

MEMORANDUM**QUESTION 1****1.1 Mine ventilation and rescue plans**

(MHSA Reg.17.19)

At every underground mine, a ventilation and rescue plan of the workings shall be kept, taking into consideration the requirements of regulation 17.22, drawn to a legible scale and depicting the ventilation districts, the direction of air currents, the quantity of air circulating in such ventilation districts, the position of each permanent fan, door, regulator, crossing, stopping, telephone, refuge bay, rope- aided or normal escape route, safe place, first aid room, main water valve, fire fighting equipment site, emergency power source and any area sealed off for fire or spontaneous combustion..

- a) A square grid, lettered horizontally and numbered vertically, drawn to a suitable scale must be shown on the plan contemplated in regulation 17.19.
- b) The information relating to the ventilation aspect of the plan in sub regulation 17.19 must be provided by the person authorised by the employer to do so and must be certified as accurate on the plan by that person.
- c) An updated hard copy of the plan contemplated in regulation 17.19 must be immediately available at the mine for rescue operation purposes. In the case of a coal mine, an updated hard copy must be submitted to the Principal Inspector of Mines at intervals not exceeding 3 (three) months.

1.2 Reporting of explosions, fires and flooding.

(MHSA Reg.16.1 (1))

The employer must ensure that a competent person reports to the employer, at appropriate intervals determined in accordance with the mine's risk assessment, on the adequacy of escape and rescue procedures at the mine relating to explosions, fires and flooding.

1.3 Issuing of Self- Contained Self-rescuers.

1.3.1: (MHSA Reg.9.1)

- (2) Where the risk assessment at the mine indicates a significant risk of a fire and/or explosion and/or toxic release, that could lead to an irrespirable atmosphere or an atmosphere immediately dangerous to life or health, the employer must provide an early warning system or systems at all working places.

1.3.2: (MHSA Reg.16.2 and 16.3)

1.3.2.1: 16.2 (1) Coal mines: The employer of every coal mine must ensure that no person goes underground at the mine without a body-worn self-contained self-rescuer, which complies with the South African Bureau of Standards specification SABS 1737.

1.3.2.2: 16.2 (2) Mines other than coal mines: If at any mine other than a coal mine, the risk assessment in terms of section 11 shows that there is a significant risk that employees may be exposed to irrespirable atmosphere at any area at the mine, the employer must ensure that no person goes into such area without a body-worn self-contained self-rescuer, which complies with the South African Bureau of Standards specification SABS 1737..

1.3.2.3 :16.2 (3) Sole allocation of a self-contained self-rescuer: Any body-worn self-contained self-rescuer supplied to any employee, employed in a full time capacity at the mine, in terms of sub regulations 16.2(1) and 16.2(2), must be allocated to the employee for that employees sole use for the duration of the deployment of that self-contained self-rescuer at the mine or until that self-contained self-rescuer becomes defective and the employee is issued with another self-contained self-rescuer as required by these regulations.

1.3.2.4: 16.3: Employer to ensure no defective self-contained self-rescue is issued: The employer must ensure that no defective self-contained self- rescuer is issued for use to any employee at a mine.

1.4 Persons not to be exposed to fumes from a conveyor belt.

(MHSA Reg.8.9 (3)):

The employer must take reasonably practicable measures to prevent persons being exposed to flames, fumes or smoke arising from a conveyor belt installation catching fire, including instituting measures to prevent, detect and combat such fires.

QUESTION 2

(MHSA Regulation 9.2 (4) – (6))

2.1 The employer must ensure that sufficient potable and palatable water, which complies with the requirements set out in schedule 22.9(2) (c), is readily available to all employees and clearly identified as drinkable.

2.2

2.2.1 Regulation 9.2 (5)

2.2.2 The employer must provide and maintain suitable and adequate:

2.2.2.1 Change house to enable employees who perform work involving hazardous substances to change into working clothes at the start of their shift and to wash themselves and change their clothes at the end of their shift.

2.2.2.2 Facilities to enable employees who perform work involving hazardous substances to wash their hands and faces before eating any meals at work.

2.2.2.3 Readily available latrine facilities, within a reasonable distance from each working place.

2.3 No employee may remove clothes referred to in regulation 9.2 (5) (a) from the mine unless such clothes have been decontaminated.

