

## Coal Exploration & Resources

### 3.1 Introduction

Exploration for coal in the country is carried out in two broad stages i.e. the Regional Exploration and Detailed Exploration. The regional exploration for coal is carried out by the Government organizations whereas detailed exploration is largely undertaken by coal companies.

#### 3.1.1 Regional and Promotional Exploration

In the first stage of exploration, Geological Survey of India (GSI, under Ministry of Mines) undertakes regional exploration of large areas to find out the broad availability of coal seams, geological structure, resource etc. on a systematic routine basis. In order to supplement and augment the efforts of the GSI, Ministry of Coal (MoC) is also undertaking regional exploration of coal on promotional basis. A central sector scheme of Promotional Exploration of Coal and Lignite has been introduced in 1989 and is continuing on plan-to-plan basis through Mineral Exploration Corporation (MECL), GSI and CMPDI. DGM (Nagaland & Assam) has also been inducted in the scheme. The reconstituted Committee-V (on Energy Minerals & Resources) of Central Geological Programming Board approves the programmes, coordinates and reviews the work. CMPDI acts as a nodal agency for disbursement of funds for Promotional Exploration besides carrying out technical supervision of MECL's work in coal sector. The Promotional Exploration programme

for XI plan envisages to undertake 7.50 lakh metre of drilling (4.0 lakh metre in coal and 3.5 lakh metre in lignite) along with sub-components of creation of coal & lignite information system and CBM studies.

Besides, preparation of coal and lignite data base has also been undertaken during X Plan under funding from Ministry of Coal under promotional exploration which is continuing in the XI Plan as well.

#### 3.1.2 Detailed Exploration

In the second stage, Detailed Exploration is carried out in potential areas identified through Regional/Promotional Exploration. Such blocks are taken up for detailed drilling and geological assessment to bring the reserves into Proved category to increase the confidence level. The Geological Reports of such detailed exploration form the basis of Mine Feasibility Studies/Mining Plans and formulation of Project Reports for mining and updation of National Coal Inventory. Detailed exploration in areas of coal PSUs is funded by respective companies whereas some of the Captive Mining block allocatees are also funding detailed drilling in blocks allotted to them. In addition, the MoC's Plan scheme of Detailed Drilling in Non-CIL/Captive Mining Blocks aims at covering exploration of coal blocks in order to reduce time lag between allotment and development of blocks. The scheme is continuing on plan-to-plan basis. It is

envisaged to undertake 13.50 lakh metre of drilling in Non-CIL blocks during the XI Plan through CMPDIL as well as through outsourcing.

### **3.1.3 Guidelines for conducting Detailed Exploration of captive coal blocks by the block allottees**

All regionally explored/unexplored coal blocks already allotted or to be allotted can be taken up for detailed exploration by the allottees on their own as per these guidelines. The detailed guidelines are available in the website of Ministry of Coal.

## **3.2 Exploration Activities in 2010-11**

### **3.2.1 Promotional Exploration**

A total of 1,55,000 metre of Promotional drilling has been targeted in 2010-11. As against these targets, a total of 73,325 metre of promotional drilling has been carried out during the period April to December 2010 covering 22 coal and 9 lignite blocks. It is projected that about 30,000 metre of additional drilling would be achieved during the period Jan. - March, 2011.

**3.2.2** Many boreholes drilled for promotional exploration have been logged geophysically and a total of 56,916 metre of multi-probe Geophysical Logging has been carried out during the period April to December 2010. It is projected that about 15,000 metre of additional logging would be achieved during the period Jan. - March, 2011. A total of 8 Geological Reports on coal (5) and lignite (3) exploration have been submitted during April to Dec. '10. One Environmental study report has also been submitted during this period.

**3.2.3** CMPDI and GSI have completed samples collection from eleven boreholes for CBM studies under the promotional exploration programme. The analysis of samples and preparation of one report is under progress. It is projected that samples from two more boreholes would be collected during the period January-March, 2011.

