Indo-US Energy Dialogue
Joint Working Group on Coal

Beneficiation of Coking Coal

Project Proposal on:

Beneficiation Technology for Low Volatile Coking Coal of Lower Seams (V, VI, VII, VIII) of Jharia Coalfields, BCCL
Indo-US Energy Dialogue
Joint Working Group on Coal

The proposal is currently under preparation as per the standard format of S&T / CIL R&D research proposals. Main points discussed in the proposal are presented below:

- Implementing Agency, Location & Action Point
- Name of Project Coordinators & Co-investigators
- Definition of the Problem
- Objective
- Need & Justification of Subject Area
- Work Plan
  - Methodology
  - Organization of Work Element
  - Time Schedule
- Details of Proposed Outlay with Justification for Capital expenditure, equipment, manpower, consumables etc.
- Scope & End Application
PROJECT : Beneficiation Technology for Low Volatile Coking Coal

IMPLEMENTING AGENCIES & PARTICIPATION

Implementing Agencies:

- US Government
  - Mr. Mark Sharpe, Sharpe International
  - Dr. Roe-Hoan Yoon, Virginia Polytechnic Institute and State University
- India Government
  - Lead: Mr. P. R. Mandal, Adviser (Projects), MoC
  - Co-Lead: Director (Engineering Services), CMPDI
    Director (Tech), BCCL
PROJECT : Beneficiation Technology for Low Volatile Coking Coal

IMPLEMENTING AGENCIES & PARTICIPATION

- Participation:
  - India Lead – CMPDI
  - Participant – BCCL
PROJECT: Beneficiation Technology for Low Volatile Coking Coal

OBJECTIVES

- To develop/establish a suitable technology for beneficiation of high ash difficult-to-wash coking coal from V, VI, VII, VIII seams of Jharia coalfield by way of setting up a demonstration plant of capacity around 1.0 Mty of raw coal to obtain the following products:
  - Metallurgical grade coking coal (Ash % ~ 18±0.5) as Cleans
  - Power grade coal (Ash ≤ 34%)
  - Low Carbon Rejects
NEED & JUSTIFICATION OF SUBJECT AREA

- This variety of coal can not be beneficiated in the existing coking coal washeries due to their typical characteristics.

- Production of such coal in CCL & BCCL at the end of XI plan (2011-12) : around 13 Mt, constitutes 32% of total coking coal production (40.65 Mty).

- LVC coals are presently being despatched to thermal power plants.
In the context of fast depleting reserves of prime coking coal it has become necessary to utilize LVC Coal for metallurgical purpose after proper blending.

In this context, it is necessary to set up a demonstration plant with suitable technology for future commercial application.
PROJECT: Beneficiation Technology for Low Volatile Coking Coal

WORK PLAN - METHODOLOGY

- Identification of work site
- Laboratory testing of coal samples from linked mine(s)
- Supply of basic engineering, system design and detail design & drawings
- Preparation of technical specifications for procurement of P&M
PROJECT : Beneficiation Technology for Low Volatile Coking Coal

WORK PLAN - METHODOLOGY

- Bid process Management
- Erection & Commissioning of the plant
- Performance guarantee tests, data generation and plant hand over
- Completion Report
PROJECT: Beneficiation Technology for Low Volatile Coking Coal

WORK PLAN – ORGANISATION OF WORK ELEMENT

- MoC to approve the proposal through SSRC under S&T scheme
- BCCL shall identify the worksite and linked mine(s) and provide infrastructure facilities & assistance during execution
- Laboratory testing by CMPDI
- Basic engineering, selection of technology & equipment, system design and detail design & drawings by US agencies
WORK PLAN - ORGANISATION OF WORK ELEMENT

- Preparation of NIT & Bid process management by US agencies assisted by CMPDI
- Execution of the project will be done by US with assistance from CMPDI & BCCL
- Laboratory testing during PGT by CMPDI
- Completion report by US with assistance from CMPDI
PROJECT : Beneficiation Technology for Low Volatile Coking Coal

WORK PLAN - TIME SCHEDULE

36 months, Zero date will start with the signing of agreement between Indian & US agencies under Indo-US Energy Dialogue or receipt of letter of approval of the project under S&T / CIL R&D scheme, whichever is later.

