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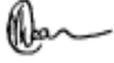
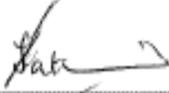
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Compiled by	Functional Responsibility	Authorized by
		
M. Atterbury Senior Advisor Fire Risk and Emergency Management	M. Moahlodi Corporate OHS Manager (Operational)	K. Pather General Manager Sustainability Systems
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1. Introduction

This standard addresses the components of Fire Risk Management for Eskom in order to achieve the requirements expressed in the Process Control Manual for “Manage Environment, Health and Safety” and Process Control Manuals referenced from the Manage Environment, Health and Safety PCM.

Eskom has adopted a value of zero harm. This requires all business to be conducted with respect and care for people and the environment. Fire Risk management is an important aspect impacting all operations within Eskom and exists to prevent damage by uncontrolled and accidental fires and other related emergencies to people, the environment, plant and equipment.

Fire Risk Management within Eskom cuts across Process Safety, Governance and Assurance, Data management and Safety Systems as well as Incident Management and Awareness. It is directly aligned and supportive of the content of Safety, Health, Environment, Quality and Security Policy.

This standard serves in support of statutory requirements, best practice considerations and insurer recommendations relating to the Management of Fire Risks.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

This document delineates and defines the responsibilities relating to Fire Risk Management. It also identifies the applicable and appropriate requirements and recommended resources in developing a consistent approach to fire safety, fire prevention, fire protection and detection.

Fire Risk Management must address the issue of fire safety through the use of fire prevention and fire protection and detection measures. Secondly, that the protection of assets, plant and equipment from an uncontrolled fire and its possible affects must be adequately addressed with the view to ensure continued function, operation and production.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions and come into effect 1 month from the date of authorization.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001: Quality Management Systems.
- [2] 32-108: Eskom Standard - Fire Fighting Organization
- [3] National Veld and Forest Fire Act 101 of 1998

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- [4] Occupational Health and Safety Act 85 of 1993
- [5] SANS 10400: Application of National Building Regulations
- [6] SANS 1475-1: The production of reconditioned fire-fighting equipment Part 1: Portable and wheeled (mobile) rechargeable fire extinguishers
- [7] SANS 1475-2: The production of reconditioned fire-fighting equipment Part 2: Fire hose reels and above-ground hydrants
- [8] SANS 1910: Portable rechargeable fire extinguishers
- [9] SANS 1567: Portable rechargeable extinguishers: Co2
- [10] SANS 10087: LPG
- [11] SANS 10105: The use and control of fire-fighting equipment
- [12] SANS 10139: Fire detection and alarm systems for buildings
- [13] 32-123: Eskom Emergency Planning.
- [14] 240-54937439: Fire Protection - Detection Assessment Standard
- [15] 240-54937450: Fire Protection and Life Safety Design Standard
- [16] 240-56737448: Fire Detection and Life Safety Design Standard
- [17] 240-54937454: Inspection Testing and Maintenance of Fire Protection Systems Standard
- [18] 240-56737654: Inspection Testing and Maintenance of Fire Detection Systems Standard
- [19] 32-681: Plant Safety Regulations

2.2.2 Informative

The following listing of documents is not exhaustive or complete, and the reader is encouraged to contact the compiler for further additional advice or information

- [20] SANS 10090: Community protection against fire
- [21] SANS 10287: Automatic sprinkler installations for fire-fighting purposes
- [22] SANS 10089: The petroleum industry.
- [23] 240-126467668: Operational Standard For Inspection, Testing Of Fire And Rescue Non-Plant Equipment
- [24] 240-126467640: Operational Standard For Fire Fighting Training In Eskom
- [25] 240-126468603: Operational Standard For Fire Management In Generation

2.3 Definitions

2.3.1 Fire Detection

A device designed to automatically detect the presence of fire and initiate an alarm system and other appropriate action – see SANS 10139 [51] (also see NFPA 72 [75]). Some typical fire detectors are classified as follows:

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- Heat detector – a device that detects a pre-determined (fixed) temperature or rate of temperature rise.
- Smoke detector – a device that detects products of combustion.
- Flame detector – a device which detects the infrared or ultraviolet, or visible radiation produced by fire.

Fire detection is managed in accordance with the Eskom engineering standard on fire detection 240-56737654 Inspection, Testing and Maintenance for Fire Detection and SANS10139 inclusive.

2.3.2 Fire Protection

Method of providing for fire control or fire extinguishment.