2.4 (MHSA Regulation 8.6 (4-6))

2.4.1 The employer must take reasonable measures to ensure that a competent person examines every main and booster fan for effective operation, internally and externally, together with all appurtenant components that are necessary for the operation of the fan, at intervals not exceeding three months, or any lesser interval determined by the mine's hazard identification and risk assessment in terms of section 11.

2.4.2 The employer must keep record of all examinations conducted in terms of regulation 8.6 (4), including remedial actions taken, for a period of at least the most recent ten years of the fan installation.

2.5 (MHSA S.54).

2.5.1 Section 54

2.5.2 The inspector may give any instruction necessary to protect the health or safety of persons at the mine, including but not limited to an instruction that:

2.5.2.1 Operations at the mine or part of the mine be halted (1)

2.5.2.2 The performance of any act or practice at the mine or part of the mine be suspended or halted, and may place conditions on the performance of that act or practice. (1)

2.5.2.3 The employer must take the steps set out in the instruction, within the specified period, to rectify the occurrence, practice or condition. (1)

2.5.2.4 All affected persons, other than those who are required to assist in taking steps referred to in the paragraph above be moved to safety (1)

2.5.3 An instruction must be given to the employer or a person designated by the employer or, in their absence, the most senior employee available at the mine to whom the instruction can be issued. (1)

- 2.5.4 An inspector may issue an instruction either orally or in writing. If it is issued orally, the inspector must confirm it in writing and give it to the person concerned at the earliest opportunity. (1)
- 2.5.5 If an instruction is not issued to the employer, the inspector must give a copy of the instruction to the employer at the earliest opportunity. (1)
- 2.5.6 Any instruction issued under subsection (1) (a) must either be confirmed, varied or set aside by the Chief Inspector of Mines as soon as practicable. (1)
- 2.5.7 Any instruction issued under subsection (1) (a) is effective from the time fixed by the inspector and remain in force until set aside by the Chief Inspector or until the inspector's instruction has been complied with. (MHSA Regulation 8.6 (4-6)) (1)

QUESTION 3

3.1

(MHSA Regulation 13.1)

- 3.1.1 13.1 (1): The employer must prevent employees from being trapped in any underground excavation by providing whenever practicable, from every underground working place, two exits, each of which is connected to separate means of egress to the surface.
- 3.1.2 13.1 (2): Where it is not practicable to provide two exits as contemplated in regulation 13.1(1) above, the employer must implement other reasonably practicable measures, determined by the mine's risk assessment, to prevent employees from being trapped in any underground excavation.
- 3.1.3 13.1 (3): Except in the case of emergency no person may enter or leave the underground workings of a mine except by means of ingress or egress especially provided or set apart for that purpose by the employer unless such person is authorised to do so by the employer.

3.2

- 3.2.1 $0.15\text{m}^3/\text{s}/\text{m}^2$ of face area.
- 3.2.2 $0.3\text{m}^3/\text{s}/\text{m}^2$ of face area.
- 3.2.3 30.0m after the blast.

3.2.4 15.0m after the blast.

3.2.5 $7 < 20\text{m}$.

3.2.6 Force fan quantity to be one third of that of exhaust fan.

3.3

(MHSA regulation 9.2)

9.2 (2) (c): Noise - $\geq 82 \text{ dB}_{\text{Aeq, 8h}}$.

3.4

Exit certificates - (MHSA S.17).

17 (1) : If an employee was subject to, or is was required to be subject to, medical surveillance in terms of this Act and such employees employment at the mine is terminated for any reason, the employer must arrange an exit medical examination of the employee.

17 (2) : The examination referred to in subsection (1) must be held before, or within 30 days after termination of employment.

17 (3) : The employee must attend the examination.

17 (4) : The Occupational Medical Practitioner conducting the examination must:

- Produce an exit certificate with respect to that employee indicating the results of all medical surveillance and the presence or absence of any occupational disease.
- Enter a copy of the exit certificate into the employee's record of medical surveillance.
- MHSA Section 17 (1) – (4)

QUESTION 4

DMR Guideline - compilation of a Mandatory Code of Practice for the Prevention of Fires at Mines:

4.1 Definitions

Part A: The guideline – Definitions and acronyms

- 4.1.1 **'FIRE'** means a rapid oxidation process in which a chemical reaction results in the evolution of light, gases, and heat energy varying in intensity.
- 4.1.2 **"FIRE HAZARD"** means a condition that presents the potential for harm to people and damage to property, or the environment as a result of fire.
- 4.1.3 **'FIRE DETECTION SYSTEM'** means the combination of Fire Alarm Systems and fire detectors.
- 4.1.4 **'FIRE SUPPRESSION SYSTEM'** means a system designed to enable total flooding by or for the localized application of extinguishing agents.
- 4.1.5 **'IFSTA'** means International Fire Service Training Association.

