of GSI continued its offshore geoscientific survey programme within the EEZ of Bay of Bengal, Arabian Sea, Andaman Sea and beyond the EEZ in Indian Ocean. Marine surveys were carried out with a deep sea going research vessel R.V. Samudra Manthan, deployed beyond territorial waters and two coastal research vessels viz. R. V. Samudra Kaustubh and R. V. Samudra Soudhikama, deployed within the territorial waters along east and west coasts respectively. The nearshore zones (0-10m depth) were surveyed by deploying small hired mechanised boats utilising portable echosounder.

4.16 The performance of GSI is given in Annexure V and is depicted at Plate 4.1.

Mineral Search and Evaluation

4.17 During 2001-2002, GSI took up a total of 148 programmes on mineral investigations as in Table 4.1.

<table>
<thead>
<tr>
<th>Mineral Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal/Lignite 35</td>
</tr>
<tr>
<td>Non-Ferrous Mineral 25</td>
</tr>
<tr>
<td>Strategic &amp; rare minerals 6</td>
</tr>
<tr>
<td>Gold 47</td>
</tr>
<tr>
<td>Diamond 11</td>
</tr>
<tr>
<td>Ferrous Mineral 5</td>
</tr>
<tr>
<td>Fertilizer 1</td>
</tr>
<tr>
<td>Limestone/Dolomite/Bauxite 5</td>
</tr>
<tr>
<td>Other Industrial minerals 7</td>
</tr>
<tr>
<td>Dimension Stone 6</td>
</tr>
</tbody>
</table>
In connection with the mineral investigation and evaluation, 667.13 square kilometer of large scale mapping, 29.507 square kilometer of detailed mapping and 70888.63 metre of drilling were carried out till December 2001.

Coal and Lignite

An additional reserve of 1239 million tonnes of coal and 64 million tonnes of lignite has been assessed from the data generated from regional exploration. The geological reserve of coal of the country has been estimated at 213.91 billion tonnes and of lignite at 29.45 billion tonnes.

Basemetal

Promising zones of basemetal (Copper, Lead, Zinc) has been intersected in Muariya block, Betul district, MP, Dhani-Basri area, Dausa district and Bethumbi belt, Dausa-Bethumbi belt, Rajsamand district, Rajasthan.

Gold Ore

A total of 2,23,362 tonnes of gold (Au) ore with an average grade of 2.88 ppm Au at 0.5 ppm cut off in Dugocha main block, Udaipur district, Rajasthan (138464 tonnes with average grade of 3.43 ppm Au at 1.0 ppm Au cut off has been assessed. Gold mineralisation has also been encountered in Dona sector, Kurnool district, Andhra Pradesh.

Diamond

The find of 32 microdiamonds from stream sediment sample collected around Pavagad area, Tumkur district, Karnataka has raised the hopes for striking a good prospect.

A diamond, weighing 0.029 g (0.15 carat) has been recovered in Wairagarh area, Chandrapur-Garhchiroli districts, Maharashtra.

Lamproite bodies were located in parts of Krishna, Khammam and Nalgonda districts, AP and in Bargarh district of Orissa.

Platinum Group of Metals (PGM)

Incidence of PGM was recorded for the first time in Sakoli Fold Belt in Nagpur and Bhandara districts, Maharashtra. Five samples analysed 100-579 ppb Platinum (Pt), 127-412 ppb Palladium (Pd) and 3.4 - 6.2 ppb Iridium (Ir). Scanning has indicated presence of platinum in Kitari West, Kitari North and Parsori West blocks also.

Bauxite

Detailed mapping continued in Kumbhawade block, and scout drilling has been taken up in the Hamadara block in Ratnagiri dist., Maharashtra. Eleven (11) boreholes were drilled with diamond drill and truck mounted augur drill. Aluminous laterite/bauxite pockets vary in thickness from 1 metre to 5.75 metre. Drilling also showed presence of a peat/lignite/clay horizon below the laterite/bauxite cap.

Iron Ore

A total of 95 million tonnes of Iron ore with an average grade of 60 % Fe in Koir - Pathiriposi deposit, Kendujhar district, Orissa has been estimated.

Dimension Stone

Dimension Stone Granite 60,000 cu. m (assuming 10% recovery) of black granite, 5000 cu. m assuming 20% recovery of multi-coloured granite in Kurnool district, Andhra Pradesh has been assessed. Also, 54.58 million cu. m. up to 10m below the ground level of granite/granite gneiss in Gaya district, Bihar and 1.483 million cu. m. of bluish leptynite in eastern Orissa have been estimated.

Clay

Over 23.23 million tonnes of clay, Kasargod district, Kerala was estimated as being a commercial grade category and useful in textile, paper coating, insecticide, rubber and ceramic industries.

Lime Stone

A tentative reserve of 440.90 million tonnes of Probable category of all grades has been estimated in parts of Litang River Valley, Jaintia Hills district, southern part of Diastong block, east of Litang River Valley, Jaintia Hills district, Meghalaya.

EXPLORATION UNDERTAKEN BY MECL

Ongoing Projects (Up to December 2001)

MECL continued to give exploration priorities to the energy minerals i.e. coal and lignite. In addition, exploration for copper, gold, molybdenum and deep drilling for Coal Bed Methane (CBM) investigation was also continued.

The following exploration programmes were continued during 2001-2002

(A) Promotional Exploration on behalf of Department of Mines

- Copper at Garhi Dongri, Malanjkhand Copper Deposit, Madhya Pradesh.
- Copper at Pachekhani Project, Sikkim.
- Copper at Singhana, Khetri copper belt, Rajasthan.
- Gold at Dona East, Andhra Pradesh.
- Gold at Chinnulagund Project, Karnataka.
- Rare Metal project, Beku, West Bengal.

(B) Exploration for Coal and Lignite on behalf of Department of Coal
Ø Coal in the command areas of Singareni Collieries Company Ltd. and Coal India Ltd. (SECL & WCL areas)
Ø Lignite in the States of Tamil Nadu, Rajasthan & Gujarat.
Ø Exploration of Non-Coal India Limited (CIL) blocks in the States of Madhya Pradesh, Jharkhand, Chattisgarh and Maharashatra.

Review of Major Exploration Programmes

4.31 A brief review of major exploration programmes undertaken by MECL during 2001-2002 is given below:-

Coal

4.32 Major part of exploration activities of MECL continued for coal, on behalf of Ministry of Coal under priority regional exploration programme and Non CIL blocks. A total of 19833 metres of drilling was completed in various non CIL blocks of Chattisgarh, Madhya Pradesh Maharashatra, West Bengal and Andhra Pradesh. Under Priority Regional exploration against an allocation of 41900 metres for the year 2001-2002, achievement was 36,186 metres, till December 2001. Beside, exploratory mining was conducted at Bhopalpalli KTK-3 and a total of 665 metres of mining has been completed.

Lignite

4.33 Exploration for lignite on behalf of Ministry of Coal under priority regional exploration programme was continued in the States of Tamil Nadu, Rajasthan and Gujarat. Against 56600 metres of drilling allocated, a total of 46738 metres of drilling representing 83% has been carried out up to December 2001.

Copper

4.34 Detailed exploration for copper at Singana (Extension) block, Rajasthan was continued, where a total of 1885 metres of drilling has been carried out till December 2001. Exploration at Ghari-Dongri block, Madhya Pradesh was concluded with 205 metres of drilling during the year. The geophysical work was in progress in the area to locate copper ore zone in the Sitalpani block. Detailed exploration for copper was commenced at Pachekhani project, Sikkim and a total of 508 metres of drilling has been carried out.

Molybdenum

4.35 Mine sampling work for Molybdenum at Harur (Tamil Nadu) on behalf of Department of Mines was concluded in April 2001 and analytical study is in progress.

Rare Metal

4.36 Pitting, trenching and associated geological work at Beku project, district Purulia, West Bengal were commenced in December 2001, and a total of 123 metres of pitting/trenching has been carried out so far.

Gold

4.37 Promotional Exploration work for gold funded by the Department of Mines was continued at Dona East, Andhra Pradesh and Chinnalgud, Karnataka. A total of 4619 metres of drilling has been completed so far and both the projects are in progress.

Coal Bed Methane (CBM)

4.38 Deep drilling for coal bed methane on behalf of ONGC was concluded, where 3144 metres of slim hole drilling has been carried out. Subsequently, work order for 3 boreholes involving 3600 metres of drilling in Jharia Coal Field has been received and the work recommenced in December 2001 and a total of 1407 metres have been drilled.

4.39 Significant findings based on MECL’s endeavour:–
Ø 322 million tonnes of non-coking coal reserves has been established in the State of West Bengal.
Ø 1092 million tonnes of lignite reserves established in the States of Tamil Nadu and Rajasthan.
Ø 3.48 million tonnes of copper ore reserves with 0.89 Cu% was established in Singhana Extension block (Ph-I), dist Jhunjhunu, Rajasthan.
Ø 1.34 million tonnes of diamondiferous conglomerate has been established at Hatupur, Panna diamond field, Madhya Pradesh.
Ø 1.90 million tonnes of gold ore with 3.93 g/t gold has been established at Dona East (Ph-I), district, Kurnool, Andhra Pradesh.
Ø 0.10 million tonnes of molybdenum with 0.08% molybdenum at Vellampatti south block, Tamil Nadu.

PERFORMANCE OF IMPORTANT NON-FERROUS MINERALS/METALS

A. Bauxite and Aluminium

Bauxite

4.40 India has large resources of high grade bauxite deposits of the order of 3037 million tonnes of which recoverable reserves are placed at 2462 million tonnes as on 1.4.1995. The proved and probable reserves are 1108 million tonnes, placing the country 5th in rank in the world, next only to Australia, Guinea, Brazil and Jamaica. The Life Index of the recoverable bauxite is placed at 211 years. An area of 32,743 hectare was held under mining lease, which is estimated to yield around 7.171 million tonnes of bauxite in 2001-2002, as compared to 7.893 million tonnes in 2000-2001.

4.41 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. While the bauxite reserves in India account for 7.5 % of the world’s total deposits, the aluminium capacity is only 3%, indicating the scope and need for new capacities to meet growing internal demand and for sizeable 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. The major bauxite mines are at Panchpatmali in Orissa held by NALCO, Durgamwadi in Maharashatra and Bagru Hill in Jharkhand held by Indian Aluminium Company Limited (INDAL), Udgiri in Maharashatra held by Swati Minerals and Asota Mevasa in Gujarat held by Bombay Minerals Limited, who together account for 56% of total bauxite production in India.

Aluminium
4.42 There are five Companies in the manufacture of alumina/aluminium, viz the National Aluminium Company (NALCO), a public sector undertaking, Bharat Aluminium Company Limited (BALCO) a joint sector undertaking, Hindustan Aluminium Corporation Limited (HINDALCO), Indian Aluminium Company Limited (INDAL), and Madras Aluminium Company Limited (MALCO), all in the private sector. The annual installed capacity for production of alumina and aluminium are in Table 4.2 and Table 4.3

<table>
<thead>
<tr>
<th>Company</th>
<th>Installed Capacity (Unit in tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NALCO</td>
<td>15,75,000</td>
</tr>
<tr>
<td>BALCO</td>
<td>2,00,000</td>
</tr>
<tr>
<td>HINDALCO</td>
<td>3,50,000</td>
</tr>
<tr>
<td>INDAL</td>
<td>3,12,000</td>
</tr>
<tr>
<td>MALCO</td>
<td>50,000</td>
</tr>
</tbody>
</table>

Table 1

<table>
<thead>
<tr>
<th>Company</th>
<th>Installed Capacity (Tonnes per annum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NALCO</td>
<td>230,000 *</td>
</tr>
<tr>
<td>BALCO</td>
<td>100,000</td>
</tr>
<tr>
<td>HINDALCO</td>
<td>242,000</td>
</tr>
<tr>
<td>INDAL</td>
<td>117,000 **</td>
</tr>
<tr>
<td>MALCO</td>
<td>25,000</td>
</tr>
</tbody>
</table>

Total 714,000

* The Government has approved expansion of the capacity of NALCO's aluminium smelter from 230,000 tonnes per annum to 345,000 tonnes per annum and that of the Captive Power Plant from the 720 MW to 840 MW and further expansion up to the capacity of 960 MW has also been approved. Currently, the projects are under implementation by NALCO.

** Hindalco is also expanding the capacity by 100,000 tonnes per annum

4.42 Production of Aluminium by the primary producers in the country during the last three years is given in Table 4.4.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NALCO</td>
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<td>230516</td>
</tr>
<tr>
<td>BALCO</td>
<td>91345</td>
<td>86532</td>
</tr>
<tr>
<td>HINDALCO</td>
<td>248936</td>
<td>251492</td>
</tr>
<tr>
<td>INDAL</td>
<td>43458</td>
<td>43924</td>
</tr>
<tr>
<td>MALCO</td>
<td>23345</td>
<td>28789</td>
</tr>
</tbody>
</table>

| Total   | 619741    | 641253               |

4.44 It is estimated that during 2000-2001, the primary producers of aluminium had exported 1,66,007 tonnes of aluminium and aluminium products, as against 141670 tonnes exported in 1999-2000.

4.45 The major aluminium producers in the world are China, USA and Canada. According to trade estimates, the total world supply of primary aluminium is estimated at around 2.45 million tonnes for the year 2001, as against an estimated consumption of around 2.40 million tonnes. The estimated supply has been estimated to have marginally increased over the level of the year 2000 while consumption is estimated to have declined, accounting for a surplus of around 0.50 million tonnes at the end of the year 2001.

B. COPPER

4.46 India has recoverable reserves of 53.78 million tonnes of copper ore, capable of yielding 5.29 million tonnes of copper metal as estimated on 1.4.1995. The Life Index of the recoverable copper ore is placed at 80 years. The Indian copper ores have low grade and prevent large scale mechanisation in the underground mines due to the nature of the geometry of the ore body (narrow width and flatter inclination). Manufacture of primary copper based on indigenous ores is characterised by high energy consumption because of low scale of operation and minimal automation. Production was about 161,000 tonnes of copper concentrate in 2001-2002, as compared to 164,000 tonnes in 2000-2001.

4.47 At present, the demand for copper minerals for primary copper production is met through two sources i.e. copper ore mined from indigenous mines and imported concentrates. The indigenous mining activity among the primary copper producers is limited to only Hindustan Copper Limited (HCL). The other primary copper producers in the private sector (Birla Copper and Sterlite Industries) import the required mineral in the form of concentrate, and they have copper mines in other countries. HCL also imports some quantity of copper concentrates for its smelter plants to supplement shortfall in indigenous production. The only copper ore mines accounting for primary production of copper during 2001-2002 were the Malanjkhand, Khetri, Kolihan and Surda mines of HCL.

Production and demand for Refined Copper
4.48 The production of refined copper in India has increased considerably since 1998-99 after Private sector manufacturers started production. Production of refined copper in 2000-2001 was 263,145 tonnes as compared to 226,933 tonnes in 1999-2000.

4.49 The details of units of the major players in copper industry and the production during 2000-2001 are given in Table 4.5

4.50 Compared to the usage of copper in developed countries, the per capita consumption of copper in India is rather low at around 0.3 kilogram. However, the growth in consumption in India for the year 2001-2002 is projected to be 8 per cent as against 3 per cent of the world average. India consumed about 288,145 tonnes of refined copper in 2000-2001, as compared to 281,333 tonnes consumed in 1999-2000.

Price of Copper

4.51 The domestic price of copper is linked to the price prevailing in the London Metal Exchange (LME). The price of copper declined sharply till 1998-99. Thereafter it appreciated and then again started declining and lately has been fluctuating between US$ 1450 and 1500 per tonnes. The year wise average LME price per tonnes of copper is shown in the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Average LME price of Copper (US $ per tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-96</td>
<td>2844</td>
</tr>
<tr>
<td>1996-97</td>
<td>2297</td>
</tr>
<tr>
<td>1997-98</td>
<td>2096</td>
</tr>
<tr>
<td>1998-99</td>
<td>1581</td>
</tr>
<tr>
<td>1999-2000</td>
<td>1670</td>
</tr>
<tr>
<td>2000-2001</td>
<td>1806</td>
</tr>
<tr>
<td>2001-2002</td>
<td>1531</td>
</tr>
<tr>
<td>(Up to Dec 2001)</td>
<td></td>
</tr>
</tbody>
</table>

4.52 India is a Member of International Copper Study Group (ICSG). According to the Copper Bulletin for January 2002 brought out by ICSG, the total production of copper in the world was 11,307,500 tonnes in January-October 2001 of which India accounted for 29,300 tonnes. The major producers of copper are United States, Chile, Peru, China, Mexico and Zambia.