2.4 Abbreviations

Abbreviation	Explanation
BU	Business Unit
CE	Chief Executive
Co2	Carbon Dioxide
EDC	Eskom Documentation Centre
Escap	Escap SOC Ltd (Escap) is the captive insurance company
FM Global	Factory Mutual Global
LPG	Liquefied petroleum gas
NFPA	National Fire Protection Association
OHS	Occupational Health & Safety
O & M	Operating and Maintenance
PCM	Process Control Manual
SANS	South African National Standards
SHE	Safety, Health and Environment

2.5 Roles and Responsibilities

2.5.1 General

Adherence to statutory requirements relating to fire safety, prevention and protection must be ensured. This is to be reflected in all aspects of the Eskom management, control, operations and function. As a primary management function, a fire risk assessment(s) must be available and must have been conducted to identify and document the risk from fire and related emergencies to which the business is exposed. The fire risk assessment must be in accordance with 240- 129790629 (Fire Risk Assessment). Included in this assessment, measures identified to eliminate or reduce the impact on people, environment, plant and equipment must be defined in a written document.

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2.5.2 Corporate Level

Eskom shall ensure that a suitable response to Fire Risk Management issues and problems is catered for.

2.5.3 Divisional or Operating Unit Level

Operating Units or Divisions are responsible for addressing adequate balance in fire prevention and protection within their working environments. This must be disseminated further down to Business Unit levels and will require a different approach within each of the Group(s) / Business Units relative to their operations, man power levels, buildings, equipment, assets, statutory requirements and elements of good practice.

2.5.4 Business Unit

In practical terms the development of a fire safety plan for the individual specific Business Units or sites or locations shall be available (see Annex C). Information relating to the fire safety plan shall be available to ensure the overall fire safety, fire prevention, fire protection and detection measures, deemed suitable and necessary for the particular Business Unit or site or location, have been addressed. The fire safety plan must be in accordance with 240-129709945 (Fire Safety Plan).

2.6 Process for Monitoring

The requirements contained in this standard, applicable to any Business Unit, shall be monitored on an annual basis by the Operating Unit or Division, utilizing a peer review process.

Compliance to the requirements, as defined in this standard shall be arranged by the Business Unit and Assurance and Forensics Department, in conjunction with Sustainability: Corporate OHS (Operational) – Fire Risk and Emergency Management (or such similar entity in the event that the discipline is relinked during any restructuring), at least every 3 (three) years.

2.7 Related/Supporting Documents

The Fire Safety Plan (example in Annex C) shall be available as a record for each Business Unit, building or structure. Random auditing of the sites will be undertaken as per 2.6.

[26] 240- 129790629: Fire Risk Assessment

[27] 240-129709945: Fire Safety Plan

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3. Document Content

3.1 Fire Safety

- 3.1.1** Fire Safety is an integral part of the general safety and protection of Eskom employees, contractors and members of the public (at Eskom facilities) from the effects of fire, heat and smoke. As a minimum, this is ensured by compliance to and the application of legislative and policy requirements.
- 3.1.2** Any building shall be so designed, constructed and equipped that in case of fire –
- 3.1.2.1** the protection of occupants or users therein is ensured and that provision is made for the safe evacuation of such occupants or users;
 - 3.1.2.2** the spread and intensity of such fire within such building and the spread of fire to any other building will be minimized;
 - 3.1.2.3** sufficient stability will be retained to ensure that such building will not endanger any other building; provided that in the case of any multi-storey building no major failure of the structural system shall occur;
 - 3.1.2.4** the generation and spread of smoke will be minimized or controlled to the greatest extent reasonably practicable; and
 - 3.1.2.5** adequate means of access for fire fighters and equipment for detecting, fighting, controlling and extinguishing such fire is provided.
- 3.1.3** The safety of personnel engaged in firefighting duties, whether in buildings, structures or in any other area, site, location or environment shall be considered and managed.

3.2 Fire Prevention

- 3.2.1** During design and development of specifications for processes, equipment, buildings and any modifications, the potential for fire must be considered.
- 3.2.2** Specific attention to the control of fuel (i.e. spills, leaks and storage) and/or ignition sources (including hot work – see annex B.1), under normal and emergency conditions, must be included in the evaluation and development of adequate site specific controls or interventions (see annex A.3).
- 3.2.3** Fire precaution and response information must be developed for the immediate working environments of employees including contractors, and the employees trained, educated and made aware of such information.
- 3.2.4** Regular inspections of work areas are established and undertaken to address life safety considerations, including both fire prevention and fire protection aspects.

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3.2.5 A process for continuous risk assessment must be developed to ensure that when new fire or related hazards are introduced into the work environment or hazards change, consideration is given to measures to prevent or mitigate risks or exposures.

