Dangerous Goods Safety Bulletin No. 0117 and Mines Safety Bulletin No. 144

Gas storage for automatic fire-suppression systems

Background

Automatic fire-suppression systems are usually installed in rooms containing significant amounts of electrical equipment, such as large server rooms and data centres. The systems typically work by automatically releasing an inert dangerous good (Division 2.2 non-flammable, non-toxic gas) in the server room or data centre to reduce the oxygen levels, which controls and extinguishes fires without human intervention.

Several incidents involving the unintended activation of fire-suppression systems have been reported. Due to an actuator failure, sites were unaware the system had activated. The Department of Mines and Petroleum has inspected sites that store their connected gas cylinders in a separate gas storage room to the data centre or server room. The potential for a gas release in the storage room may not have been adequately considered.

Note: In one incident a triple zero caller heard a large hissing noise coming from the gas storage room. The Department of Fire and Emergency Services attended and detected that the oxygen level in the gas storage room was below 19.5 per cent.

Summary of hazard

The gas released when fire-suppression systems are activated is an asphyxiant hazard and can cause suffocation by diluting or displacing oxygen.

A fire-suppression system's gas storage cylinders.

Contributory factors

- Gas cylinders are installed in workspaces.

- Inadequate risk assessment of the gas storage room, resulting in inadequate ventilation, no alarms (e.g. leak detector), no oxygen monitoring and no placarding or labelling on the door warning of the presence of dangerous goods.

Actions required

Operators are reminded of their duty to ensure that all risks associated with the presence of a hazardous atmosphere within the site are eliminated, or if this is not reasonably practicable, the risk arising from the hazardous atmosphere is minimised.

Note: A hazardous atmosphere in this case means an atmosphere that does not contain a safe concentration of oxygen for breathing.

Recommended actions include:

- taking measures to detect oxygen-deficient atmospheres in areas where there is a potential for an unintended gas release, such as server rooms and gas storage rooms

  Note: Alarms should be in place to alert workers when oxygen levels are below 19.5 per cent.

- providing adequate natural or mechanical ventilation where connected gas cylinders are stored outside of the server room

- training workers in:

  - the risks of asphyxiation and control measures

  - procedures and processes for working in rooms containing gas storage cylinders

  - operation and maintenance of fire-suppression system equipment

  - the proper use, fitting and maintenance of personal protective equipment and risk control equipment

  - implementation of the emergency plan

- installing safety signage in accordance with AS ISO 14520.1 *Gaseous fire-extinguishing systems – Physical properties and system design – General requirements*.

- placarding the entrance to the building and each room where the total water capacity of all the gas cylinders and associated pipework of Class 2 dangerous goods exceeds 1,000 litres

- installing HAZCHEM signage at every entrance to the site.

Placard for Class 2 dangerous goods and HAZCHEM signage

Further information

- Standards Australia, www.standards.org.au

  AS 1851 *Routine service of fire protection systems and equipment*

  AS 4332 *The storage and handling of gases in cylinders*

  AS ISO 14520 *Gaseous fire-extinguishing systems – Physical properties and system design (set)*

- Department of Mines and Petroleum, codes of practice, www.dmp.wa.gov.au/Safety/Codes-of-practice-16207.aspx

  Storage and handling of dangerous goods – code of practice

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