



**Fire Protection Industry
(ODS & SGG) Board**

ARTICLE

Fire Protection in the Mining Industry

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Mine sites across Australia are both broad and varied in how they operate as well as the critical natural resources that they search for. However, all have in common, highly expensive and mission critical equipment that typically operate day and night under extreme hostile conditions, in vast, remote and difficult to access environments, especially on underground equipment.

The last thing a mining operation can afford is a fire. Not only will it threaten the safety of operators and destroy vital equipment, a devastating fire most certainly will be catastrophic to production and profits. This is why it is so important to ensure that all these mission critical equipment are protected by appropriate fire protection systems.

Fire safety in the industry

On a mine site, fire hazards may occur in and around process plants, underground conveyors, static and mobile plants, draglines, workshops, substations, monitored control rooms and switch rooms. In many cases non-gaseous and gaseous fire suppression systems are the preferred systems installed to protect the high value assets, safeguard operators and processes so as to guarantee business continuity.

Systems and equipment used

Non-gaseous systems are primarily used on mobile plant and are usually not scheduled extinguishing agents under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (the Act).

Gaseous fire suppression systems typically encompass extinguishing agent stored in pressurised cylinders that are connected to a network of discharge pipework and nozzles that deliver the extinguishing agent to an enclosure to be protected. Typically they also include dedicated fire detection and control systems which provide an automatic discharge if a fire starts.



These systems are best used to primarily protect delicate electronic and electrical equipment against fire due to their quick detection of a fire event, and rapid suppression & extinguishment capabilities. An additional benefit is the extinguishing agents used do not leave any residue after discharge, and hence sometimes are referred to as 'clean agents'.

There are two broad groups of extinguishing agents:

- **Inert gases** - are naturally occurring gases such as nitrogen, argon, carbon dioxide or combinations of these (e.g. IG541, IG55). They extinguish fires by reducing the available oxygen to a level below that which a fire needs to burn (typically less than 15%).
- **Synthetic gases** – are manmade manufactured gases and they extinguish fires by reducing heat and using chemicals to interfere with the fire chain reaction.

Both types of extinguishing agents have their own advantages and disadvantages. This means that choosing the most suitable fire extinguishing agent for a specific application will depend on a range of factors including their impact on the environment.

Scheduled extinguishing agents

A number of synthetic extinguishing agents are ozone depleting substances (ODS), i.e. when released into the atmosphere they will deplete the stratospheric ozone, and/or synthetic greenhouse gases (SGG), i.e. when released into the atmosphere they will contribute to global warming.

As such, these are defined as scheduled agents under the Act and the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 (the Regulations). The Regulations stipulate certain obligations in how they are to be acquired, stored, used, handled, disposed of and maintained safely to minimise their impact on the environment.

Under the Act, a scheduled extinguishing agent can only be discharged where the product containing the extinguishing agent is being used for its designed purpose, in other words in response to an actual fire. Discharge for testing or training purposes are not permitted unless the person meets the requirements in the Regulations, and has been granted a fire protection industry permit to do so by the Fire Protection Industry (ODS & SGG) Board (the Board).

It is very important that all mine owners, facility managers, and operators understand the potential environmental impacts of scheduled extinguishing agents if released into the atmosphere. To learn more about the effects of scheduled extinguishing agents, please visit the Department of the Environment and Energy website <http://www.environment.gov.au/protection/ozone>



The types scheduled extinguishing agents in the mining industry

Scheduled extinguishing agents that are most typically used on mine sites are:

Product name	Uses	Other name
FM-200® FE-227™	Function as total flooding agents. Typical applications could include chemical storage areas, clean rooms, communications facilities, laboratories, museums, robotics and emergency power facilities.	Heptafluoropropane HFC-227ea
NAF-P-III	Typically used as a streaming agent. It is a replacement for Halon-1211. Effective on Class A, B and C type fires.	HCFC Blend C
NAF-S-III	Typically used as a total flooding agent. It is a replacement for halon-1301. Effective on Class A, B and C type fires.	HCFC Blend A

Typically they will be contained in fixed fire suppression systems located in or around the fire risk areas such as control rooms, data centers, electrical switch rooms, and process control rooms. Large mobile plants including large excavators, shovels, draglines, haul trucks and wheeled loaders may also have fire suppression systems installed that may contain such agents. The primary scheduled extinguishing agent used on mine sites is FM-200®/ FE-227™ (with some minimal use of NAF S-III and NAF P-III).