3.2.6 Fire Risk Management is included in the development of Safe Work Procedures and/or method statement, for any work process, operation, activity in the working environment.

3.3 Fire Protection and Detection

3.3.1 Aspect for fire protection and detection must be considered and applied during the design, alterations and modifications to processes, equipment, and buildings. This could include the specification and use of non-combustible materials, construction features (including compartmentalisation, or spatial separation of risks or hazards) active and/or passive fire protection measures and detection.

3.3.2 The measures and infrastructure that may be required in addressing fire protection and detection will vary and be dependent on a risk assessment/profile of the site or Business Unit. From the provision of portable firefighting equipment (generally, a statutory requirement) to the installation of a fixed fire protection system (water sprays – sprinkler or deluge systems, gas suppression systems and or fire detection systems) shall be considered in terms of statutory requirements and/or good engineering and Eskom internal fire protection and detection design standards.

3.3.3 Recommendations and requirements, from stakeholders, relating to fixed fire protection and detection systems or measures in minimizing the impact of fire (e.g. from appointed consultants and/or Insurance recommendations) shall be considered in collaboration with Eskom internal and user/stakeholders and related engineering disciplines.

3.3.4 Requirements relating to the continued functionality and operability of such fixed fire protection systems and equipment (inspection, testing and maintenance) shall be ensured and adequately addressed. This shall be determined from statutory, legislative, South African National Standards (SANS) and good engineering practice, manufacture's recommendations (O & M manuals) information and resources.

3.3.5 In the event that active fire protection and detection systems or any other measures, addressing the risks associated with identified hazards and/or exposures, become impaired during normal operations, actions and interventions must be instituted to ensure that risk levels are not excessive. A process relating to fire system impairments shall be defined and implemented to ensure reporting and management of these conditions and related information. (See annexure B.2)

3.3.6 Where considered applicable and appropriate from the results of a BU/site specific risk assessment/profile, the establishment of a manual firefighting capability shall be addressed. This could, as a minimum requirement, be limited to the provision of training in the use and operation of portable fire extinguishers and hose reels.

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3.3.7 The development of an in-house advanced firefighting team infrastructure for some BU's / sites shall be considered (including the provision of specialized equipment, training requirements and management of such infrastructure functions) subject to a risk assessment/profile for the BU/site.

The development of pre-fire plans in support of the fire protection and detection considerations and the interface with any off site local authority or external firefighting response available to a BU or site shall be addressed in the fire safety plan.

4. Acceptance

This document has been seen and accepted by:

Name	Designation
J. Naidoo	Senior Manager Contracts Management
K. Pather	General Manager Sustainability Systems
M. Moahlodi	Corporate OHS Manager

5. Revisions

Date	Rev.	Compiler	Remarks
December 2006	1	ML Cresswell	Revision date and alignment with Eskom documentation system changes. Designation names (employees) referenced within this document were correct as per revision date.
October 2007	2	ML Cresswell	EDC ISO formatted
May 2008	3	ML Cresswell	Changes regarding Risk Finance and re-insurance.
January 2013	4	M Atterbury	Revision date reached. PEER review requirement included. Impairment information updated and the list of items that may become impaired is improved.
October 2019	5	M Atterbury	Revision dated reached. Incorporate references to fire risk management standards from Engineering and Generation.

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6. Development Team

The following people were involved in the development of this document:

- The Occupational Hygiene and Safety Steering Committee members
- Fire Practitioners Forum
- Jorge Nunes
- Peter May
- Andre van den Berg
- Marius Atterbury

7. Acknowledgements

Not applicable.

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Annex A - (Information)

Explanatory Information

A.1 South African National Standards

South African National Standard are published with the intent to provide minimum compliance and include specifications and procedures to ensure that a material, product, method or service is fit for its purpose and perform in the manner it was intended for. Standards define quality and establish safety criteria. Conformance to standards ensures quality and consistency.

SANS standard that has been referenced in South African legislation takes precedence. A point in case is the provision of fire extinguishers, where, due to reference from both the Pressure Equipment Regulations and National Building Regulations, only SABS approved equipment, may be used.

A.2 National Fire Protection Association (NFPA)

NFPA is an internationally acknowledged American based organisation that specifically addresses the development of fire prevention and protection codes and standards and is extensively used as a point of reference. A comprehensive series of standards and codes relating to specific issues, industries, and interventions applicable to the prevention and protection against fire is available. The use of these reference documents is strongly supported and encouraged.

