

Major GHG Emissions Savings at Moura Coal Mine Seamgas Operation



Moura gas processing plant with dehydrator in the foreground and compressors to the rear.

Moura Mine is a pioneer in the coal mining field – it is the first operation in Queensland, Australia, to establish a commercial seamgas business alongside its coal mining operations. The owners of Moura Mine are committed to expansion of the existing business to realise the full potential of the mine as a producer of raw materials for energy generation, while simultaneously reducing greenhouse gas (GHG) emissions and improving the safety of future coal mining operations.

About Moura Mine

Peabody Resources Ltd (55%) and Mitsui Coal Holdings Pty Ltd (45%) formed a Joint Venture (JV) to purchase the Moura Mine from BHP Mitsui Coal Pty Ltd in August 1999. Moura Mine is now operated by Peabody Moura Mining Pty Ltd on behalf of the JV.

The Moura Mine has an annual production of 5.3 Mt from current open cut and high-wall mining operations destined for some of Australia's major export markets in Asia, particularly Japan, and Europe. The Mine supplies both coking and thermal coal for use in steel production and electricity generation.

Located in the Bowen Basin coalfields, Moura is a typically gassy mine with major methane gas (CH₄) deposits co-located with the coal resource. Traditional mining practices involved the release of this CH₄ to the atmosphere as a safety measure. However, in more recent times, concern over the loss of this potential energy source – together with the effect that CH₄, as a GHG, may have on the global climate has initiated the collection of this gas for commercial use.

Capturing the Coal Bed Methane

After completion of a gas processing plant and high-pressure pipeline connection to markets in Brisbane and Gladstone, Moura Mine commenced capture and sale of coal bed methane (CBM) in 1996. Gas is extracted via horizontal wells drilled up to 1,500 m into the seam and reticulated to the processing plant where the gas is dewatered, filtered, compressed and dehydrated to Queensland State gas specifications. The capital cost of implementation was estimated at A\$37 million, including A\$8 million expended on methane related research between 1989 and 1994.

Moura Mine is unique in Australia using medium radius directional drilling to prepare commercial gas wells. The drilling technique uses sophisticated locational monitoring and gamma detecting instrumentation located directly behind the down hole drill motor to steer the drilling in the planned direction and maintain the hole within the coal seam.

Over the next two years, the new owners of Moura Mine are planning to expand the seamgas operation from the 1999 production of 3,000 GJ/day up to the design capacity of the processing plant of 18,000 GJ/day. This will require a substantial new well drilling programme.





The drainage of gas from the Moura Mine coal seams has a two-fold benefit:

- Capture of the CBM reduces the release of CH₄ to the atmosphere from the mine and contributes towards Australia's greenhouse gas reduction programme.
- Drainage of the CH₄ from coal seams over several years in advance of mining reduces the cost of gas drainage compared to the current 'just in time' gas drainage employed at many coal mines.

Greenhouse Gas Emission Reductions

At design capacity the CH₄ drainage will represent a significant reduction in on-site GHG emissions. Based on an expected production of 18,000 GJ/day and an assumed energy content of Queensland gas of 37.3 MJ/m³, density of 0.68 kg/m³ and CH₄ content of 98.5%, this represents an annual utilisation of 119,000 t CH₄. GHG emissions associated with this level of CH₄ were it to be vented or otherwise released into the atmosphere are more than 2.5 Mtpa CO₂ equivalent, based on a GWP for CH₄ of 21.

Combustion of the 18,000 GJ/day of gas will yield 328,000 tpa CO₂. However, the gas from Moura will be utilised by different customers in their end use applications in a variety of ways. Typical end use applications could see this natural gas displacing some electricity for domestic water heating and displacing oil, coal and other natural gas in industrial heating applications.

On the basis that 15% of the gas is used in the domestic sector to replace electric hot water heating, then savings of 250,000 tonnes CO₂ in greenhouse emissions will result. This is based on a full fuel cycle CO₂ coefficient per unit of electricity delivered in Queensland of 283 kg CO₂ per PJ and hot water unit efficiencies of 80% for natural gas and 87% for electricity.

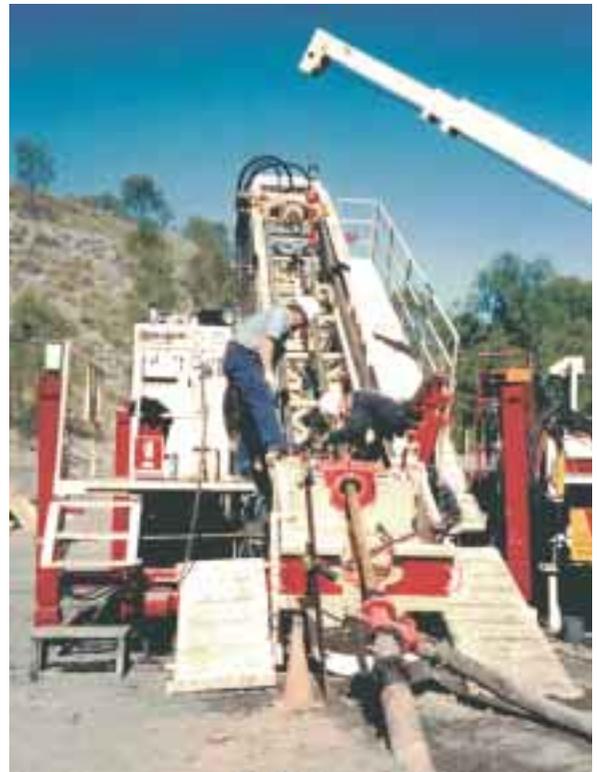
Additional savings would result from other fuel substitution by industrial customers.

Under these circumstances, recovery of CBM at Moura will result in overall savings of more than 2.8 Mtpa CO₂ equivalent.

Reduced Mine Operating Costs

Traditionally methane seamgas is often drained ahead of underground mining on a 'just in time' basis. Even when the drained gas is sold, the cost of drilling far exceeds the value of the gas due to the high drainage rates required.

At Moura Mine, the seamgas operations are being used to drain the gas from seams that will be mined by high wall



Drilling rig at Moura Mine.

The Moura coal seamgas project has the potential to make overall greenhouse gas emissions savings equivalent to 2.8 million tonnes of carbon dioxide per annum.

methods and potentially by underground methods in the future. By allowing a long lead-time of up to five years before mining is to take place, the gas drainage wells can be spaced approximately 300 m apart and traversing up to 1500 m in the coal thus minimising the drilling effort. The operation reduces the gas content of the coal to a level where little or no specific gas drainage would be needed by the time the area is required for mining. The wells produce gas for up to five years and the value of the gas on the gas market can equal the cost of gas drainage. By draining methane well ahead of mining there is the additional benefit of increased safety in the coal mining activities.

The Moura Mine Seamgas Operation is a positive outcome for coal, coal safety and for the environment via the significant 2.8 Mt CO₂ equivalent savings per annum achievable.

For further details on the Moura Coal Mine Seamgas Operation, please contact:

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