4.53 The major consumers of copper are United States, China, Japan, Germany, France and Italy. The developing countries account for over one-third of refined copper consumption and industrialized countries account for 60 per cent. Global industrial demand for refined copper is over 14 million tonnes and compounded annual growth rate for global copper consumption is around 3%. During January-October 2001, world consumption of refined copper was 12,345,400 tonnes of which India accounted for 233,300 tonnes.

C. LEAD AND ZINC

4.54 India has recoverable reserves of lead and zinc deposits of the order of 17.68 million tonnes of ore as on 1.4.1995, accounting for 2.38 million tonnes of lead metal and 9.70 million tonnes of zinc metal. The Life Index of the recoverable ore is placed at 40 years. The area of 8221 hectares were held under mining lease, which are estimated to yield around 48,000 tonnes of lead concentrate and 362,000 tonnes of zinc concentrate in 2001-2002, as compared to 54,000 tonnes of lead concentrate and 365,000 tonnes of zinc concentrate respectively in 2000-2001.

4.55 The present smelting capacity for primary zinc and primary lead metals in the country are 1,599,000 tonnes and 43,000 tonnes per annum respectively. The break-up of these capacities is indicated in Table 4.7.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>No. of Factories</th>
<th>Installed Capacity</th>
<th>Production during 2000-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) HCL</td>
<td>2</td>
<td>47500</td>
<td>42245</td>
</tr>
<tr>
<td>(b) Sterlite</td>
<td>1</td>
<td>150000</td>
<td>107090</td>
</tr>
<tr>
<td>(a) Birla</td>
<td>1</td>
<td>150000</td>
<td>113810</td>
</tr>
<tr>
<td>Copper</td>
<td>Total</td>
<td>347500</td>
<td>263145</td>
</tr>
</tbody>
</table>

4.56 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 unorganised sector.

4.57 The demand for zinc and lead has grown at an annual rate of approximately 6 per cent and 6.5 per cent respectively, during the Ninth Plan. With the projected high growth of Steel Industry (and demand for galvanization with zinc) and automobile industry (with automotive batteries with lead as major input), the demand for lead and zinc in India is expected to grow rapidly during the Tenth Year Plan period. The per capita annual consumption in India is 200 grams for zinc and 100 grams for lead. This is amongst the lowest in the developing world. The demand for zinc is expected to grow at the rate of 6.5 per cent and for lead at the rate of 6 per cent during the Tenth Plan period. In order to increase domestic
availability of recycled lead in an environment friendly manner, Battery (Management and Handling) Rules 2000, had also been brought out under the Environment Protection Act, 1986.

4.58 The table 4.8 indicates the estimated demand and production for zinc and lead during the last three years and projection for 2001-2002.

4.59 India is a member of International Lead and Zinc Study Group (ILZSG). According to the monthly bulletin of the ILZSG for December 2001, total production of lead in the world was 2.52 million tonnes for the period January to

TABLE 4.8
Demand and Production of Zinc and Lead

<table>
<thead>
<tr>
<th>Year</th>
<th>Zinc Demand</th>
<th>Zinc Production</th>
<th>Gap</th>
<th>Lead Demand</th>
<th>Lead Production</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-99</td>
<td>237000</td>
<td>181958</td>
<td>55042</td>
<td>97500</td>
<td>61918</td>
<td>35582</td>
</tr>
<tr>
<td>1999-00</td>
<td>254100</td>
<td>191958</td>
<td>62142</td>
<td>114577</td>
<td>62630</td>
<td>51947</td>
</tr>
<tr>
<td>2000-01</td>
<td>269300</td>
<td>201500</td>
<td>67800</td>
<td>121450</td>
<td>61900</td>
<td>59550</td>
</tr>
<tr>
<td>2001-02</td>
<td>287600</td>
<td>214000*</td>
<td>73600</td>
<td>129900</td>
<td>64000*</td>
<td>65900</td>
</tr>
</tbody>
</table>

* Including 15,000 tonnes of Secondary Zinc and 21,000 tonnes of Secondary Lead.

October 2001, of which the share of India was 26,000 tonnes. The largest producer of lead from lead mines is China followed by the United States, Peru, Canada and Sweden. The largest consumer of lead is estimated to be United States followed by China, Germany, United Kingdom and Italy. The refined lead consumption in the period January-October 2001 was 5.30 million tonnes of which India consumed 106,000 tonnes.

4.60 Total production of zinc in the world was 7.56 million tonnes for the period January to October 2001, of which the share of India was 175,000 tonnes. The largest producer of zinc from zinc mines is China followed by the United States, Peru, Canada and Kazakhstan and Ireland. The largest consumer of zinc is estimated to be United States and China followed by Japan, Germany and Republic of Korea. The refined zinc consumption in the period January-October 2001 was 7.34 million tonnes of which India consumed 238,000 tonnes.

D. TENTH FIVE YEAR PLAN

4.61 The Planning Commission had set up a Working Group on mineral exploration and development (other than coal and lignite) in the context of formulation of the Tenth Five Year Plan (2002-2007). The Working Group was enjoined to review the status of survey and exploration and the mining and mineral sectors, estimate growth of the various sectors, suggest measures to meet the growth objectives, and assess and indicate the investment that would be required to meet the growth objectives. The Working Group has finalized its recommendations, and submitted the same for consideration of the Planning Commission.

4.62 The main recommendations of the Working Group are as follows:

(a) Recommendations on survey and exploration

(i) The study of National Mineral Inventory covering 64 minerals reveals that, out of the known mineral commodities, 40 to 70% reserves are still under “possible” category with an inadequate confidence level and these require further exploration. Detailed exploration for upgrading the known resources should be undertaken during the Tenth Plan as a distinct activity, tailor made to the requirement of industry for which separate provisions are required to be made.

(ii) A special thrust is also required to be given to the mineral exploration and development activities in North-Eastern region and other far off places in the Himalayas, coastal regions, desert areas and areas covered by vast expanse of Deccan traps, thick alluvium etc.

(iii) Efforts by national agencies like GSI, MECL and State Governments etc. in survey and mineral exploration is required to be continued.

(b) Recommendations on Mineral Development

(i) Two additional greenfield export oriented alumina projects are expected to start production during the Tenth Plan. The alumina refining capacity needs to be enhanced by minimum two million tonnes in the Tenth Plan for increasing exports.

(ii) Current brown field expansions of existing smelters for production of aluminium during the Tenth Plan can sustain the domestic demand up to 2011-2012. These smelters may not have scope for further expansions. Additional primary metal capacity of about 500,000 tonnes has to be planned during the Tenth Plan so that towards 2010 the required metal is available.

(iii) Recycling industry needs to be encouraged and organised for obtaining secondary metal at a low cost to meet domestic demand.

(iv) India is a net importer of copper concentrate. As a long-term strategy for increasing the indigenous copper output, it is necessary to identify new economically viable deposits. To achieve this, it is imperative that exploration is to be given its due thrust during the Tenth Plan period. Further, in order to meet the growing domestic demand and additional exports, there has to be additional smelting capacity based on imported concentrates and scrap.

(v) Improvement in recoveries of indigenous smelters to the international standards is necessary if they are to remain internationally competitive.

(vi) With the existing resource position and projected growth in zinc smelting capacities, there will be no problem with availability of zinc ore up to the Twelfth Five Year Plan period. However, in the case of lead, there will be a shortage of lead ore much earlier. There is therefore an urgent need to augment the resource position in the country. An added thrust has to be given for exploration for zinc and lead, in collaboration with reputed foreign mining companies, so as to find new economically viable deposits.

(vii) Power tariffs are required to be brought down to the international level for ensuring that the zinc produced in the country is competitive in the international market.

(viii) Recycling of zinc scraps using eco-friendly and energy saving technology may be promoted. Further, Research and Development efforts are required to be intensified for recovery of the associated metals and value additions from available indigenous sources.
Recommendations on fiscal policy, research and infrastructure

(i) There is a scope for improvement in the mineral taxation regime including accelerated rate of depreciation on mining plant and equipment, amortisation of all pre-production expenses, allowing earmarking of book profits for mine reclamation etc measures, which would be beneficial and contribute to better growth of the mining sector. Also, the tariff structure of railway freights need to be evaluated afresh.

(ii) The low grade ores available in the country particularly for base metals, noble metals and strategic metals/minerals deserve consideration for suitable commercial utilisation. It is essential that indigenous research and development efforts continue for technology development for beneficiation of these resources, extraction of valuable metals from rejects and waste dumps and their subsequent value addition.

(iii) Keeping in view the likely growth of mineral sector particularly the export potential, the essential infrastructure needs are of great significance. The development of high quality roads connecting the mines to loading stations would be necessary and the State Governments should earmark revenues from royalty for such development.

(iv) Port facilities are required to be improved by further enhancing the loading rate and improving the turn round time. Also, planned development for internal waterways transportation is to be implemented urgently. Appropriate steps to expedite the commencement of the power projects along with other infrastructure projects would also be beneficial to the mineral sector.

(v) Financing of critical gaps in ports-rail-road infrastructure may be considered through a special purpose vehicle.

Plan Outlay

4.63 It may be recalled that the approved Ninth Plan Outlay (1997-2002) was Rs 7753.96 crore, against which the actual outlay is anticipated to be Rs 4907.24 crore. The proposed Tenth Plan outlay (2002-2007) is Rs 10011.86 crore. A statement on the plan wise financial outlays of the Department of Mines for the Ninth Plan and the Tenth Plan is given at Annexure VI.
Chapter V

GEOLOGICAL SURVEY OF INDIA AND INDIAN BUREAU OF MINES

GEOLOGICAL SURVEY OF INDIA

5.1 The Geological Survey of India (GSI) is a subordinate office of the Department of Mines, and is a premier national scientific survey and research organization. It is also the principal resource base of basic earth science information. GSI has recently completed its 150 years of dedicated service to the nation. A series of theme based national seminars of topical interest were held in which scientists from GSI, Central and State Departments, Universities and organizations engaged in earth science studies participated. This led to the exchange of scientific information, dissemination of knowledge and enhancement of public awareness about the contribution of earth science in general and GSI in particular towards various facets of societal development.

5.2 In view of the increasing national demand for geo-information on the state of the environment and natural hazard potential and the post-liberalization scenario in the mineral sector, which has thrown the sector open for domestic as well as foreign direct investment both in exploration as well as exploitation of minerals, it is evident that there is need to take stock of the working of GSI. Consequently the Government is in the process of setting up a High Powered Committee to review the working of GSI. Under the Third United Nations Conference on the Laws of the Sea (III UNCLOS), the outer limit of the Continental Shelf could be extended up to 350 nautical miles depending upon several parameters including the thickness of the sediments of the area. GSI has to carry out bathymetric and magnetic (parametric) surveys for the same. To enhance the capabilities of GSI in the fields of ground, marine & aerial surveys and its laboratories budget provision has been kept in the Tenth plan Outlay for purchase of a sea-going research vessel and up gradation of its laboratory facilities.

5.3 The current thrust areas of activity of GSI include:

Ø Creation and updating of national geoscientific information and knowledge base through ground, marine and airborne surveys
Ø Concept oriented thematic mapping/studies for location of deep seated mineral deposits
Ø Integrated natural resource surveys and monitoring of environmental degradation,
Ø Modernization and updating of laboratory facilities.

MINERAL EXPLORATION AND GEOScientific SURVEY PROGRAMMES

5.4 During 2001-2002, GSI took up a total of 148 programmes on mineral investigations. GSI has covered 98.23% of the total area of 32,87,000 square kilometer of the country by systematic geological mapping on 1:50,000 scale. An area of 2,63,000 square kilometer has been identified for updating and refining the database generated during systematic geological mapping by applying higher resolution and the emerging concepts to be covered by theme oriented mapping on 1:25,000 scale.

5.5 The Marine Wing of the GSI also continued its offshore geo-scientific survey programme within the EEZ of Bay of Bengal, Arabian Sea, Andaman Sea and beyond the EEZ in the Indian Ocean. The details of the survey and exploration done by GSI has been enumerated in Chapter IV.

MINERAL SEARCH AND EVALUATION

5.6 In connection with the mineral investigation and evaluation, GSI carried out 667.13 square kilometre of large scale mapping, 29.507 square kilometer of detailed mapping and 70888.63 metres of drilling. The details of the mineral reserves assessed by GSI have been enumerated in Chapter IV.

SPECIALISED INVESTIGATION

5.7 Geotechnical

Ø The GSI provides geo-technical advice to various civil engineering projects of the country, including large number of multipurpose projects dedicated to hydro-electricity generation, flood control and irrigation.

Ø Some of the important projects include:

  Tehri Dam, Uttarakhand
  Ranjit Sagar Dam (Thein), Punjab
  Naptha Jhakri Project, Himachal Pradesh
  Narmada Sagar Project, MP
  Sardar Sarovar Narmada Dam Project, Gujarat.

Ø GSI also took up landslide zonation map around Aizawal - Sairong and Serchhip and Chhiaatlong towns of Mizoram.

5.8 Environment

Ø Fifty investigations on environmental studies have been taken up for geoenvironmental appraisal, geoenvironmental impact assessment and studies on natural hazard including public health hazards, flood and drought prone areas.

Ø GSI studied high fluoride contamination of ground water in around Nasipur-Naihati area, Birbhum district, West Bengal, Yeotmal district of Maharashtra and arsenic contamination of ground water and soil of Rajnandgaon district, Chhattisgarh to identify the source.

5.9 Dovemap

Ø Under the Development of Village Economy through Mineral Appraisal Project (DOVEMAP), with a view to generate high resolution resource informatics on cadastral map base, geomorphology, geo-environment, soil pattern, land use data, availability of surface and ground water etc. surveys were carried out in 206 villages in Assam, Meghalaya and Tripura states of the North East, and 35 villages in Beed district, Maharashtra.

5.10 Seismotectonic Studies
An area of about 1.2 million square kilometre was covered for damage surveys in the areas devastated by Bhuj earthquake of 26th January, 2001 by GSI. Fourteen MEQ instruments were deployed in the area. The study of after shocks were conducted up to middle of April 2001. Iso-seismal maps of the area were prepared and detailed interpretation of the data sets is in progress.

GSI is now manning the Broad band seismic observatory at Jabalpur.

GSI is actively involved in seismic micrzonation studies in Delhi and Bhuj regions.

During the current year such studies were undertaken in Uttaranchal, Jammu and Kashmir and Madhya Pradesh.

GSI continued the collection of all types of relevant data for monitoring Himalayan Glaciers.

LABORATORY STUDIES, RESEARCH AND DEVELOPMENT

5.11 GSI accorded high priority to laboratory studies and R&D efforts to back up the extensive fieldwork carried out by the scientists.

5.12 Detailed petrological, petrochemical and other special studies were undertaken for understanding petrogenesis of host rock and economic minerals. Some of the significant achievements are:

- Arsenic - rich phases identified to be iron rich clastic grains like illite, biotite, chlorite etc and also on authigenic siderite concretions.
- Role of micro-organism in concentration of arsenic in ground water is a distinct possibility and is being examined.
- Identification and first time reporting of “Shungites” rock from the borehole core samples of meta exhalites/volcano clastics, Dugocha area, Udaipur district which has immense value in defence/industrial applications.
- Identification of native gold within arsenopyrite from the borehole samples of Bhukia area, Banswara district, Rajasthan.
- Extraction of cesium from geothermal fluids at Puga valley is a significant achievement that has generated international interest.
- GSI-ISRO collaborative programme on dynamic fluvio-geomorphological study was also carried out in the upper parts of the Brahmaputra valley between Guwahati- Sadiya sector.
- A new location to the dinosaur study has been added with the recent recovery of fossils of dinosaurs from late Cretaceous Mahadek Formation, in the West Khasi Hills district Meghalaya.
- Over 93,700 samples involving about nine lakh thirty thousand determinations have been analysed in the chemical laboratories of GSI. GSI is also involved in the preparation of Standard Reference Materials of rocks for major, minor and trace elements.

INFORMATION DISSEMINATION

GSI has launched its own WEBSITE (http://www.gsi.gov.in) with relevant information.

State-wise geological and mineral maps, geological maps of various coalfields, and mineral belt maps of North Eastern Region have been compiled.

Aeromagnetic image map of part of peninsular India on 1 : 2 million scale, compiled from high altitude aeromagnetic data and data collected by other agencies, has been published as a part of collaboration project with NGRI.

