



PROMOTIONAL AND DETAILED EXPLORATION



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1. Promotional Exploration

Mineral Exploration Corporation Limited (MECL), State Governments and Central Mine Planning and Design Institute (CMPDI) and other contractual agencies of CMPDI conducted Promotional Exploration under the Ministry of Coal's Plan scheme of "Promotional Exploration for Coal & Lignite".

During 2023-24, a total of 1.743 lakh meters. of Promotional (Regional) drilling in 29 blocks was carried out in Coal and Lignite by CMPDI with a growth of about 127% over previous years.

The summary of Promotional Drilling carried out in coal & lignite during the period 2019-20, 2020-21, 2021-22, 2022-23, 2023-34, Jan'23-Mar'24 is given below:

(Drilling in Metre)

Command Area	2019-20 Actual	2020-21 Actual	2021-22 Actual	2022-23 Actual	2023-24 Actual	(Jan'23 - Mar'24) Actual
Drilling in CIL Command Area	70973	111735	155153	76800	152962	181156
Drilling in SCCL Command Area	11210	291	0	0	2508	2508
Drilling in Lignite Areas	33497	22852	13984	0	18823	18823
Total	115680	134878	169137	76800	174293	202487
Growth %	-17%	17%	25%	-55%	127%	

2. Detailed Drilling in Non-CIL Blocks

CMPDI carries out Detailed Exploration in CIL and Non-CIL blocks as per strict timelines to bring resources falling in indicated and inferred category into the Measured (Proved) category. The exploratory drilling in non-CIL/captive Mining blocks is taken up under the Ministry of Coal's Plan scheme of "Detailed Drilling in Non-CIL Blocks".

In 2023-24, a total of 2.547 lakh meters drilling was achieved by CMPDI and its contractual agencies. Out of which, the departmental drills of CMPDI carried out 0.983 lakh meters of exploratory drilling whereas 1.565 lakh meters was achieved through outsourcing drilling. In Non-CIL blocks the achievement is 127%.

The details of actual drilling in Non-CIL/Captive Mining Blocks during the period 2019-20, 2020-21, 2021-22, 2022-23, 2023-34, and Jan'23-Mar'24 are given below:



(Drilling in Metre)

Command Area	2019-20 Actual	2020-21 Actual	2021-22 Actual	2022-23 Actual	2023-24 Actual	(Jan'23 - Mar'24) Actual
CMPDI (Departmental)	207677	174622	87571	93191	98252	146122
Outsourcing by CMPDI	464807	469961	171762	89016	156492	217919
Total	672484	644583	259333	182207	254744	364041
Growth %	39%	-4%	-60%	-30%	40%	-

3. Drilling Performance in 2023-24:

CMPDI deployed its departmental resources for detailed exploration of CIL, Non-CIL, Promotional, and Consultancy blocks. Under MoU with CMPDI, MECL deployed its resources in CIL, Non-CIL, Promotional, NMET funded, and Captive blocks. DGM (Nagaland), DGM (Assam), deployed their departmental resources in Promotional exploration. DGM (Assam), DGM (Arunachal Pradesh), DMR (Meghalaya) participated in exploration in Non-CIL/ Promotional blocks through their outsourced agencies. Besides, six contractual agencies also deployed resources for detailed drilling/exploration in CIL, Non-CIL, Promotional & NMET blocks. A total of 120 to 140 drills were deployed in 2023-24 out of which 67 were departmental drills.

In 2023-24, CMPDI and its contractual/ MoU agencies took up exploratory drilling in 124 coal blocks/mines of 26 coalfields and 2 Lignite fields situated across 13 States. Out of 124 blocks/mines, 23 are Non-CIL Blocks, 7 are Consultancy blocks, 52 are CIL blocks/mines and 39 are Promotional blocks and 13 are NMET funded blocks. Furthermore, CMPDI also carried out exploration in 2 Bauxite blocks through NMET funding in the state of Jharkhand for Base Metals and in 1 block in the state of Jharkhand.

The overall performance of exploratory drilling during FY 2023-24 and During Jan'23 - Mar'24 is given below:

Agency	Detailed Drilling in FY 2023-24			Achieved Prev. Year: FY 2022-23	Growth (%)	Achieved During Jan'23 - Mar'24
	Target	Achiev.	Achiev. (%)			
Detailed Drilling undertaken by CMPDI (CIL, Consultancy, NMET, Promotional & Non-CIL):						
I. Departmental	4.100	4.317	105%	4.210	3%	6.067
II. Outsourcing	3.400	4.308	127%	2.638	63%	5.465
Grand Total	7.500	8.625	115%	6.849	26%	11.532

During 2023-24 (Apr'23 to Mar'24), a total of about 4.317 lakh metre drilling was carried out through Departmental resources. About 4.308 lakh metre drilling was carried out through outsourcing, out of which about 0.022 lakh meter drilling was carried out through State Govts., 1.449 lakh metre drilling was carried out through tendering & 2.837 lakh metre drilling through MoU with MECL.

