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CHAPTER

RESEARCH & DEVELOPMENT

Research & Development

Research and Development projects are covered under four thematic areas viz; improvement in production, productivity and safety in coal mines; coal beneficiation and utilization, and protection of environment and ecology. The Standing Scientific Research Committee (SSRC) under the Chairmanship of Secretary (Coal) is the apex body for administering Coal related research. The Central Mine Planning and Design Institute (CMPDI) is the nodal agency for the coordination and monitoring of Science and Technology Plan schemes and of CILs Research and Development projects. The cutting edge projects are implemented by pioneering research and academic institutes related to coal and allied industries with active participation of coal and lignite mining companies.

Total no. of S&T projects taken up (till 13.3.2015) - 380

Total no. of S&T projects completed (till 13.3.2015) - 313

Physical performance

During 2014-15, 3 major projects have been completed. The overall status of Coal S&T projects during 2014-15 is as under:

i)	Projects as on 1.4.2014	12
ii)	Projects approved by SSRC during 2014-15*	03
iii)	Projects completed during 2014-15	03
iv)	Projects ongoing as on 13.03.2015	09 + 03

Following Coal S&T projects were completed during 2014-15:

- Development of Self Advancing (mobile) Goaf Edge Supports (SAGES) for depillaring operations in underground coal mines
  SAGES have been developed so as to avoid labour intensive and time consuming process in erecting wooden props at goaf edges for protection of roof during depillaring operations. These self-propelled mobile supports of medium duty (2 x 200 Te) have closed and extended height range of 1.85 to 3.2 m and can offer support resistance of 71.4 t/m^2

- Development of software for prediction of subsidence by 3D numerical modelling for SCCL mines
  Subsidence prediction software was developed using suitable programming language incorporating derived empirical equation. Empirical formula was derived after analysing the collected and measured data by statistical method. The developed software will be used for predicting subsidence in the prevailing geo-mining conditions of SCCL.

- Development of customized organic coatings for corrosion protection of special mining equipment at Neyveli Lignite mines
  Three types of coatings (Primer, undercoat & topcoat) were developed, for corrosion protection of the Special Mining Equipment (SME) at NLC. By using the above coatings, life of the components of SMEs will be maximised and availability be increased due to less breakdown.

Financial status:

Budget provision vis-à-vis actual fund disbursement during the period is given below:

(In Crores)

2013-14		2014-15	
RE	Actual	RE	Actual (till 13.03.2015)
11.65	11.76	20.0 (including ₹ 2.05 Cr. for NER)	12.95

Status of Research and Development Projects undertaken by CIL

For in-house R&D work of CIL, an R&D Board headed by Chairman, CIL is empowered to take decisions. CMPDI acts as the Nodal Agency for processing the proposals for CIL approval, preparation of budget estimates, disbursement of fund, monitoring progress etc.

So far, 72 projects have been taken up with the funds of CIL, out of which 52 projects have been completed till 13.03.2015.

The status of CIL Projects during 2014-15 is as follows:

- Projects as on 01.04.2014 - 18
- Projects sanctioned during 2014-15 - 01
- Projects completed during 2014-15 - 05
- Projects as on 13.03.2015 - 14

Following are the major R&D projects completed during 2014-15:

- Assessment of prospect of shale gas in Gondwana basin with special reference to CIL areas in partnership with the Advanced Resources International, USA.
  Four suitable Shale bearing areas in Jharia coalfields and East Bokaro coalfields were identified where target shale horizons are lying in more than 200m depth. An S&T project regarding "Shale Gas potentiality of Damodar basin of India" under S&T plan of MoC is under implementation with the objective to evaluate Damodar basin for its shale gas potential through integrated geophysical, geological, geo-chemical and petro-physical investigations.

- Studies on determination of free silica (αQuartz) content in respirable air borne dust in coal mines and preparation of data bank of free silica and other minerals present in dust as well as in coal

- Indigenous development of Integrated Dumper Collision Avoidance system for opencast mines. The system is now in operation at the KDH opencast mine of Central coalfields Limited (CCL). This three layer system consists of proximity sensors mounted on dumpers on three sides to detect objects within 10m range, distance and direction information of dumpers present in the vicinity of 100m and also positional information of the dumper through GPRS.

- Studies on shrinkage swelling characteristics of some Indian coals to ascertain recoverability of CBM from deep seated coal and shale resources.
  The experimental set-up has been fabricated and shrinkage swelling test have been conducted for coal & shale samples collected from Singura, Kauria and Brahmanbil blocks, to ascertain recoverability of CBM from the above resources. CMPDI is carrying out studies related to assessment of coalbed Methane gas through boreholes being drilled under Promotional Exploration since the Xth Plan period. A total of 60 boreholes (40 by CMPDI and 20 by GSI) are to be taken up for CBM related studies during the XIIth plan period. During the period April 2012 – March 2015, a total of 34 boreholes (24 by CMPDI and 10 by GSI) have been tested for CBM related studies. From April 2014 – March 2015, an additional 11 boreholes (8 by CMPDI and 3 by GSI) have been completed for CBM related studies. The Government has allotted two blocks in Raniganj and Jharia coalfields in 2002 to the consortium of CIL & ONGC on nomination basis for development of CBM. CMPDI is implementing the projects on behalf of CIL and ONGC is the operator for both blocks, and carrying out the jobs as per contractual agreement with the government.

- A CMM/CBM clearinghouse was established at CMPDI, Ranchi under the aegis of Ministry of Coal and USEPA on 17th November, 2008. The clearinghouse is functioning as the nodal agency for collection and sharing of information on CMM/CBM related data of the country and helping in the commercial development of CMM Projects in India by public/private participation, technological collaboration and, bringing in financial investment opportunities. The clearinghouse has been established with financial support from CIL on behalf of Ministry of Coal and US EPA. The website of India Clearinghouse, http://www.cmmclearinghouse.cmpdi.co.in, encompasses all the important information viz. EOI notifications, newsletters in addition to information regarding opportunities existing for development of CMM, VAM, etc. After completion of the initial 3 year term completed in November, 2011, USEPA grant had been extended for additional three years on approval of the Ministry of Coal, upto November, 2015.

- Research and development on efficient energy management pilot study and action plan thereof.
  A computerized monitoring and reporting mechanism of energy efficiency key performance indicators has been developed. This system will be helpful in providing necessary details about energy (both diesel and electricity) consumption and thereby key performance indicators associated with each and every process/equipment in use.

- Studies related to Underground Coal Gassification
  In India, UCG was taken up in mid 1980's by the ONGC and CIL under technical collaboration with erstwhile USSR. Although one lignite block "Merta Road" in Rajasthan was found suitable, pilot appraisal could not be taken up due to apprehension of contamination of ground water. Currently for

development of UCG in CIL Command Area a demonstration project for commercialization is being contemplated. Two blocks, namely, Kaitha in Ramgarh Coalfield (within CCL Command Area) and Thesgora "C" in Pench-Kanhan Valley Coalfield (within WCL Command Area) have been identified for commercial development of UCG.