A total of 37 departmental priced publications including Extended Abstracts highlighting investigation progress have also been released. In addition, 13 un-priced publications including “Story of GSI” was released during inauguration of the 150 year celebration.

As a part of the 150 year celebration, District Resource Maps (DRM) of 122 districts of the country have been finalized and printed.

A total of 27 geoinformatic projects have been pursued so far after creating/ developing necessary infrastructure.

First phase of GSI-ITC collaborative venture - Project : INDIGEO has been completed. It provides necessary technical knowhow and training on Geographical Information System(GIS), image processing, map digitisation etc.

HUMAN RESOURCE DEVELOPMENT

GSI organised 25 training/refresher/advanced courses in core disciplines and in management involving 438 participants, including 34 trainees from outside organisations.

The organization celebrated its hundred fiftieth anniversary. A series of national seminars had been held, in which earth scientists from GSI, Central and State Departments, Universities and private organizations engaged in earth science studies participated. These Seminars included the following:

1. “Four decades of Marine Geosciences in India - A Retrospective”, Mangalore (14-16th March, 2001);
2. “Geotechniques and Geological hazards in the Indian Context”, Shillong (24th - 26th April, 2001);
3. “Offshore and Ground Mineral Exploration and Environment”, Bhopal (16th & 17th May, 2001);
4. “Exploration and Survey for Noble metals and Precious Stones”, Hyderabad (22nd & 23rd May, 2001); and
6. “Role of Earth Sciences in integrated development and related societal issues”, Lucknow (2nd - 4th November, 2001);
Apart from training, GSI officers participated in national and international seminars held both within the country and outside.

5.17 INTERNATIONAL ACTIVITIES

GSI continued co-operation with international organisations by participating in bilateral and collaborative exchange programmes.

Out of ten International Geological Correlation Programme (IGCP) projects, three were successfully completed and four more new items have been offered for Indian participation including that of ‘Medical Geology’.

Important bilateral activities with many countries like France (BRGM), South Africa, Myanmar, Netherlands, Australia, Vietnam, China, Nepal etc. are being pursued.

A collaborative research study on impact of mining activities on water quality of Subarnarekha Basin (Jharkhand, Orissa, West Bengal) was in progress with BRGM, France.

EXPEDITION TO ANTARCTICA

5.18 Geological Survey of India is one of the major contributors in the ongoing Multidisciplinary and multiorganisational Indian Antarctica activity since its inception.

A two member team from GSI is participating in the XXI Antarctica expedition. The studies will include continuation of glacio-morphological mapping. In addition, monitoring of the fluctuation of polar ice margin and that of the shelf ice surface will be continued and extended to other areas.

WORK DONE BY GSI IN NORTH EASTERN REGION

During 2001-2002, till December 2001, GSI has undertaken the following activities in the North Eastern region

- An area of 3556 square kilometre has been photogeologically mapped
- Specialised Thematic Mapping of an area of 480 square kilometre carried out.
- A total of 440 million tonnes of probable category of all grades of limestone estimated in Litang river Valley, Jaintia Hills district, Meghalaya.
- Regional geoenvironmental appraisal of Assam on scale 1:2,50,000 completed.
- The geoenvironmental appraisal of Serchhip and Champhai townships in Mizoram, taken up at the request of the govt. of Mizoram.
- Landslide hazard zonation of certain areas in Assam, Meghalaya and Mizoram with special emphasis of site-specific studies taken up.
- Under project DOVEMAP (Development of village economy through mineral appraisal programme), 206 villages were covered.
- Three items of geotechnical evaluation with 24 components (including 8 additional components) were taken up all of which were sponsored programmes.
- Active fault mapping with neotectonic, palaeoseismic and microearthquake studies was carried out in Garo Hills, Meghalaya and adjacent Goalpara district, Assam.
- Two research programmes were continued.
- Compilation of Quadrangle Geological Maps in Arunachal Pradesh, Assam, Manipur, Meghalaya and Nagaland.

ORGANISATION AND EMPLOYMENT

5.20 The Table 5.1 gives the employment of personnel in the GSI as on 31.12.2001.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total No. of Employees in position</th>
<th>SC</th>
<th>ST</th>
<th>OBC</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>1732</td>
<td>165</td>
<td>33</td>
<td>20</td>
<td>58</td>
</tr>
<tr>
<td>Group B</td>
<td>775</td>
<td>115</td>
<td>35</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>Group B(NG) and</td>
<td>7475</td>
<td>1493</td>
<td>598</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Group C</td>
<td>3268</td>
<td>777</td>
<td>296</td>
<td>99</td>
<td>282</td>
</tr>
<tr>
<td>Total</td>
<td>13250</td>
<td>2550</td>
<td>962</td>
<td>126</td>
<td>410</td>
</tr>
</tbody>
</table>

INDIAN BUREAU OF MINES

5.21 The Indian Bureau of Mines (IBM) is a subordinate organisation under the Department of Mines, Ministry of Coal and Mines. It is engaged in the promotion of conservation of minerals, protection of mines’ environment and scientific development of mineral resources of the country, other than coal, petroleum and natural gas, atomic minerals and minor minerals.

5.22 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, the relevant provisions of the Mineral Concession Rules 1960 and Environmental Protection Act 1986 and Rules made there under. It also undertakes scientific, techno-economic, research oriented studies in various aspects of mining, geological studies, ore beneficiation and environmental studies. IBM also provides Technical 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 also prepares mineral maps and a countrywide inventory of mineral resources. IBM also maintains a data bank of mines and minerals and publishes statistical periodicals, and brings out technical publications/monographs.
### PERFORMANCE OF IBM

5.23 The performance of IBM in respect of regulation and conservation measures during the period under review has been indicated at Chapter III.

5.24 The performance of IBM with regard to technical studies, investigations and preparation of mineral inventory/maps etc. is indicated in the table 5.2.

### PREPARATION OF MINERAL MAPS

5.25 During the year 2001-2002 (up to December, 2001), preparation/updation of mineral maps of soapstone leaseholds in Rajasthan and bauxite leaseholds in Gujarat along with corresponding forest overlays were in progress. Preparation of mineral maps of sillimanite leaseholds and limestone leaseholds in Meghalaya State was completed. Besides, 39 index maps, multi-mineral maps, regional geological maps etc. were digitised.

5.26 The preparation of mineral maps with forest overlays with the help from Forest Survey of India, has been initiated for mineral rich areas of different States. These forest overlay maps will be supplied to the Department of Mines & Geology of State Governments for speedy processing of forest clearance in the grant and renewal of mining leases.

#### Table 5.2

Technical studies and consultancy (UP TO DECEMBER, 2001)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mining, Geological &amp; Other Studies</td>
<td>39</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Studies for updating National Mineral Inventory</td>
<td>1,230</td>
<td>6,852</td>
<td>-</td>
<td>642</td>
</tr>
<tr>
<td>4.</td>
<td>Special Integrated Studies</td>
<td>-</td>
<td>-</td>
<td>13</td>
<td>13 studies covering 358 mines were in progress.</td>
</tr>
<tr>
<td>i)</td>
<td>Finalisation of inventories (No. of minerals)</td>
<td>-</td>
<td>20</td>
<td>34</td>
<td>27</td>
</tr>
<tr>
<td>ii)</td>
<td>Computerisation of updated inventories (No. of minerals)</td>
<td>-</td>
<td>16</td>
<td>49</td>
<td>27</td>
</tr>
<tr>
<td>7.</td>
<td>Preparation/Updation of Mineral Maps (Hectare)</td>
<td>18,000</td>
<td>22,700</td>
<td>21,000</td>
<td>Mineral maps along with forest overlays of soapstone lease-holds in Rajasthan and bauxite lease-holds in Gujarat were in progress. Besides, preparation of mineral maps of sillimanite &amp; limestone leaseholds in Meghalaya State was completed.</td>
</tr>
<tr>
<td>8.</td>
<td>Ore Dressing Investigations</td>
<td>70</td>
<td>64</td>
<td>70</td>
<td>41 completed and 25 in progress.</td>
</tr>
<tr>
<td>9.</td>
<td>Chemical Analyses</td>
<td>49,095</td>
<td>50,240</td>
<td>50,000</td>
<td>37,733 completed and 939 in progress.</td>
</tr>
<tr>
<td>10.</td>
<td>Mineralogical Studies</td>
<td>2,444</td>
<td>2,364</td>
<td>2,300</td>
<td>1,884 completed and 46 in progress.</td>
</tr>
<tr>
<td>12.</td>
<td>Technical Consultancy assignments</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>13.</td>
<td>Mining Research including Environmental Studies</td>
<td>3</td>
<td>11</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>14.</td>
<td>Training</td>
<td>27</td>
<td>20</td>
<td>16</td>
<td>19</td>
</tr>
</tbody>
</table>

### INVENTORY OF MINERAL RESOURCES AND MARKET SURVEY REPORT

5.27 Five-yearly updating of National Mineral Inventory as on 1.4.2000 for 64 minerals was in progress. Computerisation of updated inventories in respect of 27 minerals was completed. Codification of sample deposits on the lines of United Nation Framework Classification (UNFC) was in progress. A market survey report on Granite was under finalisation, and market survey studies on Dimension Stones other than Granite and Chromite were taken up. An annual bulletin on Copper-Lead-Zinc 1999-2000 issue was released and 2000-01 issue was under finalisation. Besides, three quarterly reports on End-use metal consumption for Copper-Lead-Zinc for quarters ending March, 2001, June, 2001 and September, 2001 were prepared.

### CONSULTANCY SERVICE

5.28 The assignments completed during the year 2001-2002 (upto December, 2001) include (i) Updation of feasibility report on Dikucha Cu-Zn project with fresh market survey for M/s Sikkim Mining Corporation (ii) Mining plan of Dungri limestone quarry for M/s Industrial Development Corporation of Orissa Ltd. (iii) EI/A/EEMP of Red Hill and Jaghar Magnesite mines for M/s Burn Standard Co. Ltd (iv) Lease-wise Mining Plans of Red Hill, A.S. Jaghar and Jaghar Main Magnesite mines for M/s Burn Standard Co. Ltd. (v) Preliminary Geological Appraisal of Zinna iron and manganese ore mine for M/s G. Gokhga Lime & Chemicals Ltd., and (vi) Annual stock measurement (2000-01) at various collieries of M/s Coal India Ltd. In addition to the assignments already completed, 13 assignments on preparation of mining scheme/preliminary geological appraisal reports were in progress.

### MINING RESEARCH

5.29 During the period under review, ten assignments viz (i) Monitoring of Environmental data in respect of Kymore Bamangaon and Mehgao Limestone mines for M/s ACC Ltd., (ii) Rapid EMPs for 13 Silica Sand Mines of Faridabad Group of Mines for M/s Sethi & Others (iii) Rapid EMPs for Bandhwart and Mohabatbakh Silica Sand mines for M/s P.S. Bainsa (iv) Rapid EI/A/EEMP of Talchem Malle iron ore lease for M/s Societé De Fomento Industria Ltd., (v) Rapid EMP of Dikucha copper mine for M/s Sikkim Mining Corporation (vi) Blast vibration study at Mainpet Bauxite mine for M/s M.P. State Mining Corporation (vii) Ground vibration study at Red Hill & Jaghar Main Magnesite mines for M/s Burn Standard Co. Ltd., (viii) Ground vibration study at Belkapahar Wollastonite mine for M/s Wolkem Industries Ltd., (ix) Report on site visit to Rampura-Agucha Lead-Zinc mine of M/s HZL for M/s Indo-Gulf Corporation and (x) Geo-technical investigation at Belkapahar Wollastonite mine for M/s Wolkem Industries Ltd., were completed and reports submitted. Besides, 12 assignments sponsored by the Industry on charge basis are in progress.

### 5.30 INFORMATION DISSEMINATION
IBM is maintaining a web site (http://ibm.nic.in/) This web site provides the main functions and activities of IBM, services provided in the fields of geology, mining, environment, mineral beneficiation etc. to the mining industry, list of IBM publications along with contact persons and their address, and computerised information on mineral resources, production, exports and imports of minerals and metals.


During the year 2001-2002 (up to December, 2001), Indian Minerals Yearbook (IMYB) 2000 issue, Bulletin on Mining Leases and Prospecting Licences-1999 issue and a half-yearly bulletin on Mineral Information, April-September, 2000 issue were released.

Under the series “Mineral Facts and Problems” the Monograph on Clay was under printing and updating of Monographs on (i) limestone and dolomite and (ii) chromite was in progress. Besides, three bulletins on (i) Ore (ii) Slurry Transportation in Indian Mines and (iii) Modernisation of Indian Mines Through a Planned Programme of Replacement of Old Machinery and Equipment, were released.

SPECIALISED STUDIES

The Ministry of Steel had constituted an Expert Committee in the IBM to study the effective supply and demand position of chromite at present and in future. The Committee has submitted the report.

The Ministry of Steel had engaged a joint team of officers from IBM and Directorate of Mines and Geology, Karnataka to inspect the iron ore mining leases in the 8 ranges of Bellary-Hospet Sector in Karnataka State. IBM has since submitted a report entitled “A Report on Scientific Mining of High Grade Iron Ores for Export from Bellary-Hospet, Karnataka”.

The Department of Mines had constituted a Committee in the IBM to evolve certain standards and guidelines for mine effluents and other parameters in respect of bauxite, chromite, iron, manganese ore, copper, lead & zinc and limestone-dolomite and the Report is under consideration in the Department.

HUMAN RESOURCE DEVELOPMENT

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 2001-2002 (up to December, 2001), 19 training programmes were conducted in which a total of 276 IBM personnel and 160 industry personnel including 3 from North-Eastern States participated.

IBM also participated in the International Conference of Metallurgists “COM 2001” held at Toronto, Canada during 26-29 August, 2001.

INTERNATIONAL COOPERATION

IBM has participated in the International Conference of Metallurgists “COM 2001” held at Toronto, Canada during 26-29 August, 2001.

IMPLEMENTATION OF U.N. CLASSIFICATION OF MINERAL RESOURCES

The field guidelines for estimation of reserves under the United Nations Frame Work Classification (UNFC) System have been finalised. IBM has formulated amendment to MCDR forms to make the reserve figures consistent with UNFC System, and the same is being circulated to all State Governments to elicit their comments. GSI and MEIL have been requested to organise in-house training for their officers to familiarise them about the field guidelines. IBM has also conducted one introductory training on this for its officers.

The manual work of fixing codes for the reserve/resource figures in the National Mineral Inventory (NDM) as on 1.4.2000 has been commenced and is underway. Meanwhile, in the 15th meeting of the Indo-French Working Group held on 13-14 December, 2001 at New Delhi, it has been decided that BRGM, France will provide expert guidance to IBM officers to develop software for converting the National Mineral Inventory database as on 1.4.2000 into the UNFC System.

WORK DONE BY IBM IN NORTH-EASTERN REGION

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INTERNATIONAL COOPERATION

The requirement of setting up of an All India data communication system in IBM namely Technical Management Information System (TMIS) through a joint venture Indo-French collaborative project was finalised to extend the computer based database system for monitoring the mining activity after the implementation of Mineral Resource Intelligence System (MRIS) database at the IBM Headquarters. More specifically this would meet the needs of the Mines Control and Conservation of Minerals (MCCM) Division which is responsible for the enforcement of conservation, systematic and sustainable development of mineral resources and protection of mine environment. The project proposal was initially discussed in the eleventh meeting of the Indo-French Working Group on Mineral Exploration and Development held in September, 1997. Subsequently, IBM entered into an agreement with BRGM, France on 22 June, 1998 for implementation of this joint venture project with a financial implication of 23.4 million French Franc under the financing terms and conditions defined in the financial protocol signed on 25 January, 1998 between Government of Republic of India and the Government of Republic of France. The project commenced on 9 November, 1998 and was successfully completed in March, 2001. The TMIS Computer Centre at Nagpur was inaugurated in May, 2001.

IMPLEMENTATION OF U.N. CLASSIFICATION OF MINERAL RESOURCES

The field guidelines for estimation of reserves under the United Nations Frame Work Classification (UNFC) System have been finalised. IBM has formulated amendment to MCDR forms to make the reserve figures consistent with UNFC System, and the same is being circulated to all State Governments to elicit their comments. GSI and MEIL have been requested to organise in-house training for their officers to familiarise them about the field guidelines. IBM has also conducted one introductory training on this for its officers.

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WORK DONE BY IBM IN NORTH-EASTERN REGION

Sub-regional office of IBM at Guwahati continued to undertake inspection of mines/studies on development of resources of the North-Eastern region. During the period 18 mines were inspected for enforcement of provisions of MCDR, 1998 and for processing and disposal of mining plans.

