Government of Western Australia
Department of Mines and Petroleum
Resources Safety

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Subject: Ventilation standards in underground mines

Summary of hazard

Inspections of underground operations in the Goldfields have highlighted poor ventilation practices, particularly in the lower level workings of decline mines and in relation to the risks associated with excessive temperatures, the use of diesel equipment and dispersal of fumes after blasting.

The consequences of poor ventilation include:

- heat exhaustion where temperatures are excessive;
- exposure to blasting fumes, which can lead to unconsciousness and even death;
- exposure to excessive levels of diesel particulates, which can lead to occupational health issues such as lung damage; and
- increased exposure to risk when fatigue results from a poor working environment.

This safety bulletin addresses inadequate ventilation standards in underground mines, including the use of single fans to ventilate multiple headings.

Contributory factors

Observations indicate that the following can result in poor ventilation:

- inadequate planning and scheduling resulting in the main return shafts and airways being too far behind the decline and level development;
- electrical infrastructure not properly planned to provide an adequate power supply for multiple fans;
- fan characteristics not properly assessed for the diameter and length of ventilation ducting required;
- inadequate consideration of the regulatory requirements for ventilation standards at truck loading stockpiles in declines and on operating levels;
- shift supervisors not aware of ventilation standards with regard to velocities and quantities of air; and
- lack of appropriate equipment to monitor blasting fumes and noxious gases; and
- use of single fans to ventilate multiple headings.

Action required

Specific actions are necessary under the Mines Safety and Inspection Regulations 1995 to ensure the adequacy of ventilation practices in underground mines.

- Regulation 9.14 requires the manager of an underground mine to ensure that ventilating air is provided in sufficient volume, velocity and quantity to:
  - remove any atmospheric contaminants; and
  - maintain a healthy atmosphere in workplaces.
- Regulation 9.15 outlines the requirements to address the adverse effects of extremes of heat and cold. Where the wet bulb temperature exceeds 25^{o}C, an air velocity of not less than 0.5 metres per second (m/s) must be provided.

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- Regulation 10.52 outlines the ventilation standard when diesel equipment is used. Loaders and trucks used in the Goldfields for loading at stockpiles have power ratings that require ventilation quantities typically between 25 m^3/s and 40 m^3/s at loading locations. In many cases, this means that the velocity of air required at the stockpile is greater than 1 m/s.

This bulletin serves as a reminder to responsible persons at mines to review current ventilation practices to ensure their adequacy. Consider the need to:

- strictly adhere to the planned intervals between ventilation surveys;
- include stockpile loading locations in ventilation surveys;
- monitor scheduling of return airway development to keep up with the general development of the mine;
- advance electrical infrastructure in a timely manner;
- discourage the practice of ventilating multiple ends from one fan — it may be practical to work two ore drives in opposite directions but multiple levels should not generally be ventilated with one fan;
- carefully assess fan characteristics against the duties required;
- make shift supervisors aware of the ventilation standards in their operating areas;
- provide employees engaged in re-entry examinations after blasting with monitors suitable for the range of gases likely to be encountered; and
- provide shift supervisors and operators with the ventilation quantities required for the operation of diesel equipment in their operating areas.

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