Halon systems (halon 1301, halon 1211) have been phased out due to its significant ozone depleting and global warming impact to the environment are now typically not found on mining sites. The use of halon has been restricted to only “essential use”, and a halon special permit must be held.

If you are aware of a halon system installed in your facility (easily identified by its yellow cylinders) you should arrange for the system to be decommissioned and the cylinders sent to the National Halon Bank for disposal (please call 1800 658 084).

Identifying gaseous fire suppression system has been installed

Rooms or enclosures protected by gaseous fire suppression systems typically have warning signs installed on or above doorways into the room/enclosure.

Most of these systems will operate automatically if fire or smoke is detected. Any activity which may cause the detection system to go into alarm (such as soldering or other activities which create clouds of dust or smoke) must not occur unless the gaseous fire suppression system has been isolated.



Some systems may have controls installed to allow the system to be discharged manually, if required in a fire emergency. If you are not sure what a control does – don't touch it.

If you need training on how the gaseous fire suppression system installed in your facility works, speak with your supervisor or contact the fire service provider that maintains your system.

Ensuring correct servicing and installation of fire protection systems

All fire equipment and systems including gaseous fire suppression systems need to be regularly tested, serviced and maintained to help ensure that they will be ready to operate as intended at the event of a fire. Australian Standard, AS 1851-2012 Routine service of fire protection systems and equipment sets out these requirements.

The objective of AS 1851 is to maximise the reliability of fire protection systems and equipment such that the systems and equipment meet the requirements of the relevant design, installation and commissioning standards and are likely to continue to do so until the next scheduled activity. Section 7 of the standard contains the inspection and testing requirements for gaseous fire suppression systems.

Under the Regulations, to minimise the environmental impact for accidental discharge of scheduled extinguishing agents it mandates that work on such systems (including the installation, decommissioning and servicing) must be performed by an appropriate licensed technician.

Fire Protection industry (ODS & SGG) Board

The Board, appointed by the federal Minister for the Environment and Energy, administers the fire protection division of the regulations on behalf of the Australian Government. The Board exercises a range of powers and functions in all states and territories in Australia, including to:

- receive applications and application fees for fire protection industry permits
- process applications within the 30 day time frame specified in the regulations
- issue fire industry permits in accordance with the regulations
- inspect premises as specified in the Regulations.

The Board also undertakes other functions to educate the public and raise awareness of the FPI scheme.

- provides customer services support to members of the fire protection industry and the general public
- undertakes a program of communications and awareness activities aimed at encouraging compliance with the fire protection industry permits scheme.



The Board provides ongoing information to the fire protection industry and the general public on its activities and purpose. This improves the awareness and understanding of scheduled extinguishing agents, the legislative requirements surrounding them and the need to reduce their use and the potential risk for accidental emissions.

Mining fire safety summary

For gaseous fire suppression systems to operate effectively on mining site, it is recommended that:

- Owners, facility managers, only have technicians working on gaseous fire suppression systems that hold the appropriate Extinguishing Agent Handling licence (EAHL) when installing, decommissioning, servicing or handling scheduled extinguishing agents.
- Owners of gaseous fire suppression systems use a maintenance log book to record all maintenance activity. The use of logbooks will establish a process for documentation and provide a full life-cycle chain of custody documentation for all installed systems. A log book would record all maintenance activity and record the details of the licensed technician who is servicing the system.
- Ongoing maintenance of systems will greatly improve the efficiency and longevity of the system.

The Board has also published a mining industry factsheet and an *Ozone Depleting Substances and Synthetic Greenhouse Gases (ODS & SGG) Good Practice Guide*. Technicians servicing or working on gaseous fire suppression systems containing scheduled extinguishing agents on a mine site are encouraged to download a copy of the Good Practice Guide and the factsheet from www.fpiib.com.au/ozone.

The guide and factsheet provide additional information on obligations under the Regulations and further details on the issues discussed in this article.

Finally, if you would like further information in relation to this article or wish to contact the Board, please contact Julia Nicolas, Communication and Compliance Coordinator at (03) 8892 3131 or julia.nicolas@fpiib.com.au.