IBM has also taken up the following studies which are in progress.

- Preparation of mineral maps of sillimanite and limestone available in North-Eastern Region.
- Five technical consultancy assignments on preparation of mining plans & mining schemes and topographic survey.
- Preparation of Rapid Environmental Management Plans in respect of four mines of Sikkim Mining Corporation.
- Modernisation of beneficiation plant of Sikkim Mining Corporation.
- Beneficiation studies on silica sand and clay samples collected from North-Eastern States.
- In addition to the assignments in progress, IBM has completed 2 assignments for M/s Sikkim Mining Corporation, namely (i) updation of feasibility report of Dikchu Cu-Zn project with fresh market survey and (ii) Rapid EMP of Dikchu copper mine, and submitted the reports.
- Conducted a training programme for 3 chemists of the Directorate of Mining and Geology, Government of Sikkim on chemical analysis of ores, minerals and ore dressing samples at Modern Mineral Processing Laboratory, IBM Nagpur during 5-17 October, 2001.

REVENUE GENERATION IN IBM

Revenue generated during 2001-2002 (up to December, 2001) from the consultancy work in mining, geology, ore dressing and mining research work, training and through sale of publications etc was Rs 75.12 lakh against an annual target of Rs 1 crore.

ORGANISATION AND EMPLOYMENT

The 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 Publications Division, and (iv) Planning and Co-ordination Division, which also looks after administration and finance.

IBM has its headquarters at Nagpur and twelve regional offices located at Ajmer, Bangalore, Bhurbaneswar, Chennai, Dehradun, Hyderabad, Jabalpur, Kolkata, Mangalore (Goa), Nagpur, Ranchi and Udaipur and two sub-regional offices at Guwahati and Nellore. The IBM has well equipped ore dressing laboratories and pilot plants at Nagpur, Ajmer and Bangalore.

Employment position as on 31.12.2001 in IBM is given in Table 5.3.

TABLE 5.3

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral Resources</td>
<td>200</td>
</tr>
<tr>
<td>Geology</td>
<td>150</td>
</tr>
<tr>
<td>Mining</td>
<td>100</td>
</tr>
<tr>
<td>Research and Development</td>
<td>50</td>
</tr>
<tr>
<td>Training</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>530</td>
</tr>
</tbody>
</table>
EMPLOYMENT OF PERSONNEL IN IBM

<table>
<thead>
<tr>
<th>Class</th>
<th>Total No. of Employees in position</th>
<th>No. of</th>
<th>SC</th>
<th>ST</th>
<th>OBC</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>239</td>
<td></td>
<td>52</td>
<td>18</td>
<td>4</td>
<td>07</td>
</tr>
<tr>
<td>Group B</td>
<td>88</td>
<td></td>
<td>14</td>
<td>5</td>
<td>1</td>
<td>05</td>
</tr>
<tr>
<td>Group B (NG)</td>
<td>54</td>
<td></td>
<td>08</td>
<td>7</td>
<td>NIL</td>
<td>13</td>
</tr>
<tr>
<td>Group C</td>
<td>477</td>
<td></td>
<td>79</td>
<td>36</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>(Tech)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group C (Tech)</td>
<td>345</td>
<td></td>
<td>66</td>
<td>31</td>
<td>6</td>
<td>84</td>
</tr>
<tr>
<td>Group D</td>
<td>356</td>
<td></td>
<td>104</td>
<td>35</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>1559</td>
<td></td>
<td>323</td>
<td>132</td>
<td>44</td>
<td>167</td>
</tr>
</tbody>
</table>

FOCUS ON WOMEN AND PERSONS WITH DISABILITIES

5.47 The year 2001 was observed as Women Empowerment Year in IBM. A one month training programme on “Stress Management” exclusively for the women employees of IBM was organised by the Training Centre. The Recreation Club celebrated Special Women's Cultural Week, as part of the Women Empowerment Year. During the week long celebrations various competitions were conducted for the women employees and prizes were distributed to the winners on the final day function.

5.48 As on December, 2001, 20 physically handicapped persons were employed in IBM of which 4 are visually handicapped, one is hearing handicapped and 15 are orthopaedically handicapped. Besides, recruitment action in respect of the posts reserved for one each of orthopaedically handicapped, visually handicapped and hearing handicapped persons, is in progress.

Chapter VI

PERFORMANCE OF PUBLIC SECTOR AND JOINT SECTOR UNDERTAKINGS IN MINING, MINERAL PROCESSING AND EXPLORATION

6.1 The Department of Mines has five public sector undertakings (PSUs) under its administrative control, viz National Aluminium Company Limited (NALCO), Hindustan Zinc Limited (HZL), Hindustan Copper Limited (HCL), Bharat Gold Mines Limited (BGML), all in mining and mineral processing, and Mineral Exploration Corporation Limited (MECL), in mineral exploration. In addition, the Department of Mines held 49 per cent equity in Bharat Aluminium Company Limited (BALCO) and Sikkim Mining Corporation for major part of the year. The performance of these undertakings during 2001-2002 is discussed in the following paragraphs.

A. NATIONAL ALUMINIUM COMPANY LIMITED (NALCO)

6.2 NALCO was incorporated on 7th January, 1981 as a wholly owned Government Company following a major decision of Government of India to exploit a part of the large deposits of bauxite discovered in the East Coast. The Company has its Head Office at Bhubaneswar. The main operating units of the Company are (i) bauxite mine at Patchpatmali, Orissa, (ii) alumina refinery at Damanjodi, Orissa, (iii) smelter plant at Angul, Orissa and (iv) captive power plant (CPP) at Angul. Orissa and (v) port facilities at Vishakhapatnam. The Government of India holds 87.15 per cent equity in NALCO and a decision has been taken to further disinvest 30 per cent of the equity through market route by June 2002.

PHYSICAL PERFORMANCE

6.3 The physical performance of the Company during the last three years and 2001-2002 (up to December 2001) is given in Table 6.1.

TABLE 6.1

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. PRODUCTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bauxite</td>
<td>Tonnes</td>
<td>2822464</td>
<td>2834189</td>
<td>3420000</td>
<td>2330250</td>
<td>3420000</td>
</tr>
<tr>
<td>2</td>
<td>Calcined Alumina</td>
<td>Tonnes</td>
<td>886000</td>
<td>939000</td>
<td>1139000</td>
<td>788500</td>
<td>1139000</td>
</tr>
<tr>
<td>3</td>
<td>Aluminium Cast Metal</td>
<td>Tonnes</td>
<td>212663</td>
<td>230516</td>
<td>230000</td>
<td>173796</td>
<td>230000</td>
</tr>
<tr>
<td>4</td>
<td>Net generated From CPP</td>
<td>MW</td>
<td>3965</td>
<td>3833</td>
<td>4100</td>
<td>2870.37</td>
<td>4100</td>
</tr>
<tr>
<td>B. SALES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Alumina Export</td>
<td>Tonnes</td>
<td>497620</td>
<td>495723</td>
<td>690000</td>
<td>474148</td>
<td>690000</td>
</tr>
<tr>
<td>2</td>
<td>Aluminium Export</td>
<td>Tonnes</td>
<td>95185</td>
<td>118068</td>
<td>125000</td>
<td>86839</td>
<td>125000</td>
</tr>
<tr>
<td>3</td>
<td>Domestic Metal Sales</td>
<td>Tonnes</td>
<td>120171</td>
<td>114082</td>
<td>105000</td>
<td>94313</td>
<td>105000</td>
</tr>
<tr>
<td>4</td>
<td>Total Metal Sale</td>
<td>Tonnes</td>
<td>215356</td>
<td>232950</td>
<td>230000</td>
<td>164177</td>
<td>230000</td>
</tr>
<tr>
<td>5</td>
<td>Power to GRIDCO</td>
<td>MW</td>
<td>595</td>
<td>225</td>
<td>581</td>
<td>226.89</td>
<td>581.70</td>
</tr>
</tbody>
</table>

FINANCIAL PERFORMANCE

6.4 The financial performance of the Company during the last three years and 2001-2002 (up to December 2001) is given in Table 6.2.

TABLE 6.2

|--------|------------------|---------|---------|----------------------|----------------------------------|--------------------------|
SALES PERFORMANCE

6.5 The Sales performance of the Company is given at Table 6.3.

### TABLE 6.3
Sales Performance of NALCO

<table>
<thead>
<tr>
<th>Details</th>
<th>Unit</th>
<th>1999-00</th>
<th>2000-01</th>
<th>Target for 2001-2002</th>
<th>Actual upto December 2001</th>
<th>Revised Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Calcined Alumina</td>
<td>Tonnes</td>
<td>479620</td>
<td>495723</td>
<td>690000</td>
<td>474148</td>
<td>670000</td>
</tr>
<tr>
<td>(b) Aluminium</td>
<td>Tonnes</td>
<td>95185</td>
<td>118068</td>
<td>105000</td>
<td>60400</td>
<td>105000</td>
</tr>
<tr>
<td>Total Export Earning</td>
<td>Rs in crore</td>
<td>1031.64</td>
<td>1314.2</td>
<td>1434.56</td>
<td>809.12</td>
<td>1434.55</td>
</tr>
<tr>
<td>Domestic Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>Tonnes</td>
<td>120171</td>
<td>114082</td>
<td>125000</td>
<td>94313</td>
<td>125000*</td>
</tr>
</tbody>
</table>

* Estimated sale in domestic market from January to March, 2002 is 30,687 tonnes (keeping in view revised domestic sales target of 125000 tonnes as approved by the Board).

PROJECTS UNDER IMPLEMENTATION

6.6 NALCO is implementing a number of downstream projects to manufacture value added items like special grade alumina, zeolite, etc.

### Special Grade Alumina

6.7 A 26,000 tonnes per annum special grade alumina plant at Damanjodi at a capital cost of Rs 56.78 crore based on technical know-how obtained from Alumina Technology Associates, USA and consultancy service rendered by Engineers India Limited is expected to be commissioned during March, 2002. 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. These special products have been sold to different customers and necessary market development activities for expansion of consumer base are also being undertaken.

### Zeolite-A Project

6.8 A 10,000 tonnes per annum detergent grade Zeolite (Zeolite-A) Plant at Damanjodi, at a capital cost of Rs 24.10 crore based on technical know-how from Central Salt & Marine Chemical Research Institute (CSMCR), Bhavnagar, licensed through National Research Development Corporation (NRDC), New Delhi and with consultancy services rendered by Engineers India Limited, has been commissioned. The Plant has produced a very small quantity, which is being sent to various customers as samples. After getting feedback from the customers, between 100 and 200 tonnes will be produced for trial sale/laundry of the product. NALCO is also exploring the overseas market.

EXPANSION & DIVERSIFICATION

6.9 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 tonnes per annum to 10,50,000 tonnes per annum. The final phase of expansion to the level of 15,75,000 tonnes per annum has been completed during December 2001. In the first phase of expansion itself, NALCO has already doubled its bauxite production capacity from 24,00,000 tonnes per annum to 48,00,000 tonnes per annum to meet the ultimate requirement of bauxite ore for the expanded refinery capacity. The captive port facilities of the Company at Visakhapatnam which handles 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.

6.10 After the expansion, NALCO becomes the largest alumina producer in Asia with an exportable surplus of one million tonnes per annum after meeting the internal demands of its 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 biddings, NALCO is likely to save around Rs 200 crore on the projected cost of expansion. By any international standards the broad field expansion of NALCO's alumina refinery is being achieved at a minimum cost. The lower cost of expansion and substantial internal funding of the capital will result in lower production cost of alumina which has been the hallmark of NALCO in the field of alumina production in the world.

6.11 On the metal segment also, NALCO is on fast track, implementing an expansion project which will enhance the smelting capacity from the current level of 3,00,000 tonnes per annum to 3,45,000 tonnes per annum and captive power plant capacity from 720 MW to 840 MW. This project envisages an investment of Rs 2062 crore and is scheduled to be completed by May, 2002 (except the 8th unit of captive power plant).

6.12 The implementation of expansion of smelter and CPP (7th Unit) are in full swing. About 98% of the ordering has been completed including all major equipments. It is expected that 60 pots will be commissioned as per project completion schedule of May, 2002.

6.13 In case of 7th unit of CPP, the order for main power house package was delayed by about seven months because of a court case by one of the bidders. The delay was made up by saving the time schedule and now the project is expected to be completed by July, 2002.

6.14 Installation of the 8th unit of CPP of 120 MW at a capital cost of Rs 480 crore with a time schedule of 36 months has been approved and M/s MN Dastur & co. has been approved as the Consultant for this unit. The Main Power House Package has been placed on M/s BHIEL on repeat order basis. It is expected that this project will be completed well within schedule.

New Scheme/Diversification

6.15 As a strategic move, in March 2000, NALCO had taken over International Aluminium Products Limited (IAPL), a 100% Export Oriented Unit (EOU), with an estimated project cost of Rs 3,56 crore. Prior to the takeover, NALCO had 26% equity stake in IAPL. IAPL is a 50,000 tonnes per annum cold rolled product plant which produces products mix such as coil, cold rolled sheets and coils for end use in foils, cans, rolls forming of other industries. IAPL has since been amalgamated with NALCO with effect from 9.11.2001. After amalgamation, the facilities of IAPL have become known as “Rolled Products unit”, and it has retained its identity as a separate 100% EOU. The rolling mills of the project are expected to be commissioned by March, 2002.

ENERGY CONSERVATION
6.16 NALCO has taken various energy conservation measures in the smelter, CPP, mining and refinery complex and the port facilities. In the smelter, NALCO has used fuel oil additive in heavy fuel oil in bake-oven (trial run) and achieved approximately 9% reduction in fuel oil consumption. The existing cast iron peephole lid cover in bake oven is being replaced with refractory material to prevent heat loss, and air infiltration is in progress to reduce energy; the reciprocating compressors have been replaced by rotary compressors in air conditioners to reduce energy consumption, and energy efficient furnace burners (blow-out burners) have been installed in one furnace in cast house on trial.

6.17 In the CPP, an energy saving silica control scheme has been chalked out in consultation with Bharat Heavy Electricals Limited, which will save Rs. 49 lakh per boiler per year. Further, the number of cooling fans, pumps and compressors have been optimally reduced for energy conservation. These measures would notionally save Rs 119.04 lakh per annum. One centrifugal air conditioner of 187 KW capacity has been replaced with a new environment friendly VAM of 10 of KW rating. This replacement would notionally save Rs 19.38 lakh per year.

6.18 In the mines and refinery complex, efficient proactive maintenance, optimum control, stringent monitoring of leakages, better operational practices have resulted in reduction in overall specific prime energy consumption by 5.21 %. In the port facilities, ship loading activities have been synchronised at Visakhapatnam to achieve optimal results in saving energy, that is, time of loading is reduced by 15% approximately, and accordingly 15% of energy is saved.

INFORMATION TECHNOLOGY

6.19 Procurement of computer Thins, Client and Network resources were taken up by all units of NALCO to supplement the Information Technology (IT) resources, sixty four Kbps leased Data Circuit through BSNL has been commissioned for smelter and CPP units and is likely to be commissioned at the refinery unit in early 2002. Also the ISP service bandwidth with STI is being expanded from 128 Kbps to 512 Kbps.

Ø An Intrusion detection system to protect NALCO computing resources from internal and external threats has been implemented during November, 2001.

Ø Mail messaging and work flow application tools are implemented at smelter and CPP units.

Ø LAN, using Gigabit Ethernet technology is being finalised for implementation at the alumina refinery.

6.20 Applications using web technology for the purpose of MIS and Intranet applications for NALCO have been developed and will be deployed in early 2002. Besides, implementation of Client server Application packages in finance, establishment, purchase and stores, marketing etc. areas have been taken up at units and Zonal Offices of NALCO. Maintenance module of RAMCO e-application is also under implementation at alumina refinery.

POLLUTION CONTROL AND ENVIRONMENT

6.21 NALCO is the first central PSU in the country to design, implement and certify to the international Environment Management System (EMS) as per ISO 14001. The implementation of EMS as per ISO 14001 in all the four production units has shown improvement on environmental performance and hence greater acceptability of the products in the domestic as well as international markets. Action has been initiated to implement EMS as per ISO 14001 in the port facilities of NALCO at Visakhapatnam by March, 2002. All the production units of NALCO are operating with valid consent from State Pollution Control Board (SPCB).

6.22 More than 6.5 million trees have so far been planted in approximately 3000 hectare of fallow land of all the units of NALCO. This activity has been further extended to nearby villages by adopting joint forest management programmes.

