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COAL EXPLORATION & RESOURCES

3.1 INTRODUCTION

Exploration for coal in the country is carried out in two broad stages i.e. Regional Exploration and Detailed Exploration. The regional exploration for coal is carried out by the Government organisations 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. 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 data base 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 and 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 for detailed exploration by the allottees on their own as per these guidelines. The block allottees are required to inform and submit to CMPDI the detailed exploration programme with time schedules before starting the exploration activities. All the statutory licenses and clearances like

prospecting license, forest clearance etc should be obtained by the allottee, as per existing laws & statutes before initiating exploration activities in respective areas. Other aspects for detailed exploration namely exploration coverage, borehole spacing/density, drilling, survey/study & analysis, exploration supervision, submission of Geological reports etc. are all covered in these guidelines. The detailed guidelines are available in the web site of this Ministry at (<http://coal.nic.in/letters.htm>).

3.2 Exploration Activities in 2009-10

3.2.1 Promotional Exploration

A total of 76,288 meter of promotional drilling has been carried out during the period April to December 2009 covering 17 coal and 12 lignite blocks against target of 1,58,100 metre of Promotional drilling in 2009-10.

3.2.2 Most of the boreholes drilled for promotional exploration have been logged geophysically and 57,978 metre of multi-probe Geophysical Logging has been carried out during the period April to December 2009. 11 Geological Reports on coal and 1 Geological Report on lignite exploration have been submitted during April to Dec. '09. Apart from it, 3 Environmental study reports, 3 Remote Sensing reports and one Gravity Survey report has also been submitted during the referred period.

3.2.3 CMPDI and GSI have completed samples collection from seven boreholes for CBM studies under the promotional exploration programme. Sample collection from two more boreholes is under progress as boreholes are under drilling. The analysis of samples and preparation of one report is also under progress.

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 under progress and 1538 maps have been finalized during the period April to December, '09. The integration of survey reference point to a single origin has been completed for 92 blocks in the same period. Processing of data for creation of Geological models is also under progress and 10 models have been prepared during referred period. For similar project on creation of Integrated Lignite Resource Information System (ILRIS) by NLC, scanning of 1233 Geophysical Logs of exploratory boreholes drilled in 5 lignite blocks, geological modelling of four lignite blocks through MINEX software and data uploading of seven geological/other reports was completed during April to December '09. Compilation of seasonal reports of CGM/Gujarat for Surat & Bharuch districts for creation of database

and action for procurement of Open Series Maps from Survey of India for datum transformation from local coordinate system to UTM data projections of WGS-84 Earth Ellipsoid for lignite blocks of India is under progress.

3.2.5 Detailed Drilling in Non-CIL Blocks

In 2009-10, 1,17,000 metre of detailed drilling has been targeted in Non-CIL/ Captive Mining blocks. Out of it, 57,600 metre is targeted for CMPDI (departmentally) and 59,400 metre through outsourcing. During the period April to Dec, 09, 1,53,778 metre of detailed drilling has been carried out in Non-CIL/ Captive Mining blocks. Out of it, 60,278 metre has been drilled departmentally in 8 blocks and 93,500 metre through three contractual agencies in 7 blocks. Detailed drilling in 3 outsourced blocks could not start due to non-availability of permission to explore in forest area.

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. Floating of NIT is under process. However, the success of work through outsourcing depends largely on availability of permission to explore in forest areas and availability of suitable agencies.

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 1200 metre by the

GSI, CMPDI, SCCL and MECL etc, a cumulative total of 267.21 Billion tonnes far been estimated in the country as on 1.4.2009. Details of State-wise geological resources of coal are given as under:

(in Million Tonnes)

State	Geological Resources of Coal			Total
	Proved	Indicated	Inferred	
Andhra Pradesh	9194	6748	2985	18927
Arunachal Pradesh	31	40	19	90
Assam	348	36	3	387
Bihar	0	0	160	160
Chhattisgarh	10910	29192	4381	44483
Jharkhand	39480	30894	6338	76712
Madhya Pradesh	8041	10295	2645	20981
Maharashtra	5255	2907	1992	10154
Meghalaya	89	17	471	577
Nagaland	9	0	13	22
Orissa	19944	31484	13799	65227
Sikkim	0	58	43	101
Uttar Pradesh	866	196	0	1062
West Bengal	11653	11603	5071	28327
Total	105820	123470	37920	267210

(Source: Geological Survey of India)

The next inventory of coal resources would be prepared in April 2010 and would be available on 1st May 2010.

3.3.2 Categorisation 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 metre apart, upgrades the resources into more reliable 'Proved' category. The formation-wise and category-wise coal resources of India as on 1.4.2009 are given in table below:

(in Million Tonnes)

Formation	Proved	Indicated	Inferred	Total
Gondwana Coals	105343	123380	37414	266137
Tertiary Coals	477	90	506*	1073
Total	105820	123470	37920*	267210

* Includes 456mt of Inferred resources established through mapping in NE region.

3.3.3 The Type and Category-wise coal resources of India as on 1.4.2009 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	12449	12064	1880	26393
- Semi-Coking	482	1003	222	1707
Sub-Total Coking	17545	13766	2102	33413
(B) Non-Coking:-	87798	109614	35312	232724
(C) Tertiary Coal	477	90	506	1073
Grand Total	105820	123470	37920	267210

3.3.4 Status of Coal Resources in India:

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 267.21 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
1.1.2005	92960	117090	37797	247847
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

3.3 COAL CORE ANALYSIS CAPACITY CREATION

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 from CIMFR as per the comments made by CIL is awaited.

3.5 LIGNITE RESERVES IN INDIA:

Lignite reserves in India have been currently estimated at around 39073.56 million tonnes. The state wise distribution of lignite reserves is as follows: -

As on 01.04.2009

State	Area		Geological Reserves (M.T.)
Tamilnadu & Pondicherry	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	23099.77
	C	Ramanthapuram	52.71
	Total		31818.41
Rajasthan		4554.05	
Gujarat		2662.75	
Jammu & Kashmir		27.55	
Kerala		9.65	
West Bengal		1.15	
Total		39073.56	