

Bulga Complex Gas Drainage Q&A

Community information sheet
May 2013



Introduction

Due to the interest from the community in gas drainage, the Bulga Coal Complex has produced a comprehensive question and answer information sheet regarding our mine gas drainage program.

Why does the Bulga Coal Complex do gas drainage?

The coal seams mined by the Bulga Coal Complex contain moderate to high levels of gas including methane and very small

amounts of carbon dioxide. This gas is released from the coal seam during mining and can lead to a risk of fire and explosion within the underground mine.

Gas is a major safety concern for underground coal mining and has unfortunately resulted in several historical mine disasters in Australia and overseas. The recent tragedy in New Zealand is an example of how dangerous gas is in mining operations. Current best practice to reduce the risk to the workforce involves draining the gas from the seam before underground mining occurs.

Gas drainage also assists in reducing the mine's greenhouse gas emissions. By capturing and flaring the methane, and by utilising it to produce electricity, the potentially harmful

effects of methane on the atmosphere are substantially reduced.

What approvals do you need?

Gas extraction is approved as part of the underground mine's Project Approval granted by the Minister for Planning in NSW.

This approval runs until 2031. Additional details of the gas drainage process are also approved under the Mining Act which specifically cover safe working practices for the mine. Construction and operation of the 25MW power plant was approved in July 2010 to utilise the gas for generating electricity.

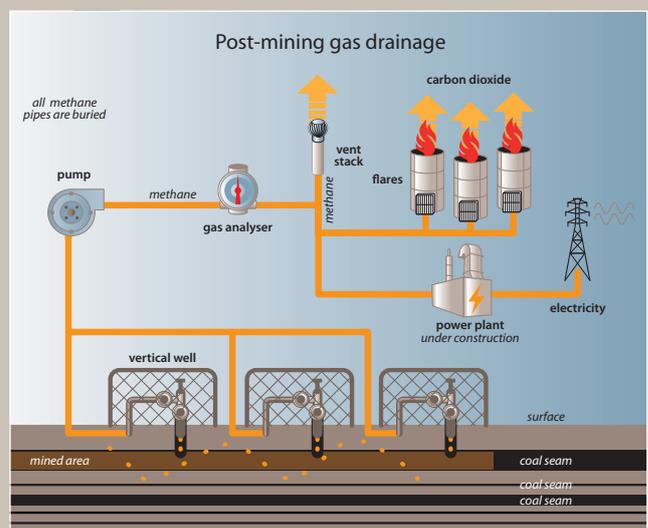
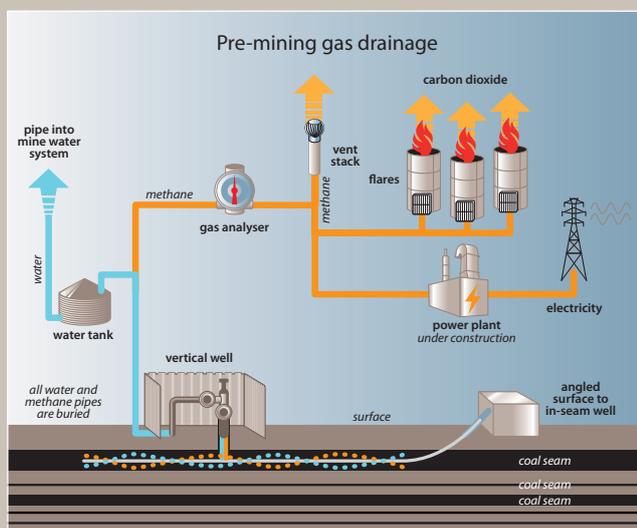
What processes are used?

There are two phases of gas drainage. Firstly, gas is extracted from the seam before mining begins in each mining panel (known as pre-drainage). This involves drilling vertical gas wells down into the coal seam. Long horizontal holes are also drilled within the seam to join up to the vertical holes. Gas flows out of the coal seam under natural pressure through these gas wells into the pipeline collection system and is currently flared (burnt) to reduce the greenhouse gas effects caused by methane being released into the atmosphere.

The second phase is called post-drainage where vertical and horizontal gas wells are drilled into the longwall workings after

the coal has been mined. The gas is removed under suction to prevent it entering the nearby mine workings which can also cause a safety issue. This gas is collected through a network of buried pipes and is also flared.

The Bulga Coal Complex has commenced construction of a power plant to utilise methane gas to generate electricity. Small quantities of brackish water are also recovered from the gas wells, and pumped to the mine's water management system for use in dust suppression and the coal processing plant.





Directional drill rig



What equipment is used?

The vertical gas wells are drilled by large conventional exploration drill rigs.

Directional drill rigs are used to drill the angled holes that run down to and horizontally within the coal seam. This type of drill is a larger version of directional boring drills commonly used to install cables and pipes under roads.

The gas wells have valves and monitoring equipment located at the top of each hole, which are often enclosed in a small shed to shield them. Vacuum extraction pumps are installed in the post-drainage system to draw gas from the mined out areas. Gas will be compressed to pump it to the power plant site.

Conventional exploration drill rig

What potential impacts can gas drainage have on the environment and how are they controlled?

Methane is a greenhouse gas which can have a detrimental effect on the atmosphere. Without the gas drainage system, the methane would enter the atmosphere through the mine ventilation system. Gas is recovered from the gas drainage system to improve safety and is currently flared to reduce the mine's greenhouse gas impact. A gas fired power plant has been approved for the Bulga Complex and is currently being constructed to utilise methane gas recovered from the coal seam for power generation.