PROCESS AND PRODUCT DEVELOPMENT:

6.23 During the year, a number of Production and Process problems including those related to quality improvements were successfully addressed to.

Ø Like earlier years, the Special Grade Alumina Pilot Plant facilities were run to its full capacity throughout the year. During the year, 292 tonnes of special grade alumina and 423 tonnes special grade hydrate were sold to the buyers.

Ø Under the Technology Demonstration Project taken up with Regional Research Laboratory (RRL), Bhopal and Fly Ash Mission, Department of Science and Technology, Government of India, on effect of fly ash on soil fertility and crop yield. 2nd year programme of cropping were successfully accomplished. Results are being analysed for incorporation in the final report.

Ø A Joint Research Project (JRP) was undertaken with Moscow Institute of Steel and Alloys (MISA) and Romelt Sail India Ltd (RSIL), New Delhi to explore possibilities for extraction of iron on a commercial scale from NALCO's red mud/desilicated sand using Romelt process developed by MISA, Russia. The project is under active implementation.

Ø A collaborative R&D project on Mechno-chemical Activation of Bauxite to improve the performance of Bayer process of alumina production and minimise the environmental impact of red mud has been taken up with National Mineral Laboratory, Jamshedpur and the project is progressing satisfactorily.

Ø A collaborative R&D Project on dispersion pattern and behaviour of valuable trace and rare earth elements in bauxite profile at Panchpahal deposit and scope of their recovery from rejects of refinery plant (laboratory scale study) has been taken up with RRL, Bhubaneswar.

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

A sponsored research project on development of squeeze cast, premium quality, aluminium alloy castings is under implementation at Mechanical Engineering Department, Indian Institute of Science, Bangalore.

Detailed studies on use of aluminium fluoride of varying densities on pot operation and its consumption pattern in collaboration with Jawaharlal Nehru Aluminium Research Development & Design Centre (INARDCC), Nagpur were successfully accomplished.

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 light alumina hydrate, Studies in high-temperature furnace for conversion into alpha alumina and studies on de-carbonisation of aluminate liquor through alternate routes continued to remain some of the main areas of R&D activities in the Mining and Reasearch Complex, Damanjodi.

Effect on anode quality improvement, reduction in anode butt generation, improvement in recovery of cathode rejected blocks, evaluation of effectiveness of low density of aluminium fluoride and development of new types of anode clads have been successfully carried out.

INDUSTRIAL RELATIONS

6.24 The industrial relations climate of the Company during the period under report remained challenging for some vital issues like demand for Executives and Non-Executives which was signed on 5.9.2001. The latter is the agreement between the management and union representative for a cordial and harmonious industrial climate in the organisation.

6.25 The situation of the ash pond disaster in the Angul Sector was handled in a very effective manner. The employees worked in a team dedicatedly to face the crisis and up hold the image of the organisation. Along with necessary compensation to the affected people, repair of the embankment of the broken ash pond was made on a war footing.

WOMEN WELFARE

6.26 NALCO is an equal opportunities employer, although the representation of women employees is relatively low on account of the mismatch between the nature of job requirement vis-a-vis the availability of technically experienced women candidates.

WELFARE MEASURES

6.27 The Alumina and Mines units of NALCO are placed in the midst of a predominantly tribal area at Damanjodi. The focus is therefore on the rehabilitation and provision of amenities for 600 families who have been displaced for the establishment of the project. Development of roads, school, college, library, recreation centre, ponds, wells and agricultural land etc. have been the hallmark of the developmental works undertaken along with the development programme on the peripheral tribal dominated villages.

Besides, direct employment in NALCO Damanjodi Sector has been provided to 487 persons on the basis of one able bodied person from each displaced family and opportunity for the rehabilitation of displaced population is being provided for the balance for their engagement with contractors.

6.28 Besides the statutory retirement benefits viz. provident fund, group gratuity life assurance scheme, pension etc., NALCO has a contributory scheme for post retirement medical facilities to the superannuated employees and also their spouse.
EMPLOYMENT AS ON 31.12.2001

6.29 The Table 6.4 shows the employment position in NALCO.

<table>
<thead>
<tr>
<th>Group</th>
<th>Total No. of Employee</th>
<th>SC</th>
<th>ST</th>
<th>Ex-Service men</th>
<th>PH</th>
<th>LDC</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executives</td>
<td>1538</td>
<td>176</td>
<td>80</td>
<td>09</td>
<td>03</td>
<td>14</td>
<td>65</td>
</tr>
<tr>
<td>Non-executives</td>
<td>4905</td>
<td>907</td>
<td>1095</td>
<td>76</td>
<td>52</td>
<td>1703</td>
<td>183</td>
</tr>
<tr>
<td>Trainees</td>
<td>106</td>
<td>18</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>09</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>6549</td>
<td>1101</td>
<td>1190</td>
<td>85</td>
<td>55</td>
<td>1726</td>
<td>264</td>
</tr>
</tbody>
</table>

PH=Physically Handicapped
LDC= Land Displaced Persons

MOU RATING ACHIEVED (DURING LAST THREE YEARS)


AWARDS and RECOGNITIONS

6.31 NALCO has bagged the ‘Excellent Organisation Gold Award’ for ‘Pollution Control and Energy Conservation Methods’ conferred by International Greenland Society, Hyderabad. The award was received in October, 2001. In the month of April 2001, NALCO received the most prestigious ‘Indira Priyadarshini Brikhyamitra Award’ for excellent plantation, afforestation and waste land utilisation. In the past, NALCO had received many more awards including ‘Pollution Control Excellence Award’ for Captive Power Plant conferred by State Pollution Control Board, Orissa.

B. HINDUSTAN ZINC LIMITED (HZL)

6.32 Hindustan Zinc Limited (HZL) 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 meet substantially the domestic demand of zinc and lead metals. HZL’s operations are broad based and its activities range from exploration, mining and ore processing to smelting and refining of lead, zinc together with recovery of by-products like silver, cadmium, cobalt, sulphuric acid and copper.

6.33 HZL, with its Headquarters at Udaipur operates five lead-zinc Mines (Zawar Group of mines at Udaipur, Rajpura-Dariba mine in Rajasmand, Rampura Aguacha Mine in Bhilwara, all in Rajasthan, Agungudla lead mine in Gunur, Andhra Pradesh and Sargipali lead mine in Sundergarh, Orissa) with a total lead-zinc ore production capacity of 3.49 million tonnes per annum. HZL also operates four smelters (Debari Zinc Smelter, Chanderiya Lead Zinc Smelter, both in Rajasthan, Vizag Zinc smelter in Andhra Pradesh and Tundoo Lead smelter in Jharkhand) with combined installed capacity of 169,000 tonnes per annum of zinc and 43,000 tonnes per annum of lead. The Sargipali lead mine and the Mount rock phosphate mine stopped operations in July 2001 and October 2001, respectively. Two of its units viz. Rampura Agucha Mine and Debari Zinc Smelter have been operating with ISO 9002 accreditation. The Government of India holds 75.92% equity in HZL and has decided to further disinvest 26% of equity.

PHYSICAL PERFORMANCE

6.34 The production of lead-zinc ore, concentrate and metals are given in Table 6.5.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-Zinc Ore</td>
<td>2744512</td>
<td>2683801</td>
<td>2577000</td>
<td>1958973</td>
<td>2682590</td>
</tr>
<tr>
<td>Lead-Zinc Concentrate</td>
<td>422257</td>
<td>420065</td>
<td>395810</td>
<td>327763</td>
<td>418826</td>
</tr>
<tr>
<td>Zinc Metal</td>
<td>143976</td>
<td>148092</td>
<td>146000</td>
<td>132542</td>
<td>172000</td>
</tr>
<tr>
<td>Lead Metal</td>
<td>35120</td>
<td>34840</td>
<td>33500</td>
<td>28993</td>
<td>36585</td>
</tr>
</tbody>
</table>

FINANCIAL PERFORMANCE

6.35 The financial performance of the Company is given in Table 6.6.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>1562.46</td>
<td>1692.12</td>
<td>1724.45</td>
<td>1199.62</td>
<td>1501.00</td>
</tr>
<tr>
<td>Operating Cost</td>
<td>1304.40</td>
<td>1348.42</td>
<td>1475.69</td>
<td>1002.61</td>
<td>1350.85</td>
</tr>
<tr>
<td>Interest</td>
<td>10.46</td>
<td>2.47</td>
<td>7.50</td>
<td>16.80</td>
<td>17.50</td>
</tr>
<tr>
<td>Depreciation and Amortisation</td>
<td>68.43</td>
<td>59.01</td>
<td>77.26</td>
<td>51.21</td>
<td>62.65</td>
</tr>
<tr>
<td>Net Profit</td>
<td>182.17</td>
<td>282.22</td>
<td>164.00</td>
<td>49.00</td>
<td>70.00</td>
</tr>
</tbody>
</table>

SALES PERFORMANCE

6.36 Zinc sale for the period April 2001 to December, 2001 was 118,898 tonnes, which was 15% higher than the corresponding period of previous year. Sale of lead metal for the period April 2001 to December, 2001 was 26,077 tonnes.

ON GOING PROJECTS

...
(i) Kayar lead-zinc prospect, District Ajmer, Rajasthan

6.37 Based on GSU/MECL exploration data, a scheme involving 16,800 metre of core drilling for detailed exploration of the area was evolved. HZL commenced exploration in June 1999 on its mining lease measuring 4.875 square kilometre near Kayar utilizing in-house resources. A total of 9699.80 metre of drilling up to December, 2001 has been accomplished.

6.38 In order to comprehend the complex geological behavior and to explore the possibility of additional ore lenses in depth, an integrated geophysical survey comprising Magnetics, TDEM and DHFEM/FREM was carried out in April 2001. Based on the results, the ongoing exploration strategy has been re-oriented to test the indicated conductors by few drill holes. The campaign is likely to be completed by last quarter of 2002, and the geological report is expected in the first quarter of 2003.

(ii) Jagurra Gold Prospect, Dist. Banswara, Rajasthan

6.39 Under its diversification plan, HZL acquired prospecting license over 43.10 square kilometer for exploration of gold in Jagurra, (Banswara district) in January 1995. A total of 17881 metre drilling progress has been achieved by HZL in the project. However, the Jagurra resource is uneconomic at the current level of gold price. Consequently it has been decided to suspend exploration till prices of gold improve.

(iii) New Zinc Smelter

6.40 The investment proposal for 100,000 tonnes per annum Greenfield Zinc Smelter at Kapasaun, Rajasthan was approved in February 2001. However, any further action on the project has not been taken in view of the decision to further disinvest Government equity in the Company.

(iv) Expansion of Debari & Vizag Zinc Smelter

6.41 Expansion projects of existing smelters at Debari and Vizag with a marginal increase in capacity by 10,000 tonnes per annum and 7000 tonnes per annum respectively have been completed, thereby increasing the total processing capacity of zinc to 169,000 tonnes per annum.

(v) Nickel Project (Ni-TPP)

6.42 Nickel Extraction Technology Plant (TPP) of 30 tonnes per day treatment capacity at Regional Research Laboratory, Bhubaneswar as a joint R&D Project between HZL and Council of Scientific and Industrial Research(CSIR), Government of India was commissioned in March 2000. The plant was in operation up to February 2001 to firm up the operation parameters. Results of plant operation were found techno-economically viable, and a tripartite Memorandum of Understanding has been signed by CSIR, HZL and NALCO for transfer of the project from HZL to NALCO.

(vi) 100 MW Power Plant

6.43 An MoU was signed between HZL and Rajasthan State Mines & Minerals Limited, (RSMML) in February, 1997 to set up a 100 MW Power Plant. The Request for Proposal (RFP) document for the power project based on liquid fuel, and including liquid natural gas(LNG) (at a later date when available) has been issued.

(vii) Mansi Wakal Stage-I Project

6.44 The Mansi Wakal Stage-I Project jointly funded by the Government of Rajasthan & HZL has been started. The construction of the dam has been started from August, 2001 with the completion period of 30 months. The work of other related items like water conveyance system and power transmission line has already been taken up to finish the activities simultaneously with the completion of the construction of the dam.

ENERGY CONSERVATION

6.45 HZL has adopted various measures as on-going process for energy conservation:

- Load & energy management.
- Measurement & monitoring the consumption of various forms of energy.
- Identifying the opportunities through energy audit and survey at regular intervals.
- Plugging of losses in energy usage.
- Sizing of equipment to achieve minimum energy consumption.
- Optimization of system power factor.
- Process improvement / modifications.
- Promoting use of energy efficient system and equipment.

INFORMATION TECHNOLOGY

6.46 Local Area Network has been installed in Head Office at Yashad Bhawan, Udaipur. E-mail facility has been provided over the LAN. Connectivity of HZL intranet to outside world through Internet on dial-up line has been implemented. To build up-in house expertise in application development in client/server environment training on database administration in oracle RDBMS has been provided to system personnel. Action towards implementation of integrated on-line software solutions in major areas are planned to be taken up in a phased manner.

POLLUTION CONTROL AND ENVIRONMENT

6.47 Pollution prevention and control systems installed at company’s mining and smelting units were operated throughout the year thereby maintaining quality of treated effluent and gases within permissible limits. Construction of an improved secured landfill facility for storage of jarosite waste both at Debari and Vizag Smelters has been taken on hand. In order to improve work environment and reduction of dust emissions in sinter plant at Lead Smelter Tundoo, the company has successfully commissioned a bag filter system at a cost of Rs.60 lakh. Further, in view of acute shortage of water at certain units, the company has been taking number of initiatives aimed at conserving water in all its operations by better water management. Every year new saplings are planted, and existing trees being kept well maintained at all the units of the company. Environmental occupational health and safety due diligence review has acknowledged good performance of the HZL units and does not contain any serious non compliance issues.

PROCESS AND PRODUCT DEVELOPMENT

6.48 The following activities were undertaken for process and product development.

- Developing technology for recovery of metals from polymetallic nodules

A pilot plant has been erected for evaluating the process based on leaching in ammonical media. This plant consists of autoclaves, mixture settlers and facilities for electro-winning of copper, cobalt and nickel. The project is a collaboration among HZL, RRL (Bhubaneshwar) and Engineers India Limited and is under the Department of Ocean Development programme. Beside ammonical process being tested in the pilot plant, HZL is working at the laboratory scale on an alternative route based on acid leaching.

- Recovery of Metals From Residues

Work is continuing for recovery of metals from silver refinery plant residue, copper cement leached residue, etc. to ensure that various residues stored for long period of time or utilized and stocks are reduced.

INDUSTRIAL RELATIONS

6.49 The industrial relations scenario in the Company had been peaceful and cordial during the period except (i) a two hour token strike by workmen at Zawar Mines, Rajpura Dariba Mines, Maton Mines, at the smelters at Debari and Chanderiya and the Head Office on the call given by Hindustan Zinc Workers’ Federation against the Central Government policy relating to workers viz. amendment in Industrial Disputes Act, Contract Labour (Regulation and Abolishment) Act, reduction in interest rate in provident fund, small savings, reduction in manpower, etc. and (ii) stoppage of work in the lead smelter at Tundoo involving 36 workers on 20.12.2001, on reluctance for re-deployment consequent upon implementation of VRS.
6.50 The Special Voluntary Retirement Scheme was introduced for the workmen of Sargipali Mines and Maton Mines in July and August, 2001 respectively, and 641 workmen have opted and retired. Further, Voluntary Retirement Scheme was notified for executives and workmen in all units except Rampur-Aguchha mines and Chanderiya Smelter, and a total of 1575 employees have opted and retired in October-November, 2001.

WOMEN WELFARE

6.51 The Company is an equal opportunities employer. The female employees of the Company are sent for training, both in-house and outside. Participation by female employees in various national fora is also encouraged. To take care of medical facilities of female employees, the Company has lady doctors in its hospitals/dispensaries.

WELFARE MEASURES

6.52 Various welfare measures including free medical aid, drinking water, school facilities, co-operative/provision store facilities etc. are being availed by/extended to the tribals and minorities residing in the adjacent areas of the units.

6.53 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 up to Rs 5.00 lakh.

EMPLOYMENT

6.54 The manpower employment in the Company as on 31st December, 2001 was 8357 (including 266 women) out of which 1381 belonged to SC, 919 belonged to ST and 470 were minorities.

