



Drilling equipment

PROMOTIONAL AND DETAILED EXPLORATION

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Promotional Exploration

GSI, MECL, State Governments and CMPDI are continuing Promotional Exploration in XII plan under the MoC's Plan scheme of Promotional Exploration for coal & lignite. The summary of Promotional Drilling carried out in coal & lignite sectors in 2012-13 to 2015-16 (anticipated) and target for 2016-17 is given below:

(Drilling in Metre)

Command Area	2012-13 Actual	2013-14 Actual	2014-15 Actual	2015-16 Anticipated	2016-17 Proposed BE*
1. Drilling in C.I.L. Command Area	36725	53695	67144	55000	85000
2. Drilling in SCCL Command Area	8899	9553	3575	2000	5000
3. Drilling in NLC Areas	67728	68774	68777	63000	85000
Total	113352	132022	139496	120000	175000
Growth%	20.94	16.47	5.71	-13.97	

*Achievement of target depends upon timely availability of forest clearance to take up drilling in forest areas, local support and occurrence of lignite in identified blocks.

Detailed Drilling in Non-CIL Blocks

CMPDI carry out Detailed Exploration in CIL and Non-CIL blocks as per strict timelines to bring resources falling in 'Indicated and Inferred' category into the 'proven category'. The exploratory drilling in non-CIL/captive mining blocks is taken up under the MoC's Plan scheme of Detailed Drilling in Non-CIL Blocks.

Details of actual drilling in Non-CIL/Captive mining blocks in 2012-13 to 2014-15, 2015-16 (anticipated) and target for 2016-17 is given below:

(Drilling in Metre)

Agency	2012-13 Actual	2013-14 Actual	2014-15 Actual	2015-16 Anticipated	2016-17 Proposed BE
1. CMPDI Departmental	77458	93742	61427	32800	32800
2. Outsourcing by CMPDI	150250	144159	220972	286700	287500
Total	227708	237901	282399	319500	320300

CMPDI has substantially improved its capacity of drilling during the XI & XII plan period. As against the achievement of 2.09 lakh metre in 2007-08, CMPDI has achieved 4.98 lakh meter in 2011-12, 5.63 lakh meter in 2012-13, 6.97 lakh meter in 2013-14, 8.28 lakh meter in 2014-15 and drilling of about 9.50 lakh metre is likely to be achieved in 2015-16 (15% Growth) through Departmental resources and outsourcing. For capacity expansion through modernization of Departmental drills, 39 new mechanical drills & 12 Hi-tech Hydrostatic drills have been procured since 2008-09. Out of which 15 have been deployed as additional drills and 36 as replacement drills. CMPDI has also replaced 38 mud pumps and 74 trucks in the last six years. In addition to this, supply order for 7 Hi-Tech Hydrostatic drills have been placed in 2015-16 and delivery of drills is likely to start.

To meet the increased work load, recruitment has been taken up through campus interviews/open examinations. 240 Geologists, 34 Geo-physicists and 20 Mechanical Engineers as drilling engineers have joined CMPDI since 2008-09. About 1073 non-executive staff have also been inducted for exploration work.

Under outsourcing, the work of 58 blocks involving 22.86 lakh metre of drilling was awarded through tendering since 2008-09. Out of which drilling has been concluded in 31 blocks. Due to local (law & order) problems, work could not start in 2 blocks and stopped in 6 running blocks. Due to non-availability of forest clearance, work was stopped in 11 blocks. Due to lack of forest

clearance and adverse law & order, about 4.0 lakh metre of drilling could not be carried out in departmental & outsourced blocks in 2014-15. In 2015-16, a total of about 5.70 lakh metre (24% Growth) is likely to be drilled through outsourcing, out of which 3.35 lakh metre drilling would be done through tendering & 2.35 lakh metre through MoU with MECL.

Drilling performance in 2015-16:

CMPDI has deployed its departmental resources for detailed exploration of CIL/Non-CIL blocks whereas State Government of MP and Odisha deployed additional resources in CIL blocks. In addition, eight other contractual agencies have also deployed resources for detailed drilling/exploration in CIL/Non-CIL blocks. A total of 140 to 160 drills were deployed in 2015-16 out of which 62 were Departmental drills.