4. Geological Reports

In 2023-24, 31 Geological Reports were prepared based on detailed/ regional exploration conducted in previous years. About 12 billion tonnes of coal resources are expected to be added to the Measured Category through Detailed Exploration covering an area of about 340 sq km through 19 Geological Reports. While, about 11 billion tonnes of new coal resources (in Indicated and Inferred categories) are expected to be added Promotional (Regional) Exploration covering an area of about 261 sq km through 12 Geological Reports.

CMPDI expanded its exploration scope with 2 Geological Reports submitted for Bauxite Regional Exploration, potentially adding about 16.093 million tonnes of Aluminum Laterite and about 9.285 million tonnes of Bauxite resources to the national inventory.

Overall, during Jan'23 - Mar'24, CMPDI submitted 33 Geological Reports of Detailed Exploration in CIL/ Non-CIL/Consultancy blocks, covering an area of about 510 sq km and with proved resource of about 18.5 billion tonnes, 12 Geological Reports of Promotional (Regional) Exploration covering an area of about 261 sq km with about 11 billion tonnes of new coal resources (in Indicated and Inferred categories) and with 2 Geological Reports submitted for Bauxite Regional Exploration, added about 16.093 million tonnes of Aluminum Laterite and about 9.285 million tonnes of Bauxite resources to the national inventory.

5. Geophysical Studies

(a) 2D/3D Seismic Survey

During 2023-24, CMPDI achieved 234.57 line km of 2D/3D seismic survey. Out of 234.57 line km of 2D/3D seismic survey, about 205 line km of survey was carried out departmentally against the target of 190 line km and additionally 29.57 line km of 2D/3D seismic survey was also carried out through outsourced resources.

Overall, during the period between Jan'2023 to Mar'2024, CMPDI carried out 403.00 line km of 2D/3D seismic survey, out of which 298.23 line km through departmental & 104.77 Line KM through outsourcing has been carried out.

(b) Other Geophysical work

During the year 2023-24, a total of 4.852 lakh meters of geophysical logging has been carried out in CIL and Non-CIL projects with multi-parametric geophysical logging equipment. Out of this, 1.719 lakh meters of geophysical logging was done by 6 departmental geophysical logging units and 3.133 lakh meters of logging was carried out by contractual agencies. About 40.66 line km, 40.99 line km & 152 stations of Magnetic survey, Resistivity Survey and Gravity survey respectively were carried out departmentally without outsourcing.

Overall Geophysical surveys during Jan'2023 to Mar'2024 are as follows:

- 1) Geophysical Logging: 2.84 Lakh meters (Departmental) & 3.21 Lakh meters (Outsourced)
- 2) Magnetic Survey: 77.06 Line Km (Only departmental)
- 3) Resistivity Survey: 83.506 Line Km (Only departmental)
- 4) Gravity Survey: 365 stations (Only departmental)



(c) Hydrogeological Studies

In 2023-24, CMPDI prepared 94 nos. of Comprehensive Hydrogeology Report of Coal Mine / Projects for obtaining NoC from Central Ground Water Authority (CGWA), New Delhi. 83 nos. of Groundwater Modelling report have been prepared for compliance and obtaining NoC for Coal mines / Projects from CGWA, New Delhi. 37 nos. of Hydrogeological study report have been incorporated in EIA / EMP studies of Coal mines / Projects. 40 nos. of other hydrogeological studies (i.e., chapter for GR / PR, Piezometers, Pumping Tests, Damage Assessment Reports etc.) have been prepared. Quarterly ground water level & quality monitoring of 4 nos. of Coalfields i.e., ECL, BCCL, CCL & NCL command area including buffer zone has been continued and three quarters of monitoring completed.

During Jan'23 - Mar'24, CMPDI prepared 120 nos. of Comprehensive Hydrogeology Report of Coal Mine / Projects for obtaining NOC from Central Ground Water Authority (CGWA), New Delhi, 105 nos. of Groundwater Modelling report for compliance and obtaining NOC for Coal mines / Projects from CGWA, New Delhi. About, 54 nos. of Hydrogeological study report have been incorporated in EIA / EMP studies of Coal mines / Projects. 58 nos. of other hydrogeological studies (i.e., chapter for GR / PR, Piezometers, Pumping Tests, Damage Assessment

Reports etc.) have also been prepared. Quarterly ground water level & quality monitoring of 04 nos. of Coalfields i.e., ECL, BCCL, CCL & NCL command area including buffer zone has been continued and three quarters of monitoring completed.