Typical examples include -

NFPA 850 - Recommended practice for fire protection for electric generating plants and high voltage direct converter stations

A.3 Risk Control and Risk Finance – Risk Management in action

Risk control measures, to ensure general safety and asset protection, are to be incorporated into design, operation, maintenance and overall function within the Eskom spheres of operation. Measures to ensure fire prevention and protection shall be included, with mitigation actions and methods tabled which could include fire prevention and fire protection including both passive measures and active systems.

Risk Finance in the form of Insurance is provided for. Eskom is self-insured and the financial aspect of this is administered through an internal department; Escap SOC Ltd. Re-insurance is purchased to cover major and large losses. Due cognisance of recommendations by insurance underwriters and providers or their agents shall also be considered. A typical example of this can be seen in the Property Loss Data Sheets, provided by FM Global (a public domain web site is available) - which can provide a wealth of additional (Risk Control) information, insight and background relating to many risks and perils a Business Unit/site can be exposed to – a significant risk or peril being a fire.

In conjunction with local (principally SANS) identified statutory, legislative, and good practice requirements the reader is strongly advised to review the information from NFPA and FM Global property loss data sheets where this information is appropriate and take cognisance of this material.

Note: Where third party organisations conduct baseline and on-going evaluations at regular, frequent intervals, recommendations shall be documented and considered by BU Management and or project managers. The results of such recommendations could have a major effect on the

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financial aspects relating to the determination of premiums and settlement of claims, should an incident occur where sufficient attention to (fire) risks cannot be demonstrated.

A.4 Administrative controls

The development of administrative controls (permits, inspections, conditions or other specialized tasks or actions) to address and regulate specific risks within a Fire Risk Management programme at Business Unit level shall be addressed and implemented. This is to be reflected in all aspects of the Eskom Holdings Limited State Owned Company management, control, operations and functions.

Typical examples include (but are not limited to) Safe Work Procedures, Hot work permit, Confined space entry, Change Management process, Fire system impairment process, Plant Safety Regulations and High Voltage Regulations.

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Annex B (Normative)

Hot Work and Impairments Information

B.1 Hot Work

Adherence to statutory requirements relating to hot work must be ensured (see OHS Act – General Safety Regulation, section 9). This regulation requires that there shall be a management process to control hot work.

Operating Units or Divisions are responsible for addressing the management and process to be employed within their area of operations and jurisdiction. Examples of typical administrative controls (permits) to manage hot work can be found referenced below and can be utilised as tabled or modified to address specific issues applicable within their work environments.

Note: These examples of typical administrative controls must be disseminated further down to Business Unit levels and will require a different approach within each of the Operating Units or Divisions/Business Units relative to their operations, manpower levels, buildings, equipment and assets.

Examples of content and layout of Hot Work permits are contained in the documents listed below and can be referred to in support of development of in-house administrative control(s). Training in the operation and application must be addressed at BU level.

SANS 10287 – Automatic Sprinkler Installations for Fire-Fighting Purposes, Annex B – Precautions When Carrying Out Hot Work

SANS 10089 – The Petroleum Industry – Part 1, Annex C, Examples of Typical Work Permits

Further additional information is available should the reader require further background in the development / implementation of a system / process to manage Hot Work in their work environment - NFPA 51B Standard for Fire Prevention during Welding, Cutting and other Hot Work.

B.2 Impairments – to fire systems

Operating Units or Divisions are responsible for addressing the management and process to be employed within their area of operations and jurisdiction.

A shutdown of a fire system or portion thereof potentially relates to the following two conditions:

Emergency: A condition where, for example, a water-based fire protection system or portion thereof is out of order due to an unexpected occurrence, such as a ruptured pipe, an operated sprinkler head, or an interruption of the water supply to the system.

Pre-planned: A condition where, for example, a water-based fire protection system or a portion thereof is out of service due to work that has been planned in advance, such as revisions to the water supply or sprinkler system piping or building work requiring the fire systems to be shut down.

Impairments to fire protection and/or fire detection systems shall be as short in duration as practical. If the impairment is planned, all necessary parts, manpower etc. should be assembled prior to removing the fire protection system from service. Additional protective measures as necessary and available (e.g. temporary water supplies, additional manual firefighting equipment,

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blanking off parts of a system to keep other parts operational) must be considered and documented.

When impairment/s is **not planned** or when a system has discharged the repair work and/or system restoration should be expedited.

Process: A written process must be established to address impairments to fire systems to ensure that the Business Unit does not accept excessive risk or exposures that impact the fire hazard or exposure.

Note: A change request will be logged during the tenure of this document to have such impairment reports routed via SAP.