4.2 Fire hazards

Part C: Format and content of the mandatory COP – aspects to be addressed

4.2.1 Fuel sources

The COP should classify the identified fuel sources in terms of the fire classes defined by the combustion process associated with them:

a) Class A: Materials (ordinary combustibles)

These are solid materials, usually of an organic nature, in which combustion normally results in the formation of glowing embers. These include combustibles such as wood, paper, fabric, plastics, and most kinds of solid waste materials.

b) Class B: Materials (flammable liquids and gases)

These are non-solid fuels consisting of flammable or combustible liquids or gases such as petrol or propane gas.

c) Class C: Energized electrical equipment

Electrical fires involve potentially energised electrical equipment. This sort of fire may be caused by short-circuiting or overloaded electrical networks.

d) Class D: Combustible metals

Combustible metals mostly encountered are magnesium, potassium, titanium, and zirconium. With the exception of the metals that burn in contact with air or water (for example potassium and sodium), combustible metals on their own do not represent unusual fire risks because they have the ability to conduct heat away from hot spots efficiently. However, when combustion is induced, the fire is self-sustaining: rapid combustion (oxidation) of magnesium induced by an external source may result in a fiercely exothermic process.

e) Class F: Cooking oils and fats (kitchen fires)

These include unsaturated cooking oils in well-insulated cooking appliances located in commercial kitchens. Though such fires are technically a subclass of the flammable liquid/gas category, the special characteristics of these types of fires, namely the lower flash point, are considered important enough to re-classify these separately. Water mist can be used to extinguish such fires.

4.2.2 Ignition sources

The COP should identify potential sources of ignition at a mine including but not limited to the following energy sources:

a) Heat energy

The presence of heat energy is often characterised by high temperature surfaces (e.g. exhaust systems of internal combustion engines, pumps, turbochargers, electric motors, gearboxes, heat exchangers, bearings, rubbing surfaces such as brakes, cigarette butts, naked flames from use of welding equipment and matches or cigarette lighters).

b) Electrical energy

Switch gear, motors, retarders, transformers, lights and cables; short-circuit arcs, earth-faults, static electricity discharge, induction heating, thyrist or drives.

c) Mechanical energy

Friction (conveyor belts drives, winch ropes), mechanical impact (coal picks) or grinding.

d) Chemical energy

Self-heating, auto-ignition, exothermic reactions, spontaneous combustion of coal and induced pyrolysis of vehicle tyres (lightning).

4.3 Fire prevention controls

Part C: Format and content of the mandatory COP – aspects to be addressed

4.3.1 Mine infrastructure

The COP should identify fire hazards and record in the fire hazard register all infrastructure and installations that could pose a significant fire risk such as, but not limited to:

- a) Fuel storage and associated transfer equipment;
- b) Refuelling bays;
- c) Main substations and switchgear installations;
- d) Underground hoisting stations;
- e) Workshops;
- f) Densely timbered areas in intake airways;
- g) Diesel fuel lines in main shafts and declines – where these are used for transport;
- h) Any fire hazardous areas as classifiable by SANS 10108: Fire hazardous area classification;
- i) High density surface storage area, e.g. fire hazardous material and combustible liquid storage areas, timber yards, fuel storage tanks, liquid oxygen tanks, ammonia refrigeration plants, etc.; and
- j) Waste disposal containers.

To minimise fire risk at critical installations and infrastructures, the following requirements should be considered at the design stage:

a) The installation of infrastructure that could pose a heightened high fire risk should only be undertaken following a formal assessment and consideration of the controls necessary to minimise risk; and

b) Wherever possible, such high risk infrastructures should be located in the return airways or near these, to facilitate exhausting of smoke and gases directly to return in the event of a fire and/or be equipped with suitably designed fire doors that would shut-off in the event of a fire thereby limiting or reducing smoke contamination of fresh air streams.