**3.2.4** Under the project on creation of Integrated Coal Resource Information System (ICRIS) by CMPDI & SCCL, the work on map data capture is progressing. During the period April 2010 to December 2010, the map data capture of 1656 maps has been finalized and work completed. Integration of survey of 33 blocks has been brought to a single origin. Processing of data for creation of Geological models is in progress and 6 models of zones have been prepared. The consultancy for design & integration of database (RDBMS) for the ICRIS data has been awarded through tendering and work started from Nov. 2010. It is projected that, during January-March 2011, survey integration of 15 more blocks would be completed and RDBMS design structure would be generated. For similar project on creation of Integrated Lignite Resource Information System (ILRIS) by NLC, 15 number of Exploration reports were uploaded to server and geological modelling of 12 blocks have been completed during April 2010 to December 2010. Compilation of seasonal reports of CGM/Gujarat for creation of database is under progress.

### **3.2.5 Detailed Drilling in Non-CIL Blocks**

In 2010-11, a total of 1,84,555 metre of detailed drilling has been targeted in Non-CIL/Captive Mining blocks. Out of it, 74,555 metre is targeted for CMPDI

(departmentally) and 1,10,000 metre through outsourcing. During the period April 2010 to December 2010, a total of 1,75,499 metre of detailed drilling has been carried out in Non-CIL/Captive Mining blocks. Out of it, 43,563 metre has been drilled through departmental resources in seven blocks and 1,31,936 metre of drilling has been carried out through outsourcing in eleven blocks. It is projected that about 75,000 metre of additional drilling would be achieved in Non-CIL blocks during January-March, 2011.

**3.2.6** CMPDI has decided to outsource seven more blocks, involving 4.37 lakh metre of detailed drilling, through open tendering. This includes four Non-CIL blocks involving 3.07 lakh metre of drilling. Bids have been received after re-tendering and tender is under finalization.

### 3.2.7 Coal Core Analysis Capacity Augmentation

The scheme for expansion of coal core

analysis capacity by Central Institute of Mining and Fuel Research (CIMFR) for quality evaluation of coal cores explored from different region of India in XI plan has been approved by EFC, through CIL funding. Various meetings had been held and draft expansion proposals discussed. The final proposal submitted by CIMFR is under consideration CIL.

## 3.3 Coal Resources

### 3.3.1 Inventory of Geological Resources of Coal in India

As a result of exploration carried out up to the maximum depth of 1200m by the GSI, CMPDI, SCCL and MECL etc, a cumulative total of 276.81 billion tonnes of Geological Resources of Coal have so far been estimated in the country as on 1.4.2010. The details of state-wise geological resources of coal are given as under:

(in Million Tonnes)

| State             | Geological Resources of Coal |           |          |        |
|-------------------|------------------------------|-----------|----------|--------|
|                   | Proved                       | Indicated | Inferred | Total  |
| Andhra Pradesh    | 9257                         | 9730      | 3029     | 22016  |
| Arunachal Pradesh | 31                           | 40        | 19       | 90     |
| Assam             | 348                          | 36        | 3        | 387    |
| Bihar             | 0                            | 0         | 160      | 160    |
| Chhattisgarh      | 12441                        | 30230     | 4011     | 46682  |
| Jharkhand         | 39633                        | 30992     | 6338     | 76963  |
| Madhya Pradesh    | 8505                         | 11267     | 2216     | 21988  |
| Maharashtra       | 5360                         | 2984      | 1964     | 10308  |
| Meghalaya         | 89                           | 17        | 471      | 577    |
| Nagaland          | 9                            | 0         | 307      | 316    |
| Orissa            | 21507                        | 32074     | 12726    | 66307  |
| Sikkim            | 0                            | 58        | 43       | 101    |
| Uttar Pradesh     | 866                          | 196       | 0        | 1062   |
| West Bengal       | 11752                        | 13030     | 5071     | 29853  |
| Total             | 109798                       | 130654    | 36358    | 276810 |

(Source: Geological Survey of India)

The next inventory of coal resources would be prepared in April 2011 and would be available on 1<sup>st</sup> May 2011.

