

SAFETY BULLETIN

Sealing of a goaf or mined out area in an underground coal mine and management of legacy sealed areas

BACKGROUND

NSW Trade & Investment Mine Safety has been provided with information about potential explosions that may occur in sealed goaves or mined out areas. The Mine Safety and Health Administration USA report into the Sago Mine explosion now means that the possibility of a lightning strike to the surface over and surrounding such areas must be considered as a direct ignition source in addition to mine infrastructure that may be capable of conducting electrical energy into a mine.

Lightning can also indirectly couple to insulated conductors in a sealed area and such coupling would have sufficient magnitude to generate an arc capable of igniting an explosive mixture of methane.

Sealed goaves and mined out areas in existence before the release of this bulletin are to be deemed as legacy goaves and mined out areas. The provisions of this bulletin need only be applied to legacy areas if the assessed risk at the mine warrants that action.

RECOMMENDATIONS

1. It is recommended that any coal operator in NSW that cannot quantitatively demonstrate that their existing sealing arrangements for goaves or mined out areas are tolerable and maintained as low as reasonably possible (ALARP), then one of the following measures be implemented to eliminate or control the risk of explosion post sealing:
 - a. Maintain the goaf or mined out area inert before and after sealing, and employ normal 20 psi overpressure rated mine seals.
 - b. Evacuate the mine until a sealed goaf or mined out area has passed through the explosive range and employ normal 20 psi overpressure rated mine seals.
 - c. Permit the goaf or mined out area to pass through the explosive range, without evacuation of the mine, after the installation of 120 psi or 120 psi plus overpressure rated seals in all entrances to the goaf or mined out area.
 - d. Ensure all ratings of seals are for a tested design that meets the overpressure rating awarded. Design testing must be for full scale seals. Testing and rating of seals must be undertaken by an organisation approved by the Chief Inspector.
2. Using a risk-based approach, coal operators should review and evaluate the likelihood of a lightning strike initiating an explosion in an underground coal mine. The obligation on those who seal goaves or mined out areas is to apply new, proven, practical technology to reduce the risk to life of mine workers from an explosion after sealing.

3. Coal operators are to consider indirect coupling of lightning into sealed areas as an ignition source when determining the risk of explosions and apply new, proven, practical technology to control the risk of explosions.
4. Coal operators are advised to remove all conductive material that may be insulated from the general mass of earth from goaf areas and areas that are to be sealed. Coal operators are advised where conductive material is likely to remain in sealed areas, e.g. windblast monitoring, gas monitoring, then it can only be done where the risk is ALARP.
5. Coal operators are advised to develop and implement a gas monitoring regime designed to specify the placement of sampling points and sampling frequency for pre and post sealing times. The gas monitoring regime shall be developed in consultation with the mine's Inspector of Coal Mines.
6. Coal operators are advised to develop the capability to remotely monitor sealed areas from the surface for times when the mine has been evacuated.
7. Coal operators are advised that the structural rating of 20 and 120 psi seals shall be to a standard acceptable to the Chief Inspector of Coal Mines. The structural rating of 20 and 120 psi seals shall extend beyond the seal matrix and is to include the junction of the seal matrix with the roof, ribs and floor at the seal location.
8. It is recommended that practical, regular training in the donning, use and change-over of self rescuers be adopted in NSW. This training should be undertaken at a frequency that ensures employees are fully familiar with the self-rescuers in use at the underground coal mine. This training should be included in the Emergency Management System required by the *NSW Coal Mine Health & Safety Act* and *Regulation*.

NOTE: Please ensure all relevant people in your organisation receive a copy of this Safety Bulletin, and are informed of its content and recommendations. This Safety Bulletin should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Signed



Rob Regan
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Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing. (August 2013) However, because of advances in knowledge, users are reminded of the need to ensure that information on which they rely is up to date and to check the currency of the information with the appropriate officer of the NSW Department of Trade and Investment, Regional Infrastructure and Services or the user's independent advisor.