MOU RATING


C. HINDUSTAN COPPER LIMITED (HCL)

6.56 Hindustan Copper Limited (HCL) was incorporated on 9th November, 1967, under the Companies Act, 1956. The major activities of HCL are mining, beneficiation, smelting, refining and casting of finished copper metal into saleable products. HCL produces primary copper in the form of cathode/wire bar/wire rod. HCL also produces by-products in small quantities like gold, silver, sulphuric acid, nickel sulphate, selenium, tellurium. The Company has its Head Office at Kolkata. The main operating units of the Company are: (i) Khetri Copper Complex (KCC), Khetri, Rajasthan; (ii) Indian Copper Complex (ICC) at Ghasola, Bihar; (iii) Malanjkhand Copper Project (MCP), Malanjkhand, Madhya Pradesh; and (iv) Taloja Copper Project (TCP), Taloja, Maharashtra. The Government of India has decided to disinvest its total shareholding (98.95%) in Hindustan Copper Limited (HCL) to an interested buyer. Expressions of interest have been invited for engaging an Adviser to assist the Government in the disinvestment process. An Inter-Ministerial Group for disinvestment of HCL has been constituted under the Chairmanship of Secretary, Department of Disinvestment.

PHYSICAL PERFORMANCE

6.57 The production of ore, metal in concentrates, refined copper(cathode) and wire rod during the year 1998-99 to 2000-2001 is at Table 6.7.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore Production (Thousand tonnes)</td>
<td>3109</td>
<td>3477</td>
<td>3700</td>
<td>2537</td>
</tr>
<tr>
<td>Metal in concentrates (tonnes)</td>
<td>33462</td>
<td>34087</td>
<td>37000</td>
<td>24753</td>
</tr>
<tr>
<td>Refined Copper (Cathode) (Tonnes)</td>
<td>38464</td>
<td>42245</td>
<td>45000</td>
<td>29926</td>
</tr>
<tr>
<td>Wirerod (Talaja) (Tonnes)</td>
<td>29778</td>
<td>30572</td>
<td>29000</td>
<td>22067</td>
</tr>
</tbody>
</table>

FINANCIAL PERFORMANCE

6.59 The financial performance of the company is at Table 6.8.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Income</td>
<td>633.22</td>
<td>666.21</td>
<td>704.98</td>
<td>419.32</td>
</tr>
<tr>
<td>2.</td>
<td>Operating Cost</td>
<td>651.38</td>
<td>628.01</td>
<td>599.45</td>
<td>422.16</td>
</tr>
<tr>
<td>3.</td>
<td>Interest and Transaction cost</td>
<td>62.26</td>
<td>81.98</td>
<td>90.21</td>
<td>63.72</td>
</tr>
<tr>
<td>4.</td>
<td>Depreciation and Amortisation</td>
<td>77.84</td>
<td>62.02</td>
<td>67.51</td>
<td>42.70</td>
</tr>
<tr>
<td>5.</td>
<td>Net Profit/ (Loss) before Income Tax and dividend</td>
<td>147.463</td>
<td>1405.88</td>
<td>(52.29)</td>
<td>(149.84)</td>
</tr>
</tbody>
</table>

SALES PERFORMANCE

6.59 The Company achieved a total sale of 41054 tonnes of copper during the year 2000-2001. The Company is likely to achieve a total sale of around 45000 tonnes of copper during 2001-2002.
6.60 HCL is maintaining an internal energy audit system which monitors the energy consumption. The overall consumption of power has reduced from 3254 lakh KWH in 1998-99 to 2795 lakh KWH in 2000-2001, and overall consumption of fuel has reduced from 37,001 kilo litre in 1998-99 to 35,633 kilolitre in 2000-2001.

INFORMATION TECHNOLOGY
6.61 Networking at the corporate office was completed in May, 2001. Post Master software was installed at the Head Office for mail transfer. Networking in some of the units and offices was also taken up and completed during the year. The remaining offices and units will be taken up in a phased manner subsequently. Integrated system design and development is being carried out in a phased manner to standardize the programs and MIS reports in offices/units.

POLLLUTION CONTROL AND ENVIRONMENT
6.62 All the Units of HCL have been provided with effluent treatment facilities and attempts are being made for meeting regulatory norms, set by State Pollution Control Boards. The treated water is recycled for further use in plants. For controlling air pollution, HCL has commissioned double hood system of converters, gas cleaning plants, sulphuric acid plants and tail gas scrubbing plants.

INDUSTRIAL RELATIONS
6.63 The Industrial Relations situation in the Company was by and large peaceful. A notice under Section 25(O) of the Industrial Disputes Act, 1947 was sent to the Ministry of Labour, Government of India for seeking permission for the closure of the Ralkha Copper Project (RCP) w.e.f. 31.8.2001. There were 701 workmen on the rolls. As a sequel to the closure notice, the recognised trade union and other registered trade unions at RCP started holding gate meetings, dhumas etc. All the employees of RCP however, availed the Voluntary Retirement Scheme. RCP has ceased to be in operation since July, 2001.

WELFARE MEASURES INCLUDING WOMEN WELFARE
6.64 The Company is an equal opportunities employer. The Company maintains creche and special rooms for the women employees. The Company has taken steps to prevent any form of discrimination between employees on the basis of gender. In line with the decision of the Hon’ble Supreme Court, HCL has incorporated a special provision in the Conduct, Discipline and Appeal Rules for the prevention of sexual harassment of women workers at work place and for taking adequate punitive measures against such acts.

6.65 Special training programmes were conducted for SC/ST employees during the period under review to augment the technical skills and expertise of the employees. Vocational training programmes are being conducted for the rural men and women mostly belonging to Scheduled Castes, Scheduled Tribes and OBC under various developmental schemes. Hand gloves made by them are being purchased by the Company and these are used as safety appliances.

EMPLOYMENT
6.66 Table 6.9 gives the employment position in the Company as on 31.12.2001.

<table>
<thead>
<tr>
<th>Group of Post</th>
<th>No. of Employees</th>
<th>No.of SC</th>
<th>No.of ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>871</td>
<td>72</td>
<td>22</td>
</tr>
<tr>
<td>Group B</td>
<td>254</td>
<td>43</td>
<td>15</td>
</tr>
<tr>
<td>Group C</td>
<td>724</td>
<td>998</td>
<td>1005</td>
</tr>
<tr>
<td>Group D</td>
<td>1167</td>
<td>300</td>
<td>265</td>
</tr>
<tr>
<td>Total</td>
<td>9539</td>
<td>1413</td>
<td>1307</td>
</tr>
</tbody>
</table>

STATUS OF VOLUNTARY RETIREMENT SCHEME (VRS)
6.67 A Non plan loan of Rs14 crore was provided to the company during financial year 2000-2001 for separation of surplus employees through VRS. The company released 1954 employees by utilising the amount.

MOU RATING
6.68 Hindustan Copper Limited is an MOU signing Company and the rating for 2000-2001 is categorized as “Good”. Rating for the years 1998-1999 and 1999-2000 has been ‘Fair’ and ‘Very Good’ respectively.

D. BHARAT GOLD MINES LIMITED (BGML)
6.69 Bharat Gold Mines Limited (BGML) was incorporated as a Public Sector Undertaking on 1st April, 1972. BGML has been incurring losses since its inception except 1979-80 and 1980-81, when company made marginal profit because of the spurt in the prices of gold. The Company has ceased economic operations since October 2001. As on 31.3.2001, the net loss of the Company was Rs 53.25 crore and cash loss was 1.16 crore.

PRESENT STATUS
6.70 When the net worth of the company became negative, despite the efforts made by the Government of India to prevent the same through fiscal measures, BGML was referred to Board for Industrial and Financial Reconstruction (BIFR) in 1992. BIFR having considered the case for eight years and three reports of Operating Agency, passed the final order on 12.6.2000 concluding that it is just, equitable and in public interest to wind up BGML under section 20(1) of Sick Industrial Companies (Special Provisions) Act, SICA). 1985 and forwarded its opinion to High Court of Karnataka on 30.6.2000. The Appellate Authority (AAIFR) upheld the verdict of BIFR on the appeal filed by the employees of BGML vide their order dated 15.11.2000.


6.72 The Employees Union filed a number of Writ Petitions in High Court of Karnataka. The Hon’ble Single Judge Bench of High Court of Karnataka pronounced a verdict on 16.3.2001 disallowing the Writ Petition concerning VRS but quashing the Orders dated 12.6.2000 of BIFR, Orders dated 15.11.2000 of AAIFR, and Orders dated 29.1.2001 of the Ministry of Labour, Government of India. An appeal against the orders dated 16.3.2001 of High Court of Karnataka before the Division Bench was filed and stay obtained on the order of the Single Judge Bench. The matter is sub-judice.

PAYMENT OF SALARIES
6.73 The employees of BGML have not been paid salaries from March 2001 as BGML stands closed with effect from 1.3.2001 under Section 25(O) of the Industrial Disputes Act, 1947 in terms of Ministry of Labour, Government of India order dated 29.1.2001. However, the employees of BGML through one of the interlocutory applications to High Court of Karnataka asked for disbursement of salaries. The Division Bench of Karnataka High Court on 28.5.2001 passed an interim order directing for payment of salary for the month of March, 2001 as a stop gap arrangement on humanitarian grounds. As the undertaking stood closed from 1.3.2001, the order regarding payment of salary for March 2001, was not legally sustainable and based on legal advice in this regard, the same was challenged in the Supreme Court. The Supreme Court in its order dated 27.8.2001 directed that the amount equivalent to one month salary be paid as ad-hoc payment, to be treated as payment of salary or payment of benefits to the employees consequent upon the closure consistently with the final orders to be passed by the High Court. The decision of the Supreme Court has been implemented.

EMPLOYMENT
6.74 As on 31-12-2000, the total number of employees in the company was 3873, out of which 2051 were technical and 1822 were non-technical. When the orders of closure of the Industrial Undertaking BGML under the Industrial Disputes Act, 1947 and that of winding up of the Company BGML under SICA, 1985 were challenged in the High Court of Karnataka by the employees, and stay was obtained from a single judge Bench, a total of 3544 employees had remained on the rolls of the Company.
E. MINERAL EXPLORATION CORPORATION LIMITED (MECL)

6.75 The Mineral Exploration Corporation Limited (MECL) was set up on 21.10.1972 under the administrative control of the Department of Mines to undertake detailed systematic mineral exploration and allied works to establish reserves of various minerals/ores in the shortest possible time to curtail the gap between the discovery of a prospect and its eventual exploitation. The Corporation has been carrying out these functions by steadily enlarging its volume and scope of activities during the last 29 years and has so far established 108,394 million tonnes of mineral reserves up to December 2001, in different states of the country. The Company's registered office is at Nagpur, Mahanashtra, and zonal offices are located in Ranchi, Nagpur, Hyderabad, Neyveli and Barmer. To promote the commercial activities, commercial centres also function at Delhi and Kolkata. The Government of India has decided that the disinvestment process in Mineral Exploration Corporation Limited (MECL) will be taken up in 2002-2003.

PHYSICAL PERFORMANCE

6.76 MECL is the premier exploration agency in the country. It carries out promotional exploration activities on behalf of the Government of India and also contractual exploration on behalf of other agencies including public and private sector and the state Governments as per contract executed by MECL with them. It has been decided to take up the process of disinvestment of the Company in the year 2002-2003.

TABLE 6.10

<table>
<thead>
<tr>
<th>Items</th>
<th>1999-2000</th>
<th>2000-2001</th>
<th>Target for 2001-02 (Revised)</th>
<th>Actual in 2001-02 (Up to Dec 01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling (Metres)</td>
<td>2,14,546</td>
<td>1,51,647</td>
<td>1,96,000</td>
<td>1,20,466</td>
</tr>
<tr>
<td>Mining (Metres)</td>
<td>6,424</td>
<td>5,888</td>
<td>5,200</td>
<td>2,529</td>
</tr>
</tbody>
</table>
| Financial Performance of MECL

6.77 The performance of drilling, mining and the geological reports is at Table 6.10.

TABLE 6.11

<table>
<thead>
<tr>
<th>Items</th>
<th>1999-2000</th>
<th>2000-2001</th>
<th>Target for 2001-02 (Revised)</th>
<th>Actual in 2001-02 (Up to Dec 01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>61.68</td>
<td>59.95</td>
<td>63.50</td>
<td>39.96</td>
</tr>
<tr>
<td>Operating Cost</td>
<td>54.73</td>
<td>52.10</td>
<td>54.03</td>
<td>38.53</td>
</tr>
<tr>
<td>Interest</td>
<td>6.22*</td>
<td>6.80</td>
<td>8.06</td>
<td>5.70</td>
</tr>
<tr>
<td>Depreciation &amp; amortisation</td>
<td>2.72</td>
<td>2.29</td>
<td>3.25</td>
<td>2.85</td>
</tr>
<tr>
<td>Net profit before income tax &amp; dividend</td>
<td>1.33,62</td>
<td>1.96,06*</td>
<td>1.33,34</td>
<td>1.79,12**</td>
</tr>
</tbody>
</table>

* After prior period adjustment, write off etc.

SURVEY AND EXPLORATION

6.79 The details of the survey and exploration done by MECL have been enumerated in Chapter IV. During the year 2001-2002 (From April 2001 to December 2001), MECL has carried out exploration for copper ore in Singhana blocks of Khetri copper belt, Rajasthan, Pachehkham block, Sikkim and Garhi-Dongri/Shitalpals blocks of Malanjkhand copper belt, Madhya Pradesh, under promotional programme.

Ô Khetri Copper Belt, Rajasthan

In Khetri area, the exploratory drilling and associated geological, survey and analytical work has been carried out by MECL in Singhana block (Phase-I). The geological report of the block was submitted in August 2001. A total of 3.48 million tonnes of ore reserves with 0.89% Cu have been estimated in Singhana Extension block (Phase-I) over a strike length of 900 metres. Work in Singhana Extension block-II has commenced in February 2001, and up to December, 2001 a total drilling of 2147 metres has been completed.

Ô Upper Pachehkham Block, Sikkim

MECL commenced exploration in the block in June 2001. A total of 575.25 meters of drilling has been completed in 5 closed and 1 running borehole up to December 2001.

Ô Malanjkhand Copper Belt, Madhya Pradesh

In Malanjkhand area, MECL has carried out exploration work in Garhi-Dongri block, Kurfi-Ghat, Pipirdhar South & Pipirdhar East and Sitalpals blocks during 2001-2002. In Garhi Dongri Block, promising results of gold have been obtained in trenches, which require further probing. In Kurfi-Ghat, Pipirdhar South and East, exploration was completed in July 2001, and results at shallow depth were not very promising. Exploration work in Sitalpals is continuing.

POLLUTION CONTROL AND ENVIRONMENT

6.80 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 exploration 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.

INFORMATION TECHNOLOGY

6.81 The computerized processing of exploration data of 36 blocks of coal, lignite, copper, bauxite, nickel etc. consisting of online database creation, numerical modelling, geological modelling and variographic modelling for analyzing the directional variability was done. Detailed information such as surface topography, lithology boundaries, infra, mine workings, section line etc. were captured from geological plans, topography, geophysical logs etc. by converting into vector data by using autocad map software. The digital information was synthesized and integrated in the main data base for carrying out the modelling application.

6.82 Preparation of Ground Water Prospects Maps under Rajiv Gandhi National Drinking Water Mission Project awarded by National Remote Sensing Agency, Hyderabad was done for total of 30 maps pertaining to the states of Andhra Pradesh, Madhya Pradesh and Rajasthan. The variables that control the ground water regime such as geology/lithology, geological structures, geomorphology, recharge conditions etc. was interpreted from satellite data. This was integrated with the field data collected on rainfall, water table fluctuation, well yield etc. and composite ground water prospects map was prepared in digital and analog form.

6.83 To keep pace with the modern technology in mineral sector and also to meet future challenges, Arc/Info version 8.0.2. NT was purchased and successfully made operational. Extensive usage of the in house facility available for Image processing work connected with remote sensing projects was done. Further, a comprehensive data of textual and graphical content, digital maps were compiled, synthesized and integrated.
EXPANSION & DIVERSIFICATION

6.84 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:

(a) A total of 47 offers were submitted up to December 2001.
(b) A total of 16 work orders valued at Rs 658.46 lakhs, were received from various agencies up to December 2001.

(c) Agreement signed with:
   Ø Uranium Corporation of India Ltd. for mine development work in Khundungri East in Decline Mines at Narwapahar and for 200 m drive and allied work at 2nd level in Khundungri block mine at Narwapahar.
   Ø Bisra Stone Lime Company (BSLC) for purchase of rejected stone from BSLC mines at Birmitrapur.
   Ø South Eastern Railway, Chakradharpur for supply, delivery, stacking & loading of hard stone machine crushed ballast at Biramitrapur depot.
   Ø WSIL for supply of mineral sand.

