



Indo-US Energy Dialogue Joint Working Group on Coal

Coal Fines Recovery

Project Proposal on :

**Cost-effective Technology for
Beneficiation and Recovery of Indian
Coking Coal Fines**

CMPDI



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 : Cost-effective Technology for Beneficiation & Recovery of Indian Coking Coal Fines

IMPLEMENTING AGENCIES & PARTICIPATION

➔ Implementing Agencies:

- **US Government**

- Lead : Dr. Craig Zamuda, Office of Clean Energy Collaboration, USDOE
- Co-Lead : Mr. Mark Sharpe, Sharpe International

Dr. Roe-Hoan Yoon, Virginia Polytechnic Institute and State University

- **India Government**

- Lead : Mr. P. R. Mondal
- Co-Lead : Director (Engineering Services), CMPDI

Director (Technical), BCCL

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IMPLEMENTING AGENCIES & PARTICIPATION

- ➔ Participation :
 - India Lead – CMPDI
 - Participants – BCCL

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PROJECT : Cost-effective Technology for Beneficiation & Recovery of Indian Coking Coal Fines

OBJECTIVES

- ❖ To establish an efficient technique for beneficiation of Indian coking coal fines consisting of high percentage of ultrafine particles (<100 #)
- ❖ To establish an efficient technique for cost-effective recovery of clean products
- ❖ To establish an efficient technique for recovery of effluent solids

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NEED & JUSTIFICATION OF SUBJECT AREA

Most commonly used technology for beneficiation of fine coal in India is Froth flotation which is too much process sensitive, requires costly reagents & unsuitable for oxidized coals. Hence, it is required to identify a technology most suitable for Indian coking coal fines

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NEED & JUSTIFICATION OF SUBJECT AREA

Most commonly used technologies for dewatering of fine coal e.g. Disc and Drum filters are becoming ineffective due to heaviness of high ash coals

High frequency screens are not effective if dewatering is desired below a certain size range

For these reasons, it is required to identify and implement a suitable dewatering technology for coking coal fines

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WORK PLAN - METHODOLOGY

- ➔ Identification of washery for implementation of the technology
- ➔ Laboratory testing of fine coal samples
- ➔ Identification of the technology for beneficiation and recovery of fine coal
- ➔ Supply of basic engineering, system design and detail design & drawings for implementation of the selected technologies
- ➔ Preparation of technical specifications for procurement of P&M

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WORK PLAN - METHODOLOGY

- ⇒ Bid process Management
- ⇒ Erection & Commissioning of the fine coal plant
- ⇒ Performance guarantee tests, data generation and plant hand over
- ⇒ Completion Report

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WORK PLAN – ORGANISATION OF WORK ELEMENT

- ➔ MoC, India will approve the proposal through SSRC under S&T scheme
- ➔ BCCL shall identify the worksite/ washery
- ➔ Laboratory testing of coal and PGT tests by CMPDI
- ➔ Basic engineering, selection of technology & equipment, system design and detail design & drawings by US agencies
- ➔ Bid process management and NIT preparation by US agencies, CMPDI will assist

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WORK PLAN – ORGANISATION OF WORK ELEMENT

- ➔ Execution of the project and plant performance testing will be done by USA. CMPDI & BCCL will provide assistance
- ➔ BCCL will provide all infrastructure facilities required for execution of the project
- ➔ Completion report by USA with assistance from CMPDI

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WORK PLAN – TIME SCHEDULE

18 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 out after consultation with all agencies involved)

PROJECT : Cost-effective Technology for Beneficiation & Recovery of Indian Coking Coal Fines

USA Agency has indicated the cost for setting up of a 800 tph plant which is not relevant for this project. Hence, revised cost should be indicated

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SCOPE AND END APPLICATION

Successful demonstration of the technologies will solve the biggest problem of Indian coking coal washeries i.e. beneficiation & dewatering of fine coal. It will also help to install similar plants in other coking coal washeries and preserve precious coking coal in our country

CMPDI

Thank You

PROJECT : Coal Fines Recovery

STATEMENT OF THE PROBLEM

- Most of the Indian coals contain higher percentage of inorganic impurities
- Normally dirt is intergrown within the matrix of Indian coal due to which the raw coal has to be crushed to smaller sizes for release of impurities, this results in increased fines generation
- Fines, if not recovered, report to rejects causing loss of combustibles and environmental degradation
- Fines having higher ultra fines content, beneficiated and dewatered by existing methods when mixed with coarse coal poses handling and storage problem.

PROJECT : Coal Fines Recovery

STATEMENT OF THE PROBLEM

- Reduction of surface moisture at the coal beneficiation plant end has been a challenge for the operators
- High moisture levels in prepared/ washed coal often reduce the benefits of ash reduction, reduces the heat content and reduces the thermal efficiency
- Many coal beneficiation plants in India are situated in arid areas, which make it all the more necessary to dewater prepared coal to the extent possible for saving precious process water

PROJECT : Coal Fines Recovery

PRESENT WASHING TECHNOLOGIES

Froth Flotation	Below 0.5 mm
Autogenous Cyclone	Below 0.5 mm
Spiral Concentrator	2 – 0.1 mm

- **Froth flotation is too much process sensitive, requires costly reagents & unsuitable for oxidized coals**
- **Autogenous cyclones are largely ineffective and can reduce ash% by a maximum 4% units**
- **Spiral concentrators are recent introductions & yet to be popular**

PROJECT : Coal Fines Recovery

PRESENT DEWATERING TECHNOLOGIES

Disc & Drum filters	- 0.5 mm
Screen Bowl Centrifuges	- 0.5 mm F/F Conc.
Belt Filter Press	- 0.5 mm
Solid Bowl Centrifuges	- 0.5 mm F/F Tailings
High Frequency Screens	- 2.0 mm

- Disc and Drum filters, once used extensively, are becoming ineffective due to heaviness of high ash coals
- High frequency screens are not effective if dewatering is desired below a certain size range
- Centrifuges and Filter presses are recent introductions and have limited applications, these are costly technologies also