

Maximising the Recovery of Coal Reserves in Hot Ground

Liddell Coal Mine, Australia

Site Profile

Hunter Valley Earthmoving operate the Liddell Open Cut Coal Mine in the Hunter Valley for Liddell Coal. The mine operations consist of 5 pits, three of which are effected by elevated rock temperatures caused by spontaneous combustion in old mine workings. Mining is carried out using excavators and trucks for overburden (approximately 15Million BCM pa) and off road trucks for coaling operations (2.5 to 4 Million tonnes pa).

The Situation

Orica was requested to assist in the development and implementation of "Hot Blasting" Safe Working Procedures at Liddell Coal Open Cut in the Hunter Valley. The mine operator, Hunter Valley Earthmoving (HVE), have to contend not only with elevated temperatures in their overburden resulting from burning coal beneath, but also old underground workings which tend to exacerbate the problem.



The Liddell Seam is susceptible to spontaneous combustion and although the mines were sealed on cessation of operations, combustion still prevailed. This combustion is fuelled by added oxygen caused by current mining operations. The old workings in the Liddell seam are now being mined to recover the remnant coal left behind in pillars and to allow access to the lower Barrett seam. Failure to remove these areas results in significant loss of reserves and therefore revenue to the owner.

Blasting Issues

The hot ground at Liddell Open Cut is encountered in overburden located above the areas previously mined in the Liddell seam that had been on fire. Therefore, any solution for mining these areas should consider the complexities of the presence of old workings, hole breakthroughs, fractured overburden and high temperature areas. Technical issues surrounding blasting in hot ground, including temperature monitoring, product selection, application and design to ensure safety and performance were maintained

Technical Solutions

The Australian Standard AS 2187.2 - 1993 defines hot ground blasting as being in ground temperatures greater than or equal to 55°C but less than 100°C. Orica Mining Services has extensive experience assisting mines with blasting in hot ground in a range of different applications globally.

The Xtreme™ range of products have been developed for use in hot ground blasts dependent on the application and are delivered through the Orica Mining Services Mobile Manufacturing Units (MMU's®). Specialised initiation products are used to initiate holes in the hot ground areas. This includes Cordtex™ Pyrocord™, a detonating cord that is heat resistant rated at 8 hours up to 100°C, for downlines and Senatel™ Powerfrag™ emulsion cartridges, also rated up to 100°C for 8 hours, to prime the blastholes.

The Result

Liddell Coal has been able to access reserves on an ongoing basis that would have been lost and combat a problem that had the potential to spread causing further loss of reserves. The removal of areas of spontaneous combustion also reduces the environmental liability on the site.

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