

# The Australian Mine Ventilation Conference 2017

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## Findings from preliminary testing to determine alternative sources of ethylene within sealed areas of underground coal mines

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### **ABSTRACT**

The detection of ethylene in mined-out “goaf” areas of underground coal mines is an industry standard indicator of accelerated oxidation where the coal temperature has exceeded 100°C. If uncontrolled, this naturally occurring process can lead to spontaneous combustion and catastrophic mine explosions, such as the Moura No.2 mine explosion. Spontaneous Combustion Trigger Action Response Plans (TARPs) typically use the detection of ethylene as a trigger for definite change requiring immediate reaction, which can include the withdrawal of coal mine workers.

Following the completion of sealing of longwall goaves at Crinum North Mine, ethylene was often detected in trace quantities. This ethylene was detected via the bag sampling regime in place as per the respective sealing management plan, and was found to be present in quantities below 1ppm in all samples analysed by gas chromatograph. Further to this, any ethylene detected was not associated with increased quantities of carbon monoxide to conclusively indicate a heating within the sealed area.

Ethylene was only detected in a newly sealed goaf and would not remain present for an extended period following the sealing. As part of the longwall recovery process, the predominant roof support mechanism during the recovery was the use of timber cribs. It was decided to investigate the possibility of this timber generating ethylene.

Preliminary tests were completed by placing timber specimens from several species of Australian Native hardwoods in gas bags in air. Over time, some of the samples showed significant levels of ethylene within the bags.

This paper discusses the issues faced at Crinum North mine, the concept behind the testing and preliminary results found. The results obtained should provide enough support for further investigation into this issue.

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## A review of the strategy and gas monitoring results obtained during the use of the QMRS GAG at Crinum North Mine

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### **ABSTRACT**

Final mine sealing of BMA's Crinum North mine, near Emerald, Queensland was undertaken in December 2015. Due to the benign atmospheric environment at Crinum North, the Queensland Mines Rescue Service GAG unit was utilised to reduce oxygen levels throughout the underground atmosphere as part of the final sealing process.

The GAG was utilised by way of a vertical borehole from the surface to seam to successfully reduce oxygen levels throughout the underground mine workings. Application of the GAG unit enabled the underground mine to be classified as stable and inert within days of the GAG operation, and subsequently cease gas monitoring at Crinum North. The data and information obtained from this activity provides valuable information to the underground coal mining industry on successful application of the GAG in realistic situations.

This paper discusses the strategy used for sealing, the assisted inertisation and the results obtained from the application of the GAG unit. This paper discusses both the overall result and a detailed review the gas monitoring data obtained via the tube bundle and real time system, both during and following the use of the GAG unit.

Gas monitoring results obtained and the strategy used are critical to share with the industry to obtain a better understanding of how the GAG unit works and how it can be applied for emergency preparedness, emergency response or planned inertisation.