Hydrogeology Section of Exploration Division of CMPDI, Ranchi has been awarded as Groundwater Professionals by CGWA, New Delhi for preparation of Groundwater Modelling Reports during 2023-24 and having MoU with 2 nos. of CGWA, New Delhi accredited consultants for preparation of Ground Water Modelling report. Three nos. of Reports of UCIL (Uranium Corporation India Ltd.) as an outside consultancy job has also been prepared during 2023-24.

6. COAL RESOURCES**Inventory of Geological Resources of coal in India**

As a result of exploration carried up to the maximum depth of 1200 m by the Geological Survey of India (GSI), CMPDI, SCCL and MECL, a cumulative total of 378.21 Billion tonnes of geological resources of coal have so far been estimated in the country as on 01.04.2023. The details of State-wise geological resources of coal are given below:

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STATEWISE GEOLOGICAL RESOURCES OF COAL IN INDIA AS ON 01.04.2023*(Resource in million tonnes)*

State	Measured (331)	Indicated (332)	Inferred (333)	Resource
Odisha	52046.19	37536.32	4936.08	94518.59
Jharkhand	55749.18	26994.01	5094.91	87838.10
Chhattisgarh	37236.35	42293.97	1243.55	80773.87
West Bengal	17459.34	12698.82	3775.12	33933.28
Madhya Pradesh	15279.27	12456.93	4482.33	32218.53
Telangana	11256.78	8496.57	3433.07	23186.42



State	Measured (331)	Indicated (332)	Inferred (333)	Resource
Maharashtra	8064.76	3424.65	1846.59	13336.00
Bihar	309.53	5040.18	47.96	5397.67
Andhra Pradesh	1024.65	2368.94	778.17	4171.76
Uttar Pradesh	884.04	177.76	0.00	1061.80
Meghalaya	89.04	16.51	470.93	576.48
Assam	464.78	57.21	3.02	525.01
Nagaland	8.76	21.83	447.72	478.31
Sikkim	0.00	58.25	42.98	101.23
Arunachal Pradesh	31.23	40.11	18.89	90.23
Total	199903.90	151682.06	26621.32	378207.28

Source: Geological Survey of India's Inventory of Geological Resources of Indian Coal and Lignite Resources as on 1.4.2023. The inventory did not take into account the mined out reserves.

7. 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 800-1600 m apart, the resources are classified into 'Indicated' or 'Inferred' category. Subsequently, Detailed Exploration in selected blocks, where boreholes are less than 400 meter apart, upgrades the resources into more reliable 'Measured' category.

The formation-wise and Category-wise coal resources of India as on 1.4.2023 are given in table below:

(Resource in million tonnes)

Formation	Proved/ measured	Indicated	Inferred	Total
Gondwana Coals	199310	151561	25681	376552
Tertiary Coals	594	121	940	1655
Total	199904	151682	26621	378207

The Type and Category-wise resources of India as on 1.4.2023 are given in table below:

(Resource in million tonnes)

Coal Type	Proved/ measured	Indicated	Inferred	Total	% share
Prime Coking	5132.65	185.64	0.00	5318.29	1.4%
Medium Coking	16499.51	10266.18	1761.43	28527.12	7.5%
Semi Coking	529.68	1081.47	186.33	1797.48	0.5%
Sub-Total of Coking	22161.84	11533.29	1947.76	35642.89	9.4%



Coal Type	Proved/ measured	Indicated	Inferred	Total	% share
Non-Coking	177148.25	140027.60	23733.00	340908.85	90.1%
High Sulphur	593.81	121.17	940.56	1655.54	0.4%
Grand Total	199903.90	151682.06	26621.32	378207.28	100.0%
% share	52.9%	40.1%	7.0%	100.0%	

8. Lignite Reserves in India

Lignite reserves in India have been currently estimated at around 47,368.54 million tonnes as on 01.04.2023. The state wise distribution of lignite reserves as on 01.04.2023 is as follows:

(Resource in million tonnes)

State	Measured (331)	Indicated (332)	Inferred (333)	Resource
Pondicherry	00	405.61	11.00	416.61
Tamilnadu	5023.09	21885.01	10688.48	37596.58
Rajasthan	1203.85	3108.55	2273.84	6586.24
Gujarat	1278.65	283.7	1159.7	2722.05
J&K	00	20.25	7.30	27.55
Kerala	00	00	9.65	9.65
WB	00	1.13	2.80	3.93
Odisha	5.93	00	00	5.93
Total	7511.52	25704.25	14152.77	47368.54