WELFARE MEASURES INCLUDING WOMEN WELFARE

6.85 MECL is an equal opportunities employer. MECL has given due importance to meet socio-economic needs of the tribals and minorities communities living in and around each camp/project sites.

EMPLOYMENT

6.86 Table 6.12 shows the employment position in the Company as on 31.12.2001.

<table>
<thead>
<tr>
<th>Employment of Personnel in MECL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
<td><strong>Number Of Employees</strong></td>
</tr>
<tr>
<td>A</td>
<td>343</td>
</tr>
<tr>
<td>B</td>
<td>38</td>
</tr>
<tr>
<td>C</td>
<td>2018</td>
</tr>
<tr>
<td>D</td>
<td>161</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2560</td>
</tr>
</tbody>
</table>

JOINT SECTOR UNDERTAKINGS

BHARAT ALUMINIUM COMPANY LIMITED (BALCO)

Introduction

6.87 Bharat Aluminium Company Limited (BALCO) was incorporated on 27th November, 1965 as a Central Public Sector Undertaking with an integrated Alumina/Aluminium Complex at Korba in the district of Korba (Chhattisgarh). The Alumina Plant has 200,000 tonnes per annum (TPA) capacity and is based on Hungarian Technology. The Aluminium Smelter of 100,000 TPA capacity is based on Soviet Technology. The downstream facilities of Balco include capacity to produce 35,000 TPA of properzi rods, 40,000 TPA of roller products, 7,000 TPA of extrusions and 18,000 TPA of billets and slabs etc.

6.88 The Government of India disinvested 51% equity in 2000-2001. With the disinvestment of 51% equity, along with the management control in favour of M/s. Sterlite Industries (India) Limited with effect from 2nd March, 2001, BALCO has ceased to be a public sector undertaking.

6.89 Developments in BALCO post-disinvestment

Ø During 2001-2002 (up to December, 2001) BALCO produced 46119 tonnes and sold 42943 tonnes of aluminium metal.

Ø No retrenchment of any workmen in the Company after disinvestment has taken place.

Ø Long term wage settlement, pending since 1.4.1999, was concluded amicably by the first week of October, 2001. More than 20% increase in the emoluments of workmen has taken place and the agreement is valid for 5 years from 1.4.1999.

Ø Induction of international experts to de-bottleneck and improve production, productivity, work practice, etc. have taken place.

SIKKIM MINING CORPORATION (SMC)

6.90 The Sikkim Mining Corporation (SMC) was established under the proclamation of then Darbar Sikkim dated 27th February, 1960, as a joint venture of Government of Sikkim and Government of India with equity Share Capital ratio of 51:49 for exploration and exploitation of mineral deposits of the State. SMC since its inception was with the
INTRODUCTION

7.1 In the context of economic liberalisation, to improve the competitiveness and productivity of the mineral and non-ferrous metal sectors, the necessity of continuous upgradation of existing technology and introduction of new technologies is evident. With this in focus, the Department of Mines has been orienting the Science and Technology (S&T) Programme from time to time.

7.2 In Ninth Five Year Plan the selection of projects has been guided by national, industrial and public sector requirements. The projects based on national requirements are funded through grant-in-aid from the Department of Mines. The projects based on industrial requirement, are financed through the contributions from the Government, beneficiaries and the implementing organisations. The projects based on public sector requirements are financed through their internal resources. The emphasis has been on application of advanced process control technologies for improving efficiency and reducing cost of operations, reducing energy consumption, waste reduction in mining and mineral processing and also utilisation of low grade ores. The S&T project “Advanced Process Control and Optimisation Technology for Mineral Processing Plants” will improve significantly the efficiency of the grinding and flotation circuits at HZL mines. The outputs of the project, on completion will be beneficial for other mineral processing and also utilisation of low grade ores. The S&T project “Advanced Process Control and Optimisation Technology for Mineral Processing Plants” will improve significantly the efficiency of the grinding and flotation circuits at HZL mines. The outputs of the project, on completion will be beneficial for other mineral processing and also utilisation of low grade ores.

7.3 In the Tenth Five Year Plan the project selection will be based on national requirement to build up further the capabilities and strengths of the mineral and non-ferrous metal industries. The emphasis will be on multi-disciplinary, multi-organisational projects catering to the national requirements.

FINANCIAL OUTLAY

7.4 The outlay for Science & Technology programme was Rs 9.0 crore (budget support Rs 5.5 crore) for 2001-2002. This was revised to Rs8.0 crore (budget support Rs 4.5 crore) in revised estimate 2001-2002.
7.14 The consultancy work in the field of occupational hygiene involved air-borne respirable dust studies which includes source monitoring studies, personal sampling near working places, and (iv) study the techniques and trends of processing the slabs with a view to collate all information on the differences or sophistication in the processing techniques that are instrumental in reducing the waste in processing, enhancing the value of the product. The project has been completed and the final report is under preparation.

7.13 Consultancy project work in the field of occupational health involves periodic medical examination of miners, which includes evaluation of chest x-rays for pneumoconiosis, lung function test and audio-visual tests. 300 miners from three limestone mines, one magnesite mine and one gold mine were examined. The statutory requirements of the Director General Mine Safety (DGMS) were met by these examinations in following companies:-

Ø M/s Madras Cement Limited, Vedru Nagar, Tamil Nadu,
Ø M/s India Magnesia Products Limited, Salem, Tamil Nadu,
Ø M/s Madras Cement Limited, Alathiyar Works, Tamil Nadu,
Ø M/s Hutti Gold Mines Limited, Karnataka.

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Ø M/s India Magnesia Products Limited, Salem, Tamil Nadu,
Ø M/s Madras Cement Limited, Alathiyar Works, Tamil Nadu,
Ø M/s Hutti Gold Mines Limited, Karnataka.
breathtaking zone of the workmen, free silica analysis using fourier transmission infra-red-spectro-photometer, noise vibration and illumination studies. Four iron ore mines, two limestone mines and one bauxite mine of companies were covered.-

Ø National Aluminium Company, Damajodi, Orissa
Ø M/s Zuari Cements Limited, Yerraguntla, Cuddapah, A. P.
Ø M/s Domnalai Iron Ore Project, NMDC, Hospet, Karnataka.
Ø M/s Madras Cement Limited Vijayawada, Andhra Pradesh.
Ø M/s Bailadila Iron Ore Project, NMDC, Bachel, Chattisgarh.
Ø M/s Bailadila Iron Ore Project, NMDC, Kinarudh, Chattisgarh.

1.5 The studies carried out have helped in evaluating prevailing work environment and to meet the statutory requirements of DGMS. On the basis of these studies, NIMH recommended specific modifications to the concerned industries for reduction in dust and noise level exposure. The industries have accepted and implemented the modifications.

1.6 The budget estimate for the year 2001-2002 was Rs 50 lakh. Till 31st December, 2001 the institute earned Rs 5.74 lakh as revenue. Till 31st March, 2002 a revenue generation of Rs 8 lakh is envisaged.

OTHER RESEARCH AND DEVELOPMENT PROJECTS

(A) Technology Proving Plant for extraction of nickel from chrome overburden of Sukinda Valley - HZL, CSIR.

1.7 The country’s requirement of nickel is met fully through import of metal. Only known deposit in the country is in Sukinda Valley. To extract nickel from the chrome overburden generated during mining of chrome ore in Sukinda Valley, a process route was developed jointly by the Department of Mines and the Council for Scientific and Industrial Research (CSIR). To verify the critical parameters of the process, a 10 tonnes per day ore throughput pilot plant was set up at Regional Research Laboratory, Bhubaneswar at a cost of Rs 10.50 crore jointly by HZL and CSIR. The expenditure was shared equally. The feasibility of extracting nickel from COB has been established. Nowhere in the world nickel with such a low concentration (0.6%) has been extracted from similar ores. HZL has transferred its right to the use of technology to National Aluminium Company Limited. The actual expenditure incurred by HZL will be reimbursed by NALCO and an agreement has been signed to this effect. NALCO will proceed further to establish the techno-economic viability of the process.

(B) Extraction of Magnesium from Indigenous Raw Materials, National Metallurgical Laboratory, Jamshedpur.

1.8 The project was approved in December, 1997 at a cost of Rs 229 lakhs. The objective is to develop independently a silico-thermic reduction process for magnesium production on the lines of magne-silica process which undoubtedly is superior to the pyro-processing. The demonstration of 100 Kgd/day production of magnesium metal and the evaluation of the techno-economic processes of the project to assist further scale up to the commercial scale are aimed at. The pilot plant was scheduled for commission by end of January, 2002, although the pilot plant campaigns will continue till 31st March, 2002. The results will help in reducing the cost of production of magnesium metal in the country.

(C) Advanced Process Control And Optimisation Technology For Mineral Processing Plants - Tata Research Development and Design Centre, Pune, Hindustan Zinc Limited, Regional Research Laboratory, Bhopal.

1.9 The project was approved in December, 1997 at a cost of Rs 281 lakhs. The project has a specific target of achieving one per cent improvement in lead and zinc metal recovery (individually) at Aguapa concentrator of HZL. Additional benefits anticipated are (i) saving in consumption of re-agents, (ii) saving in energy consumption during grinding, (iii) lower variability in plant temperature and, (iv) smoother running of the plant resulting in saving in maintenance and break down costs. Grinding circuit instrumentation has been completed and handed over to HZL. Grinding circuit controller has been gone on line. The hardware and field instruments for control of flotation circuits have been commissioned. The controller of flotation circuit has been handed over to Hindustan Zinc Limited. From the preliminary observations, stable operations of the plant, reduced to cultivated load in grinding circuit and improved zinc recovery (from 87% to 90%) in the flotation circuit have been noticed. These are being established by the long run trials. The project is scheduled to be completed by June, 2002. The results will be applicable to other mineral processing plants also.

(D) Studies On Production Of Alloyed Pig Iron And Low Alloyed Steel/Stainless Steel Using Chromite Overburden from Sukinda, Orissa, MECON Ranchi.

1.10 The project was approved in 1998 at a cost of Rs 90 lakhs. The objective of the project is to use chrome overburden to produce a sinter of requisite quality for making low alloy pig iron through mini blast furnaces at Kalinga Iron Works, Barbil, Orissa. The blast furnace trials are likely to be completed by end of February, 2002. The project is likely to be completed by September, 2002. This route if successful will enable extraction of nickel present in COB waste being dumped at present. The additional advantage of this route is that there will be very little waste generation in production of low alloy steel, containing nickel. At present nickel present in COB waste is not extracted.


1.11 The project was approved in December, 1997 at a cost of Rs 94 lakhs. The objective of the project is to:-
Ø Identify and bring 3-D view of fractured zones/ore body within massive rock mass by transmission and reflection survey by electro-magnetic waves through drilled boreholes.
Ø Map on the surface the continuity of fractured zones/ore body encountered in a borehole using buried electrode method by simulating the sub-surface from the bottom of the borehole.
Ø Identify and delineate old working/void in metallic/chn-metallic mineral deposits by transmission and reflection, electro-magnetic surveys as well as by gravity method.
Ø The micro-gravity meter and resistivity meter have been procured and field data for Dona Gold Area has been collected. The upgradation of cross-hole tomography system already available with the company is in progress. The project is likely to be completed by the end of 2003. The results will help in reducing substantially the cost and time required for exploration.

(F) National Facility for Semi Solid Forming - Indian Institute of Science, Bangalore.

1.12 The project was approved in 2001 at a cost of Rs 409 lakhs. The objective of the project is to set up a national facility for semi solid forming at Indian Institute of Science, Bangalore to help the production of quality, aluminium auto components and later to be extended to other non-ferrous metals like Titanium, Magnesium, Zinc and metal matrix composites. The Memorandum of Understanding has been signed by the Department of Mines, Department of Science & Technology, Defence Research Development Organisation and Indian Institute of Science, Bangalore. The Vice-Chancellor, University of Hyderabad is the Chairman of Project Monitoring Committee (PMC) constituted to monitor smooth implementation of the project. The representatives of Department of Mines, Department of Science and Technology, Defence Research and Development Organisation (DRDO) and Materials Research Group, Vikram Sarabhai Space Research Centre, TVS Suzuki, SALCO Extrusion Limited, Hyundai Motors Limited, JNARDDC Nagpur, and Indian Institute of Science, Bangalore are the members of the PMC. Rs 50 lakh by Department of Mines, Rs 25 lakh by DRDO and Rs 15 lakh by Department of Science and Technology have been released as first instalment of the grant. The project is likely to be completed by the end of 2003.

Chapter - VIII

INTERNATIONAL CO-OPERATION

8.1 International co-operation continued to be a thrust area in the Department of Mines during the year 2001-2002. Concerted and continued efforts were made to project the mineral sector as an attractive investment destination. The International Co-operation Section of the Department played an active role in achieving this goal, the key objectives being to further strengthen areas of bilateral co-operation with countries where bilateral agreements already exist, and also to enter into fresh agreements with countries that are technology 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 three proposals involving Foreign Direct Investment to the tune of Rs 29 crore in the mining sector. This takes the total number of FIPB approvals to 70, indicating an expected FDI flow of Rs 3,965 crore.
8.2 The 15th Meeting of the Indo-French Working Group on Mineral Exploration and Development was held in New Delhi on 13-15 December, 2001. The meeting reviewed the status of the completed projects, 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 prioritized the following five projects for future cooperation besides training programmes, viz: (1) Supply of oceanographic equipment and technical and scientific assistance to the Indian programme of seaward investigations in the Indian Ocean; (2) Management of Solid Waste from Mining in India (Indian Bureau of Mines); (3) Implementation of United Nations Framework Classification for mineral resources management in India (IBM); (4) Capacity building at State Level for Mineral Development and Environmental Management; and (5) Modernisation of GSI facilities.

8.3 Agreements for two new projects viz., (1) Supply of one Electron Probe Microanalyser (EPMA) to Geological Survey of India; and (2) Supply of laboratory equipment for physico-chemical characterization of minerals to Indian Bureau of Mines, were also signed during the meeting on 13th December, 2001. The Working Group has emphasized the need for revival of the cooperation in the field of training with French grants. The Working Group also decided to depute officers for CESMAT training programme from GSI, IBM and interested Public Sector Undertakings.

BRGM has agreed to organize a Group Training Session in association with CESMAT, for a batch of 20 trainees in the field of environmental aspects related to mining activities.

8.4 The 15th Meeting of the Indo-French Working Group on Energy and Minerals. The meeting was held at Hotel Taj Mahal, New Delhi on 13-15 December, 2001. The meeting reviewed the progress of the joint venture between the Government of India and the Government of Vietnam on energy and minerals. It was therefore decided that the Department of Mines, Ministries of Coal, Power, Petroleum & Natural Gas and Department of Non-Convention Energy Resources would form the Indian Side for the Joint Working Group.

8.5 Australia has a highly developed and competitive mineral exploration and mining industry using advanced geological concepts and technology and has a comprehensive and high quality Geoscience knowledge base. The Indian industry in this area is comparatively less developed and successful. It is known to have the 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 manganese. Australia is one of the top six mineral producing countries for bauxite, gold, iron ore, lead, zinc, mineral sands and uranium.

8.6 The sixth meeting of the Indo-Australian Joint Ministerial Commission held on 26th February, 1999 at New Delhi reiterated the need to establish a Joint Working Group on Energy and Minerals. It was therefore decided that the Department 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.

8.7 The First Meeting of the India-Australia Joint Working Group on Energy and Minerals was held in Sydney, Australia on 10th April, 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. The Indian side advised of improved policies for investment in power, mining and petrol sector’s in India. The Australian side outlined their capabilities and technologies for minerals processing and coal handling and utilisation. The meeting suggested co-operation on existing coal ports study to assist in more efficient preparation of coal (blending and washing). Both sides also examined opportunities for cooperation in non-conventional energy sources.

8.8 The Second Meeting of the India-Australia Joint Working Group on Energy and Minerals was held in New Delhi on 23-24 May, 2001. The Department of Mines acted as the nodal Department in respect of this Working Group on the Indian side. The meeting reviewed the Protocol of the 1st Meeting of the Joint Working Group. The meeting also identified new project proposals in the fields of Mining, Petroleum & Natural Gas and Non-Conventional Energy Sources and decided to work together to develop the collaborative projects discussed during the meeting.

INDO-SOUTH AFRICAN CO-OPERATION

8.9 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, fluorspar, nickel, phosphates, etc. South Africa has an impressive track record of mineral development and holds great potential for meaningful and mutually beneficial co-operation in the mineral sector. Ever since diplomatic ties with South Africa have been established in November, 1993, the Department of Mines has been exploring the possibility of co-operation with South Africa as both countries have some geological similarities.