(Detail break-up to be worked put after consultation with all agencies involved)
## Details of Proposed Outlay (1$ = Rs. 41/-)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Item</th>
<th>Total Estimate in million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INR*</td>
<td>USD (included in the INR)</td>
</tr>
<tr>
<td>1</td>
<td>Cap. (Civil &amp; Structures)</td>
<td>170.00</td>
</tr>
<tr>
<td></td>
<td>Cap. (P&amp;M), US</td>
<td>328.00</td>
</tr>
<tr>
<td>2</td>
<td>Rev. Salary (CMPDI)</td>
<td>8.41</td>
</tr>
<tr>
<td></td>
<td>Rev. Salary (US)</td>
<td>18.45</td>
</tr>
<tr>
<td></td>
<td>Rev. Travels (US)</td>
<td>6.15</td>
</tr>
<tr>
<td></td>
<td>Rev. Testing &amp; Lab. (US)</td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>Rev. Test &amp; Lab. (Indigenous)</td>
<td>4.29</td>
</tr>
<tr>
<td></td>
<td>Sub-Total (Cap. + Revenue)</td>
<td>537.35</td>
</tr>
<tr>
<td>3</td>
<td>Less (US Contribution)</td>
<td>8.20</td>
</tr>
<tr>
<td>4</td>
<td>Contingency</td>
<td>7.26</td>
</tr>
<tr>
<td></td>
<td>Grand Total</td>
<td>536.41*</td>
</tr>
</tbody>
</table>

* Including FE component of US $ 8.45 million
SCOPE AND END APPLCATION

Successful completion of the project is expected to set a trend for beneficiation of the Low Volatile Coking coal, which constitutes about one-third of the mineable coking coal reserves. Similar plants operating at commercial level will help in exploiting this variety of coal for its proper use i.e. metallurgical purposes.
Thank You
Current coal quality management

<table>
<thead>
<tr>
<th>Type of Coal</th>
<th>X Plan</th>
<th>XI Plan Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgical Grade Coking Coal</td>
<td>17.90</td>
<td>18.29</td>
</tr>
<tr>
<td>Non-coking coal</td>
<td>405.29</td>
<td>429.21</td>
</tr>
<tr>
<td>Non-Metallurgical Coking Coal</td>
<td>9.31</td>
<td>13.00</td>
</tr>
<tr>
<td>Total</td>
<td>432.50</td>
<td>460.50</td>
</tr>
</tbody>
</table>

Total coal production in India in 2006-07 is anticipated to be 432.50 Mt, which is estimated to be augmented to 680 Mt by the XI Plan terminal year 2011-12.

Coking coal production for Steel sector would be 27.65 Mty in XI Plan from 17.90 Mty in 2006-07.

Only 60 to 65% of the total coking coal production could be used for metallurgical purpose after processing in Coal Washery.

Balance is Low Volatile High Rank coking coal and not outright suitable for Steel sector due to quality reason, hence, being used for non-metallurgical purpose.

Production of LVHR coking coal is 9.3 Mty at present and is expected to rise to 13 Mty in XI Plan.

No. of Coking Coal Washeries : 19
Capacity : 27.38
Current Coal Quality Management

**NON-COKING COAL**

- **Non-coking coal production**
  - During X Plan period: 405.29 Mty
  - During XI Plan terminal year: 639.35 Mty
  - Superior grades with ash content < 34%: 143 Mty
  - Inferior grades with ash > 34%: 160 Mty
  - linked to Pit-head TPS: 160 Mty
  - Captive Mining Production: 104 Mty
  - Remaining: 232.35 Mty

- Non-Coking coal washing capacity: 103 Mty
- Additional Capacity Requirement: 127 Mty