Included in the process there must be reference to a time frame for which the impairments can be tolerated e.g. no longer than a full working day or shift (i.e. longer than eight (8) hours)

As a minimum the site administrative control should address the following –

1. The BU / site concerned, date, time and identity of person reporting
2. Identify the equipment and area(s) affected by the fire system impairment.
3. Describe the type of system and extent of the system impairment.
4. Identify personnel to be notified e.g. Site Management, site risk practitioners, safety, fire officers, maintenance personnel, control staff, security staff – any applicable off site notifications (example: local authority fire brigade).
5. Consider additional measures that could be implemented on a temporary basis (inspections or surveillance of protected areas, partial closures by use of blanking flanges, local authority fire brigade advised) as necessary.
6. Provide additional protective measures as necessary and available, depending on circumstances of the impairment (e.g. temporary water supplies, additional manual firefighting equipment).

Proper reinstallation after maintenance or repair should be performed to ensure proper and correct system operation. Once repairs are complete, tests that will ensure proper operation and restoration of the fire protection capabilities should be made.

The latest revision of the design documents reflecting as-built conditions should be available to ensure that the system is properly reinstalled (e.g. drawings showing direction / angles of nozzles). Material fire system impairments represent impairments where the systems impaired cover a large area or may be impaired for a period longer than 8 hours.

A process of communication, sharing and collating information shall be defined (e-mail is preferred) and implemented to ensure reporting of this information to Operating Unit or Divisional Senior Management (Integrated Risk Management, Fire Risk Management, Corporate Risk Control and Escap) as soon as such an event or incident occurs.

On establishing that there is any material fire system impairment, BU's or departments having control over fire systems (or persons made responsible for such actions or activities) shall raise an e-mail (preferred) to the following:

Business Unit:

- Safety Risk Manager or Risk Manager, as appropriate.
- Production Manager, for inclusion on the production meeting agenda.

Operating Unit:

- Safety Risk Manager or Risk Manager, as appropriate.

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Corporate:

- Manager Fire Risk and Emergency Management.
- Escap; Middle Manager Project Management

Following restoration of the impaired fixed fire protection system(s) to service, the parties notified of the impairment should be advised the system being back in service, again by e-mail (preferred).

Impairments to fixed fire protection systems are considered to include active systems, or parts thereof, these include -

Water based systems

- Fire pumps (including firefighting water supplies, tanks, mains or valves)
- Sprinkler systems (including water mist)
- Deluge / drencher systems
- Foam systems

Gas fire protection systems

- Systems employing any gas extinguishing mediums for protection (local application or total flooding)

Fire detection systems

- Some evaluation should be considered in that if the power supplies, or a number of component zones or numerous detectors are affected in a significant area of the protected premises is affected – an impairment of that detection system should be declared.

Other Systems

- The following systems are to be addressed in a similar fashion, as stated above:-
 - Fire dampers
 - Passive Protection
 - Fire Ventilation and/or Smoke Control Systems
 - Firefighting vehicle and equipment
 - Other

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Annex C (Informative)

Fire Safety Plan (See 240-129709945: Fire Safety Plan)

C.1 Typical example of basic content for fire safety plan -

A description or narrative of the main features for the specific site indicating the following,

1. General information

- Building(s), layout, overall size, number of floors (relative to a site plan)
- Construction materials of main building(s)
- Means of escape, exit(s) routes, assembly point(s)
- Population and / or occupancy levels
- Fire Loading
- Specific risk areas, hazards, exposures or operations identified

2. Fire prevention

- List and location of fuel sources of interest (e.g. flammable liquids)
- Fire precaution and immediate response for each specific work area and hazard
- Schedule of formal and informal training related to fire precautions and immediate response
- Schedule of inspections, both internal and external
- Risk assessments for existing hazards and approach regarding risk assessments for new or changed hazards

3. Fire protection and Detection

- Fixed fire protection measures, hydrant & hose reel layouts
- Fire protection water supplies, capacity, location of important valves
- Fire protection systems (active systems) i.e. water based systems, gas systems, special systems and ventilation arrangements (smoke extraction)
- Fire detection systems, coverage, control points, interface with other building or fire protection systems (fire ventilation and/or smoke control systems, alarms, off site indications)
- Manual firefighting philosophy, based on risk assessments and personnel availability

4. Emergency information

- Site emergency arrangements, raising an alarm, organisation & infrastructure under emergency conditions, responsibilities defined.
- Contact information for emergency services, essential staff, and maintenance personnel for site / BU.

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Schematic or line drawings can support the basic descriptive document.

Note: A fire safety plan can be requested by a local authority as a specific requirement from the National Building Regulations (SANS 10400 – Application of the National Building Regulations). The development of the fire safety plan as tabled above can be used to address this issue and any additional supporting requirements from an Emergency Planning perspective

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