### 3.3.2 Categorization of Resources

The coal resources of India are available in older Gondwana Formations of peninsular India and younger Tertiary formations of north-eastern region. Based on the results of Regional/ Promotional Exploration,

where the boreholes are normally placed 1-2 Km apart, the resources are classified into 'Indicated' or 'Inferred' category. Subsequent Detailed Exploration in selected blocks, where boreholes are less than 400 meter apart, upgrades the resources into more reliable 'Proved' category. The Formation-wise and Category-wise coal resources of India as on 1.4.2010 are given in table below:-

| Formation      | Proved | Indicated | Inferred | Total  |
|----------------|--------|-----------|----------|--------|
| Gondwana Coals | 109320 | 130564    | 35559    | 275443 |
| Tertiary Coals | 478    | 90        | 799      | 1367   |
| Total          | 109798 | 130654    | 36358    | 276810 |

### 3.3.3 The Type and Category-wise coal resources of India as on 1.4.2010 are given in table below:-

(in Million Tonnes)

| Type of Coal      | Proved | Indicated | Inferred | Total  |
|-------------------|--------|-----------|----------|--------|
| (A) Coking :-     |        |           |          |        |
| -Prime Coking     | 4614   | 699       | 0        | 5313   |
| -Medium Coking    | 12573  | 11940     | 1880     | 26393  |
| -Semi-Coking      | 482    | 1003      | 222      | 1707   |
| Sub-Total Coking  | 17669  | 13642     | 2102     | 33413  |
| (B) Non-Coking:-  | 91651  | 116922    | 33457    | 242030 |
| (C) Tertiary Coal | 478    | 90        | 799      | 1367   |
| Grand Total       | 109798 | 130654    | 36358    | 276810 |

### 3.3.4 Status of Coal Resources in India during Last 5 Years

As a result of Regional, Promotional and Detailed Exploration by GSI, CMPDI,

SCCL and MECL, etc, the estimation of coal resources in India has reached to 276.81 billion tonnes. The increase/upgradation of coal resources in the country during last 5 years is furnished in table below:

(in Million Tonnes)

| As on    | Geological Resources of Coal |           |          |        |
|----------|------------------------------|-----------|----------|--------|
|          | Proved                       | Indicated | Inferred | Total  |
| 1.1.2006 | 95866                        | 119769    | 37666    | 253301 |
| 1.1.2007 | 97920                        | 118992    | 38260    | 255172 |
| 1.4.2007 | 99060                        | 120177    | 38144    | 257381 |
| 1.4.2008 | 101829                       | 124216    | 38490    | 264535 |
| 1.4.2009 | 105820                       | 123470    | 37920    | 267210 |
| 1.4.2010 | 109798                       | 130654    | 36358    | 276810 |

### 3.4 Lignite Reserves in India

Lignite reserves in India have been currently

estimated at around 39897.58 million tonnes. The state wise distribution of lignite reserves is as follows:-

As on 01.10.2010

| State             | Area  |                          | Geological Reserves (M.T.) |
|-------------------|-------|--------------------------|----------------------------|
| Tamilnadu & Pondy | A(i)  | Neyveli Region           | 4150.00                    |
|                   | (ii)  | Jayamkondachola puram    | 1206.73                    |
|                   | (iii) | Eastern part of Neyveli  | 562.32                     |
|                   | (iv)  | Veeranam                 | 1342.45                    |
|                   | (v)   | Others                   | 987.82                     |
|                   | (vi)  | Pondy (Bahur)            | 416.61                     |
|                   | B     | Mannargudi lignite field | 23673.82                   |
|                   | C     | Ramanthapuram            | 52.71                      |
|                   | Total |                          | 32392.46                   |
| Rajasthan         |       |                          | 4804.02                    |
| Gujarat           |       |                          | 2662.75                    |
| Jammu & Kashmir   |       |                          | 27.55                      |
| Kerala            |       |                          | 9.65                       |
| West Bengal       |       |                          | 1.15                       |
| Total             |       |                          | 39897.58                   |