Apart from the above, CMPDI has continued technical supervision of promotional exploration work undertaken by MECL, GSI and DGM (Nagaland). Promotional exploration work was undertaken covering 16 coal & 12 lignite blocks during the period April, 2015 to December, 2015.

In 2015-16, CMPDI and its contractual agencies took up exploratory drilling in 99 blocks/mines of 22 coalfields situated in 6 States. Out of 99 blocks/mines, Departmental drills of CMPDI took up exploratory drilling in 47 blocks/mines whereas contractual agencies drilled in 52 blocks/mines.

The overall projected performance of exploratory drilling in 2015-16 is given below:

Agency	Target 2015-16 (metre)	Performance of Exploratory Drilling in 2015-16 (Projected)			Achieved Prev. Year: 2014-15 (m)	Growth %
		Achiev. (metre)	Achiev. (%)	+/- (m)		
A. Detailed Drilling Undertaken by CMPDI						
I. Departmental	400000	375000	94%	-25000	356480	5%
II. OUTSOURCING						
-State Govts.	10000	4500	45%	-5500	6863	-34%
-MECL (MOU)	400000	235000	59%	-165000	220255	7%
-Tendering (CIL blocks)	429500	208000	48%	-221500	159356	31%
-Tendering(Non CILblocks)	260500	127500	49%	-133000	85015	50%
Total Outsourcing	850000	575000	68%	-275000	471489	22%
Grant Total A	1500000	950000	63%	-550000	827969	15%

B. Promotional drilling by MECL, GSI, DGM (Nagaland) & DGM (Assam)						
I. COAL SECTOR						
-GSI	19000	19000	100%	0	18904	1%
-MECL	75500	37000	49%	-38500	50325	-26%
-DGM, Nagaland	800	1000	125%	200	427	134%
-DGM, Assam	500	0	0%	-500	0	0%
-CMPDI	3000	0	0%	-3000	1063	-100%
Total Coal	98800	57000	58%	-41800	70719	-19%
II. LIGNITE SECTOR						
-GSI	8200	10000	122%	1800	8446	18%
-MECL	68000	53000	78%	-15000	60331	-12%
Total Lignite	76200	63000	83%	-13200	68777	-8%
Grand Total B	175000	120000	69%	-55000	139496	-14%

Note: Data given above include actual for April'15 to Dec.'15 and projected for Jan.'16 to March'16.

In 2015-16, CMPDI is likely to achieve its Departmental and overall drilling targets by 94% and 63% respectively. The performance of Departmental drilling is better than previous year with likely growth of 5% and recording average operational drills productivity of 500 m/drill/months. Non availability of permission to explore in forest areas & local problems (law & order) has affected the performance of outsourced drilling. MECL could not achieve the targets of 'promotional drilling' in coal sector due to forest problems and CMPDI could not take 'promotional drilling' due to its priority in 'detailed drilling'.

Progress of 2D & 3D seismic survey

It was decided in the 182nd Board Meeting of CMPDI to take up 2D seismic survey in 4 blocks by the end of FY 2014-15. Accordingly, seismic survey has been taken up in Pundi East block, West Bokaro coalfield and Dabor, Central Salanpur A, Central Salanpur Phase-II, Sangramgarh East, Sadhna East, Sadhna South East, Mohanpur East and Mohanpur south East blocks of Raniganj coalfield collectively from the last week of December, 2014. Data acquisition and processing has been completed in Pundi East Block, West Bokaro coalfield and data processing is under progress for Salanpur & adjoining blocks. Interpretation of data of Pundi & Raniganj Areas will be taken up very shortly. Nearly 50 line K.M. of seismic data has been collected in the above 9 blocks.

During 2015-16, seismic survey has been taken up in Patratu ABC blocks, South Karanpura coalfield & Chandrabila block, Talcher in coalfield. A total of 19.93 line km. & 15.34 line km was covered in respective blocks. Report of Patratu ABC has already been submitted in Nov'2015 and data processing of Chandrabila block is under progress. Seismic survey has already started in Marki-Barka (E) block, Singrauli coalfield.