Drilling noise may disturb nearby residents. This is controlled by drilling the vertical gas wells in daylight hours only and by erecting temporary sound barriers around the drills such as shipping containers or removable acoustic barriers. These are removed after drilling has been completed. Drilling of the surface to in-seam wells is required to run 24 hours a day to maintain the stability of the hole. These wells are located away from nearby residents.

Underground mining usually requires pumping of water from the mine during mining operations. As a result of gas extraction, approximately four megalitres of water is drawn annually from each well before mining commences.

Changes to the surrounding groundwater levels are monitored during the mining process to ensure no adverse impacts occur to the Wollombi Brook or Monkey Place Creek alluvial aquifers. Gas drainage gas wells and longwall mining at Beltana are not undertaken under or within these alluvial lands.

Drill pads and gas well installations are rehabilitated at completion of gas drainage to re-establish the former land use.

How are potential impacts monitored?

Monitoring is undertaken to measure the gas produced from each well. The water quality is monitored regularly before the water is used on the mine site. Noise is monitored regularly during drilling.

The mine operates an environmental management program which collates and analyses the monitoring results. The program also determines where roads and drill pads can be built and runs environmental audits to ensure that these procedures are being correctly undertaken.

How long are the gas wells in place for?

Each mining panel has its own set of gas wells which are usually in place for two to four years to extract gas during the development and mining of each mining panel. The post-mining gas wells are usually in place for two to three years after mining has been completed in each panel. When the gas wells are no longer used, they are sealed with concrete from top to bottom in accordance with Department of Industry and Investment NSW regulations.



Visual screening of a surface to in-seam gas well using photographic decals



Visual screening of a vertical gas well using a painted shed



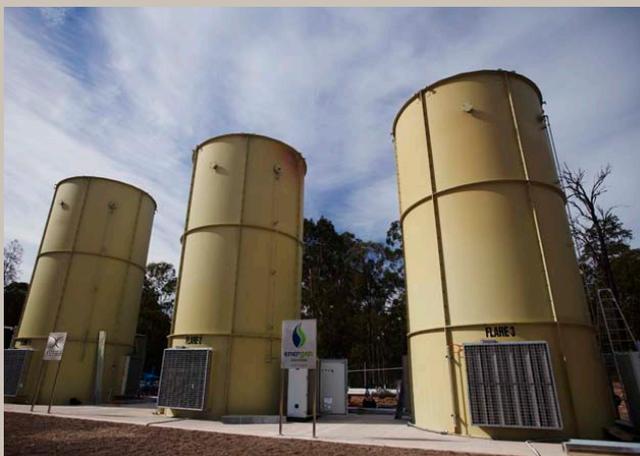
Visual screening of a vertical gas well with native trees

What do you do with the water that is produced?

The water is collected and pumped to the mine's water storage dams. The water can then be used in the coal washery, and for dust suppression on roads and on stockpiles.



Tanks used to store coal seam bore water



Flares

What do you do with the gas?

Gas is currently burnt using flares located on the mine site to reduce the greenhouse gas impacts of methane on the atmosphere. The Bulga Coal Complex received project approval in July 2010 to construct and operate a 25MW power plant which will produce electricity from the methane. The Bulga Coal Complex has commissioned the 9MW first stage of the power plant which is planned to commence operating in 2013. This will utilise the gas as first priority. Because the gas is not produced at a constant rate, excess methane will continue to be flared.

The Bulga Coal Complex is considering developing further power plants to use the gas which will be extracted as a result of its future underground mining program.

What is hydraulic fracturing and does Xstrata Coal use it?

The Bulga Coal Complex does not utilise hydraulic fracturing (commonly referred to as 'fracking') in its gas drainage program. Hydraulic fracturing involves fracturing the coal seam underground by injecting a combination of high pressure water, sand and chemicals into the coal seam. This technique is generally used to increase the amount of gas recovered from a seam. Hydraulic fracturing can involve the use of BTEX chemicals such as benzene, toluene, ethylene and xylene. Xstrata Coal **does not** use any of these chemicals in its gas drainage drilling program.

The Bulga Coal Complex has previously conducted a small trial using the hydraulic fracturing method; however, this method of gas extraction is not suitable for the coal seams or the underground mining activities at the Complex. The Bulga Coal Complex does not use this technique. The Bulga Coal Complex can achieve better results using gas wells and horizontal directional drilling within the seam.

Do you drill on private land or company owned land?

To date, the majority of gas extraction gas wells have been installed on Bulga Coal Complex owned land. In the future, private access agreements will be made with land owners to enable the Bulga Coal Complex to install some of the gas wells on private land. These installations also include access roads, powerlines and pipelines. When the gas wells are no longer required, the equipment will be removed, the gas wells sealed with concrete and the area rehabilitated in consultation with the landholder.



Beltana and Bulga Coal information display at the Broke Fair in 2009



Community consultation at the Bulga Tavern in 2009

Consultation program

Updates on the Bulga Coal Complex gas drainage activities have been included in the:

- Bulga Coal Complex Community Newsletter
- Bulga Coal Complex Broke Fair display
- Community barbeques
- Information sheets
- Landholder correspondence and meetings
- Presentations to the Hunter Valley Protection Alliance

The Bulga Coal Complex will continue to keep the community informed of any developments associated with the gas drainage program.

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Xstrata's commitment to Sustainable Development

We are committed to the goal of sustainable development. We balance social, environmental and economic considerations in how we manage our business. We believe that operating to leading standards of health, safety and environmental management, contributing to the development of sustainable communities, and engaging with our stakeholders in two-way, open dialogue, regardless of our location, enhances our corporate reputation and is a source of competitive advantage. This enables us to gain access to new resources, maintain a licence to operate, attract and retain the best people, access diverse and low-cost sources of capital, identify and act upon business opportunities, and optimise our management of risks.