Mines Safety Bulletin No. 151

Subject: Ventilation design in underground mines

Date: 26 April 2018

Background

In November 2015, there was a fatality at a mine when a worker was exposed to high wet bulb temperatures in a poorly ventilated underground working area. Since then there have been other incidents of underground workers being affected by heat and requiring medical treatment – in one instance a worker became semi-conscious. In addition, mines inspectors have also reported deteriorating ventilation conditions at some underground mines raising concerns about the maintenance of thermal comfort and atmospheric contaminants below exposure standards.

From August 2016 the Department has been conducting unannounced inspections of underground ventilation systems. This has resulted in production and development in work areas being halted, issuing of prohibition and improvement notices and, in some instances, follow-up inspections.

Summary of hazard

Inadequate ventilation may lead to:

- an increase in temperature and humidity which reduces the cooling capacity of air, resulting in an elevation in the core body temperature and the onset of heat illness
- the inability to maintain atmospheric contaminants at levels below the exposure standard and as low as is reasonably practicable, exposing workers to a hazardous work environment with potential short- and long-term health effects. Contaminants include those from diesel emissions, gas outbursts, blasting fumes, dusts and fibrous materials.

Contributory factors

- Inadequate verification of the effectiveness of the ventilation design (e.g. comparing expected and actual performance).
- The limitations of ventilation designs not adequately understood, particularly their time-dependent nature. For example, if new ventilation rises are not developed in a timely manner and fan installation delayed, the current design may not be able to deliver adequate ventilation to new headings.
- Inadequate ventilation design for work areas (e.g. air volume requirements for mining activity not being met).
- Inadequate training provided to workers and supervisors in the assessment of general atmospheric conditions and use of monitoring equipment.

- Workers not communicating to supervisors that they are operating in inadequately ventilated headings.

Actions required

Underground mining operations are reminded of their requirements under Part 9 and Part 10, Division 4 of the Mines Safety and Inspection Regulations 1995 [MSIR]. The following actions are recommended to duty holders to assist in the provision of a safe mine atmosphere.

- Verify the ventilation system is performing as designed following installation or changes to the primary ventilation infrastructure (e.g. increase in fan size, addition of vent rises).

  Note: Ventilation measurements should be taken under operating conditions.

- Confirm the ventilation system's design capacity and design parameters are not exceeded by changes in production and development scheduling.
- Confirm there is a ventilation design standard for each work area to account for the air requirement for the type of mining activity.

  Note: Refer to rr. 9.14, 9.15, 9.16 and 9.22 MSIR, as a minimum.

- Establish a trigger action response plan (TARP) outlining the minimum actions required by workers in response to a deviation in working conditions (e.g. contaminant levels, thermal conditions).
- Provide adequate information, instruction and training for workers in the management of ventilation in their work areas, including taking ventilation measurements using appropriate instruments and reporting adverse ventialtion conditions.

  Note: Training for supervisors can also include an understanding of legislation, basics of ventilation designs, and the management of ventilation controls (e.g. chokes, doors).

Further information

- Department of Mines, Industry Regulation and Safety, Mines safety alerts, www.dmp.wa.gov.au/Safety/Mines-safety-alerts-13194.aspx

  SIR No. 232 *Underground operator collapses underground – fatal accident*

  Mines Safety Bulletin No. 95 *Ventilation standards in underground mines*

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