NGRI has already completed data acquisition of 3D seismic survey in Belpahar block, Ib-Valley coalfield under the promotional scheme. Till date, approx. 10 Sq. K.M. areas have been covered. Geophysicists from CMPDI have been associated with the NGRI team for acquaintance of 3D seismic data acquisition. Processing of 3D data is under progress at NGRI, Hyderabad.

Geological Reports

In 2015-16, 14 geological reports are likely to be prepared on the basis of detailed exploration conducted in previous years. In addition to this, 8 revised geological reports/interim geological reports have also to be prepared. The prepared geological reports are likely to prove about 6.0 Billion Tonnes of additional coal resources under 'Proven' category.

Geological report of license area nos. 3450L & 3451L, Moatize coalfield, Tete Province, Mozambique was also submitted by Coal India Africana Limitada in Dec'2015.

Coal Resources

Inventory of Geological Resources of coal in India

As a result of exploration carried up to the maximum depth of 1200m by the GSI, CMPDI, SCCL and MECL, a cumulative total of 306.595 Billion tonnes of geological resources of coal have so far been estimated in the Country as on 1.4.2015. The details of State-wise geological resources of coal are given below:

STATE-WISE RESOURCE OF INDIAN COAL

(As on 01-04-2015)

(Resource in million tonnes)

State	Proved	Indicated	Inferred	Total
WEST BENGAL	13518	13010	4907	31435
JHARKHAND	41463	33026	6559	81049
BIHAR	00000	00000	0160	00160
MADHYA PRADESH	10411	12784	3341	26536
CHHATTISGARH	18237	34390	2285	54912
UTTAR PRADESH	00884	00178	0000	01062
MAHARASHTRA	05953	03190	2110	11253
ODISHA	30747	36545	8507	75799
ANDHRA PRADESH	00000	1149	0432	01581
TELANGANA	09807	8808	2597	21211
ASSAM	00465	0047	0003	00515
SIKKIM	00000	0058	0043	00101
ARUNACHAL PRADESH	00031	0040	0019	00090
MEGHALAYA	00089	0017	0471	00576
NAGALAND	00009	0000	0307	00315
GRAND TOTAL	131614	143241	31740	306596

Note: The next inventory of coal resources would be prepared in April 2016 and would be available on 1st May 2016. No projections are possible for this inventory.

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 (NER). 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 1.4.2015 are given in table below:

(In million tonnes)

Formation	Proved	Indicated	Inferred	Total
Gondwana Coals	131020	143142	30941	305102
Tertiary Coals	594	99	799	1493
Total	131614	143241	31740	306595

Type and Category-wise resources of India as on 1.4.2015 are given in table below:

(In million tonnes)

Type of Coal	Proved	Indicated	Inferred	Total
Coking				
-Prime Coking	004614	000699	00000	005313
-Medium Coking	013389	012114	01879	027382
-Semi coking	000482	001004	00022	001707
Sub Total Coking	018485	013816	02101	034402
Non-coking	112535	129326	28840	270700
Tertiary Coal	000594	000099	00799	001493
Grand Total	131614	143241	31740	306595

Lignite Reserves in India

Lignite reserves in India have been currently estimated at around 44114.24 MT. The state wise distribution of lignite reserves as on 1.4.2015 is as follows:

State	Area		Geological Reserves (M.T)
Tamil Nadu & Puduchery	A(i)	Neyveli Region	04150.00
	(ii)	Jayamkondacholapuram	01206.73
	(iii)	Eastern part of Neyveli	00562.32
	(iv)	Veeranam	01342.45
	(v)	Others	00987.82
	(vi)	Pondy (Bahur)	00416.61
	B	Mannargudi lignite field	24594.77
	C	Ramanthapuram	02364.81
	Total		34764.32
Rajasthan			05726.71
Gujarat			02722.05
Jammu & Kashmir			00027.55
Kerala			00009.65
West Bengal			00002.77
Total			44114.24