8.10 India and South Africa entered into an Agreement for co-operation in the field of Geology and Mineral Resources on the 7th October, 1997. For the implementation of this Agreement a Joint Working Group was formed in March, 1999, and the First Meeting of the Working Group was held at Johannesburg in August 1999 and a Protocol was signed in Cape Town on the 18th August, 1999, identifying six projects for mutual cooperation. The six projects identified for co-operation 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) Characterization and processing of gold, diamond and platinum group of metal ores and to evolve suitable beneficiation processes.

8.11 The 2nd Meeting of the Indo-South African Working Group on Geology and Mineral Resources was held in New Delhi in November, 1999 reviewed the progress of ongoing projects, and expressed satisfaction at the pace at which the projects and programmes were progressing. 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 chrome 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 an economically viable flow-sheet for extraction of gold from the gold ore by bioleaching methods; (6) Development of National Institute of Miner’s Health, Kolar; and (7) Application of Ground Penetration Radar for 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.

8.12 The Third Meeting of the Indo-South African Working Group on Geology and Mineral Resources was held in Pretoria, South Africa on 16-17 July, 2001. The JWG reviewed the implementation of the identified projects, and expressed satisfaction that some progress had been achieved in respect of several projects. Both sides agreed that there is excellent opportunity to further expedite the implementation of the projects, as these were clearly of mutual benefit to both countries and resolved to pursue more vigorously for the implementation of the identified projects.

VIETNAM

8.13 The 10th Meeting of the India-Vietnam Joint Commission held in Hanoi from 6th to 8th November, 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 18th April, 1994, for a further period of three years. Both sides discussed the progress of the joint venture between Hindustan Zinc Limited and VIGEGO. Vietnam for exploitation of gold deposits in Vietnam. The Vietnamese side also welcomed the Indian offer to involve Indian scientists in geological mapping, mineral exploration and prospecting activities in the mining sector of Vietnam. Both sides also agreed to cooperate in the expert exchange programme in the field of geology and mineral resources. Under ITEC programme of the Ministry of External Affairs, the Ministry of Mines organized a study tour for a four-member delegation from the Vietnam National Geos and Gold Corporation (VIEGO) to India. The study team visited various mining and mineral processing installations at Udaiarpur, Kolar Gold Fields, Laboratory and I-T Center of Mineral Exploration Corporation at Nagpur and the Diamond and Gems Development Corporation at Jaipur.

RUSSIA

8.14 The eighth session of the Indo-Russian Working Group on Ferrous and Non-Ferrous Metallurgy was held in New Delhi on 6th February, 2002. 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

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

MOROCCO

8.16 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 fields of Geology and Mineral Exploration. In the field of Geology, the cooperation will be particularly in computer processing, advanced laboratory techniques, 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

23-02-2015 16:14
assistance will also be provided to promote joint ventures between specialised organisations in the fields of Geology and Mining.

8.17 The Hon'ble Minister of Mines, Energy, Trade, Industry and Commerce of the Kingdom of Morocco visited India in 2001 and met the Hon'ble Minister of Mines and Hon'ble Minister of State for Mines. During these meetings the visiting dignitary expressed desire for strengthening the bilateral cooperation between the two countries in the mineral sector. He has outlined the fields such as (1) Cartography; (2) Training of Moroccan technical personnel in India; and (3) Geological mapping as their priority areas for mutual cooperation.

LAO-PDR

8.18 The Department of Mines participated in the 3rd India-Lao PDR Joint Committee Meeting held in Vientiane on 9th November, 2000. The Lao side offered to cooperate with the 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 impart training of scientific and technical personnel of Laos in exploration, mining and mineral processing.

CANADA

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

8.20 The Department of Mines participated in the 'Vancouver Cordilleran Exploration Round Up' organised by the British Columbia and Yukon Chamber of Mines held in Vancouver, Canada in 2001. The Department of Mines set up an Exhibition Booth and also organised a one-day Investors' Seminar concurrently with the Round Up.

Chapter - IX

PROGRESSIVE USE OF HINDI

INTRODUCTION

9.1 As per Article 343 of the Constitution, Hindi has been adopted as the Official language of Union of India. A Hindi section has been established in the Department of Mines to ensure the compliance and monitoring of Official Language Policy in the Department and in subordinate offices/PSUs under its control. The Department is continuously trying its level best to promote the progressive use of Hindi in official work as per the Official Language policy.

COMPLIANCE OF SECTION 3/3 OF OFFICIAL LANGUAGE (O/LA) ACT, 1963

9.2 During the period under review section 3(3) of Official Language Act, 1963 was fully complied with. All documents under this section e.g. General Orders, Notification, Resolution, Administrative and other reports etc. were issued bilingually. The Department prepared a RABHASHA SAHAJAYIK in the use of the Department and its subordinate offices/PSUs and Standard Drafts relating to the said section have been included in this publication.

HINDI TRAINING

9.3 Officers/employees are nominated under Hindi Teaching Scheme of MHA for training in Hindi, Hindi stenography and Hindi typing. More than 90 percent of the officers/employees of the Department have working knowledge of Hindi.

HINDI SALAHAKAR SAMITI

9.4 Hindi Salahakar Samiti is a high powered committee which reviews the progress made in the use of Hindi in the Ministries/Departments and in the subordinate offices/PSUs under their control. It also recommends effective measures to increase the use of Hindi and ensures the compliance of Official Language Policy. In order to accelerate the use of Hindi in the Department of Mines and its subordinate offices/PSUs a Hindi Salahakar Samiti has been reconstituted in the Department on 23.11.2000 and a meeting of this committee was held on 16 March, 2001.

HINDI FORTNIGHT

9.5 Hindi in Devnagri script was adopted as the Official Language of the Union on 14 September, 1949. Since then, 14th September is celebrated as Hindi Day every year. In order to propagate the Official Language of the Union in the offices of the Central Governments, Hindi Fortnight is celebrated every year. Department of Mines also organised the Hindi Fortnight from 1-9-2001 to 15-9-2001 and during this period various Hindi competitions were organised. This year, the prize-money for the first, second and third consolation prizes was respectively increased to Rs 1500, Rs 1200, Rs 1000 and Rs 500 respectively. A prize distribution function was organised in the Department on 11th January, 2002 in which certificates and prizes were given away to the runners of the competitions held during the Hindi Fortnight.

MEASURES FOR IMPLEMENTATION OF OFFICIAL LANGUAGE POLICY

9.6 It is the policy of the Government to propagate the use of Hindi through inspiration and incentive. In order to inspire and encourage the officers/employees of the Department to do their work in Hindi, various Cash award Schemes of Department of Official Language such as Hindi Noting and Drafting Scheme, Hindi Dictation Scheme and Hindi Incentive Allowance Scheme were implemented. Eight employees of the Department were given Cash Awards under the Hindi Noting and Drafting Scheme.

9.7 An Official Language Implementation Committee has also been constituted in the Department and during the year 2001-02, the meetings of this committee were held as per schedule. In these meetigs the progress made in the use of Hindi was reviewed and measures were adopted to achieve the targets fixed for various items in the Annual Programme for the year 2001-02 issued by the Department of Official Language.

9.8 For achieving the annual targets fixed for the use of Hindi by the Department of Official language, sections of the Department were inspected and remedial measures were suggested to overcome the shortcomings noticed.

MEASURES ADOPTED BY THE DEPARTMENT OF MINES TO PROPAGATE THE USE OF HINDI IN ITS SUBORDINATE OFFICES/PSUs

9.9 In order to ensure the compliance of Official Language policy in subordinate offices/PSUs of Department of Mines, directions were issued to them by the Department from time to time and their work was duly reviewed by the Department.

9.10 The subordinate offices/PSUs of the Department of Mines have their respective Hindi Sections and they are making their best efforts for implementing the Official Language policy of the Union.

9.11 Official Language Implementation Committee under the chairmanship of the Head of the Office has been set up in all the subordinate offices/PSUs of the Department of Mines. The meetings of these committees were held regularly during the year under review.

9.12 In order to assess the progress made in the use of Hindi in official work 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 Department. The reports were reviewed and shortcomings noticed during the review were intimated to the concerned offices and remedial measures suggested to overcome the same.

9.13 In order to assess the use of Hindi in Subordinate Offices/Undertakings of the Department of Mines, Officers of the Department of Mines inspected National Aluminium Company Limited, Bhubaneswar and Smelter Plant and Captive Power Plant, Angul, Geological Survey of India, Kolkata, Hindustan copper Limited, Kolkata, Indian Bureau of Mines, Nagpur; MBECL, Nagpur; J.N.A.R.D.D.C., Nagpur and Geological Survey of India (Regional Office), Nagpur. The shortcomings noticed during the inspection were intimated to the concerned offices and remedial measures suggested to overcome the same.

INSPECTION BY THE THIRD SUB-COMMITTEE OF THE PARLIAMENTARY COMMITTEE ON OFFICIAL LANGUAGE

9.14 The third sub-committee of the Parliament on Official Language inspected the Department of Mines on 20.6.2001. The committee noted that the progress of Hindi in the Department was satisfactory. The said committee also inspected a subordinate office of the Department viz. Indian Bureau of Mines, Bangalore and an undertaking of the Department viz. NALCO, Vishakhapatnam.
INSPECTION OF THE SECTIONS OF THE DEPARTMENT OF MINES

9.15 In order to assess the use of Hindi, Deputy Director (OL) and Assistant Director (OL) inspected 12 Sections out of the 18 Sections of the Department during the period under review.

ORGANISATION OF HINDI WORKSHOP

9.16 The Department of Mines, its 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.

REDESSAL OF PUBLIC GRIEVANCES

10.2 In pursuance of the instructions and guidelines issued on 1st March, 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 Department 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 Department. Whenever a grievance is found to be genuine, directives for appropriate corrective measures are given to the concerned executive authorities.

10.3 The Ministry of Coal & Mines, Department of Mines has under its administrative control two subordinate offices and five 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 Undertaking and Subordinate Offices to the Department. These reports are, in turn, sent to the Department of Administrative Reforms and Public Grievances. During the year 2001-2002 (upto December, 2001), 24 cases were received, out of which 12 cases have been disposed of. In addition, as per instructions of the Department of Personnel & Training, periodic inspections are also conducted of the working of the Public Grievances Redressal Machinery in the five Public Sector Undertakings and the two sub-ordinate offices viz. (GSI & IBM) under the administrative control of the Department. The grievance cases are also being reviewed by Secretary (Mines) in Quarterly Performance Review Meetings of these organisations.

10.4 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 Department and the subordinate offices including the five PSUs under its administrative control had accordingly designated such Staff Grievance Officers also.

Annexure I

Annexure II

PRODUCTION OF SELECTED MINERALS, 1997-98 TO 2001-02

<table>
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<td>Value</td>
<td>Value</td>
<td>Value</td>
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<td>Value</td>
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<td>ALL MINERALS</td>
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<td>Liquids</td>
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Value in Rs crore
### Annexure II (Contd.)

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<td><strong>Tonnes</strong></td>
<td>Value</td>
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<td>Total</td>
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### Annexure III

### EXPORTS OF ORES & MINERALS 1995-96 TO 1999-2000

#### Value in Rs crore

<table>
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<th></th>
<th></th>
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<tr>
<td><strong>M.T.</strong></td>
<td><strong>Coal</strong></td>
<td>Value</td>
<td><strong>Qnty.</strong></td>
<td>Value</td>
<td><strong>Qnty.</strong></td>
<td>Value</td>
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</tbody>
</table>

**Note:**
- M.T. — Million tonnes
- M.C.M. — Million cubic metre
- Kg — Kilogram
- ** — Negligible
- (P) Provisional and based on monthly returns to the extent available with IBM.
- * Excludes the production of fireclay, if any recovered incidental to coal mining.
- (R) — Previous years figures repeated as current data have not been received yet.

**Source:**
- (a) Coal and Lignite : Coal Controller, Kolkata
- (b) Petroleum (crude) and Natural Gas : Ministry of Petroleum & Natural Gas, New Delhi
- (c) Minor Minerals : State Governments
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<tr>
<th>Annual tonnages</th>
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<td>Nickel</td>
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<tr>
<td>Borax</td>
<td>266800</td>
</tr>
<tr>
<td>Asbestos</td>
<td>192000</td>
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<tr>
<td>Barite</td>
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**Note:** Quantity figures are not given due to partial coverage. Value figures have full coverage.

NESL. Not Elsewhere Specified.
Annexure IV

IMPORTS OF ORES & MINERALS 1995-96 TO 1999-2000

<table>
<thead>
<tr>
<th>Value in Rs Crore</th>
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<tbody>
<tr>
<td>All minerals</td>
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<td>Quantity</td>
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</tr>
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<td>1995-96</td>
</tr>
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<tr>
<td>1999-2000</td>
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<tr>
<td><strong>Grand Total</strong></td>
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Annexure V

PERFORMANCE OF GSI

| Sl. No. | Name of the Scheme/Programme | Achievements
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<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Programme 2003-2004</td>
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I. MINERAL EXPLORATION

(i) Large Scale Mapping (sq.km.)

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<tbody>
<tr>
<td>1</td>
<td>1774.97</td>
<td>2240.41</td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>1,03,894</td>
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II. SURVEY & MAPPING

(a) Ground Survey

(i) Systematic Geol. Mapping (sq.km.)

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<thead>
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<tr>
<td>4</td>
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<td>5</td>
<td>5764.60</td>
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(b) Aerial Survey

(i) Multisensor/Aeromagnetic Survey

<table>
<thead>
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<tbody>
<tr>
<td>6</td>
<td>18,000</td>
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(c) Marine Survey

(i) Territorial water (coastal launches) (sq km)

<table>
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<tbody>
<tr>
<td>7</td>
<td>4300</td>
<td>3960</td>
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* Upgradation of TOASS
+ Parametric studies were carried out. Data presented in tables A and B

Annexure V (Contd.)

A. Coverage by R.V. Samudra Manthan

| Sl. No | Name of the Scheme/Programme | Achievements
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Programme 2003-2004</td>
</tr>
</tbody>
</table>

1. Parametric studies carried within EEZ

(i) Bathymetry (Lkm)

<table>
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<tr>
<th>Sl. No</th>
<th>Target</th>
<th>Achievement</th>
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<tbody>
<tr>
<td>8</td>
<td>14,510</td>
<td>13,839</td>
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(ii) Magnetic (Lkm)

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<tr>
<td>9</td>
<td>4,000</td>
<td>3,287</td>
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(iii) Sample stations (nos.) (grab/core/dredge/water)

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<tr>
<td>10</td>
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2. Parametric studies beyond EEZ

(i) Bathymetry (Lkm)

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(ii) Magnetic (Lkm)

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<td>12</td>
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(iii) Sample stations (nos.) (grab/core/dredge/water)

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<th>Sl. No</th>
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<td>13</td>
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B. Coverage by Coastal Launches

| Sl. No | Name of the Scheme/Programme | Achievements
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1. Parametric studies carried within TW

(i) Bathymetry (Lkm)

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<tr>
<th>Sl. No</th>
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<tbody>
<tr>
<td>14</td>
<td>2,488</td>
<td>2,449</td>
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Geological Survey of India/Department of Mines http://www.mines.nic.in/writereaddata/Filelinks/272f753_REPORT.HTML
<table>
<thead>
<tr>
<th>No</th>
<th>Shallow seismic/sub-bottom (km)</th>
<th>1,000</th>
<th>1,007</th>
<th>2,000</th>
<th>3,000</th>
<th>5,000</th>
<th>10,000</th>
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<tbody>
<tr>
<td>1</td>
<td>Shallow seismic (km)</td>
<td>1,696</td>
<td>1,207</td>
<td>2,888</td>
<td>2180.01</td>
<td>3320</td>
<td>486</td>
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<tr>
<td>2</td>
<td>Side Scan Sonar (km)</td>
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<td>1,210</td>
<td>--</td>
<td>--</td>
<td>1070</td>
<td>--</td>
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<tr>
<td>3</td>
<td>Magnetic (km)</td>
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<td>323</td>
<td>448</td>
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<td>280</td>
<td>154</td>
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<td>1198</td>
<td>1351</td>
<td>130</td>
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<td>5</td>
<td>Current observations (nos.)</td>
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<td>72</td>
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*Geological Survey of India/Department of Mines*

http://www.mines.nic.in/writereaddata/Filelinks/272ff753_REPORT.HTML