COAL MINE METHANE PROJECT OPPORTUNITY
Mohuda Sub-basin CMM Project
Bharat Coking Coal Ltd
Jharia Coalfield, Jharkhand, India

OVERVIEW OF COAL MINE METHANE PROJECT:
The Mohuda Sub-basin CMM Project is located in the south-western part of Jharia Coalfield under BCCL, near Dhanbad, Jharkhand, India. The CMM block covers 15.5 km² and has an estimated coal resource of 75 MT. The gas resource is estimated to be 0.4 BCM (6.35 Bcf). There are 8 coal seams in the area. Coal seams include the upper seams, Lohapatty Middle, Pathogoria ‘A & ‘B’, and Bhurungia Top. These seams are mined using the bord and pillar method. The Mohuda Top seam, which is below the actively mined seams, has been targeted for CMM recovery. The target coals are high volatile bituminous ‘A’ in rank and have an average gas content of 2.4m³/t (85 scf/ton). The commercial CBM Project of CIL-ONGC is in operation near the area and has proven commercial production on a limited scale. It is expected to reach full scale in 2013. Data dossiers encompassing all details related to geology, mining history, and gas resource have been prepared.

ESTIMATED ANNUAL EMISSION REDUCTIONS: 56,890 MTCO₂E

PROJECT DETAILS
• Name of Project: Mohuda Sub-basin CMM Project
• Name of Mine: Mohuda Top U/G Mine
• Type of Ownership: Public Sector Undertaking
• Type of assessments performed: A detailed data dossier is under preparation, which will form part of bid document

MINE INFORMATION
• Mine owner: Bharat Coking Coal Ltd
• Parent company: Coal India Ltd
• Status and type of mine: Active, underground
• Mining Method: Bord & Pillar

PROJECT FINANCES
• Assumptions: $5-$7/Mcf
• Estimated revenue: US$9-13 Million
• Projected capital costs: Approximately US$10 Million
HISTORICAL AND PROJECTED MINE DATA

HISTORICAL COAL PRODUCTION

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Coal (tonnes/yr)</td>
<td>169,000</td>
<td>133,000</td>
<td>150,000</td>
<td>133,000</td>
<td>203,000</td>
<td>135,000</td>
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<tr>
<td>Methane (Mm³/yr)</td>
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<tr>
<td>Emitted from ventilation system(s)</td>
<td>0.631</td>
<td>0.497</td>
<td>0.560</td>
<td>0.497</td>
<td>0.758</td>
<td>0.504</td>
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<tr>
<td>Liberated from drainage systems</td>
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<td></td>
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<tr>
<td>Vented to atmosphere</td>
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</tr>
<tr>
<td>Total Methane Emissions</td>
<td>0.631</td>
<td>0.497</td>
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<td>0.504</td>
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PROJECTED COAL PRODUCTION AND METHANE EMISSIONS

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<tbody>
<tr>
<td>Coal (tonnes/yr)</td>
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<td>110,000</td>
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<td>110,000</td>
<td>110,000</td>
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<tr>
<td>Methane (Mm³/yr)</td>
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<tr>
<td>Emitted from ventilation system(s)</td>
<td>0.411</td>
<td>0.430</td>
<td>0.400</td>
<td>0.420</td>
<td>0.410</td>
<td>0.430</td>
<td>0.450</td>
<td>0.440</td>
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<tr>
<td>Liberated from drainage systems</td>
<td>1.0</td>
<td>1.5</td>
<td>2.4</td>
<td>3.2</td>
<td>4</td>
<td>4</td>
<td>4</td>
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</tr>
<tr>
<td>Vented to atmosphere</td>
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<td>0.430</td>
<td>0.400</td>
<td>0.420</td>
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GREENHOUSE GAS EMISSION REDUCTIONS

At present there is no system of methane drainage and therefore, there is no utilization of CMM from the project area. There is no existing gas drainage system operational in the operating mine. To reduce the release of methane into the environment from the operating mine and to make future mining safe, this CMM project has been perceived.

TOTAL VOLUME OF METHANE EXPECTED TO BE RECOVERED/UTILIZED

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<tr>
<td>Total CH₄ recovered and utilized (m³/year)</td>
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COAL PRODUCTION AND METHANE EMISSION CHARTS
MARKET ANALYSIS / DEMAND ANALYSIS

The CMM produced after implementation of the Mohuda sub-basin CMM Project would have a ready market as it is located close to the developed industrial area of Bokaro Steel City and Dhanbad. The produced CMM may be utilized in the Bokaro Steel Plant or other steel plants, or in other industries.

TYPE OF ASSISTANCE SOUGHT

Technical Assistance:
• CBM resource assessment in de-stressed coal seams
• Techno-economic evaluations of the project
• Adoption of suitable drilling technology

PROPOSED TECHNOLOGIES

To be adopted after careful examination of existing geo-mining conditions.

Sucker Rod Pump  Gas-Powered Generator

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