Department of Industry
Resources Regulator

Mine Safety

SAFETY ALERT

Workers exposed to elevated levels of methane

INCIDENT

On 25 October 2016, a disruption to the ventilation system in a NSW underground coal mine resulted in potentially explosive levels of methane gas migrating into the longwall return airway while workers remained underground. The Resources Regulator served a Prohibition notice on the mine operator, immediately stopping mining operations. This event led to the re-examination of the triggers and emergency plans for the withdrawal of workers from NSW mines.

CIRCUMSTANCES

The mine uses two sets of main ventilation fans at two shaft sites to ventilate the underground workings. An electrical fault on the mine's power supply resulted in shutting down one of the two sets of main ventilation fans.

At the time of the incident there were about 150 workers underground.

Production panel workers were withdrawn to the underground crib (meal) room. Development panels withdrew to the entry of the panel and outbye workers withdrew to pit bottom. No workers were directed to evacuate to the surface.

INVESTIGATION

An investigation discovered:

- the back-up power supply for the fans did not automatically start as they were designed
- ventilation fans at the second shaft site continued to run as programmed, drawing methane from waste workings into underground roadways
- the mine's trigger action response plan (TARP) did not require workers to be immediately withdrawn to the surface when the main ventilation system failed
- elevated levels of methane were drawn throughout the mine when the main ventilation was restored
- mine workers remained underground during the entire incident
- TARPs for withdrawing workers in relation to a main fan failure were based on time elapsed, not on unsafe levels of methane gas.

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LEGISLATION

Clause 14 of the Work Health and Safety (Mines and Petroleum Sites) Regulation requires the safety management system for a mine to include the procedures and conditions under which people at the mine, or a part of the mine, are to be withdrawn to a place of safety and to remain withdrawn as a precautionary measure when a risk to health and safety warrants withdrawal.

Mine operators of all underground mines (coal and metalliferous) in NSW are required to take action when ventilation is inadequate. The key legislative provisions are those relating to the duty to prepare a ventilation control plan (clause 62 WHSMPSR[1])

Key extracts from this clause are as follows.

- The mine operator of an underground mine must ensure that a ventilation control plan is prepared to provide for the management of all aspects of ventilation at the mine.
- The ventilation control plan must describe all control measures implemented in relation to ventilation at the mine.
- The ventilation control plan must include:
    - a description of arrangements, in the event of a loss of power supply, for an alternate and independent way of operating the main ventilation fans or for the withdrawal of people from the mine
    - arrangements for managing risks to health and safety associated with ignition sources in the event that the main ventilation fans fail to adequately ventilate the mine
    - procedures to ensure the health and safety of people at the mine in the event of a total or partial ventilation failure
    - starting procedures for fans
    - procedures to be followed in the event of the failure of the main ventilation system including details of the circumstances requiring the safe withdrawal of people from the mine and the sounding of an alarm at the surface if any main ventilation fan stops.

RECOMMENDATIONS

Ventilation is a critical control measure in the management of noxious and flammable gases. It is reasonably foreseeable that a loss of main ventilation in a gassy underground mine will result in an accumulation of potentially explosive mixtures of gas. It is also reasonably foreseeable that on restarting the ventilation system for the mine, high volumes of high-concentration methane could be drawn through the mine's return ventilation circuit if effective control measures are not in place.

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[1] Regardless of whether or not a mine has transitioned to a safety management system under the Work Health and Safety (Mines and Petroleum Sites) Regulation, mine operators have a primary duty to ensure the safety of workers so far as is reasonably practicable.

Although power was not restored to the underground parts of the mine, potential ignition sources were still present. In such circumstances, workers should not be underground during the restoration of ventilation, other than those directly involved in the restoration work.

Therefore, it is recommended that:

1. mine operators review their procedures for the safe withdrawal of workers from mines in the event of a total or partial ventilation failure
2. trigger action response plans (TARPs) include actions to adequately address all foreseeable circumstances associated with a particular hazard
3. a WHSMPSR clause 10 and 17 review of controls be conducted on a periodic or post-incident basis to ensure sound risk management
4. a trend toward a condition of danger is seen as a trigger that requires a timely response so that workers are withdrawn before becoming exposed to a dangerous situation
5. in an event where explosive mixtures of methane are highly likely and/or present, all underground workers be immediately withdrawn from the underground workings.

NOTE: Ensure all relevant people in your organisation receive a copy of this Safety Alert and are informed of its content and recommendations. Process this Safety Alert through the mine's information and communication systems, and ensure a copy is placed on the mine's notice board.

Issued by

Dave McLean
Chief Inspector of Mines
Appointed pursuant to *Work Health & Safety (Mines and Petroleum Sites) Act 2013*

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