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**Kaius Resources**

**Standard Operating Procedure – Fire Control**

Reference: SOP-001

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# Purpose

This Standard Operating Procedure outlines the requirements for the identification of potential fire hazards and the prevention and control of fires.

# Scope

This Standard Operating Procedure (SOP) applies to all activities at sites operated and/or under the control of Kaius Pty Ltd and its subsidiaries. It applies to all persons working on the site including exploration personnel, permanent, temporary and contract employees. This SOP forms a key part of the Kaius Safety & Health Management System which has been established to manage risk to an acceptable level and in accordance with all relevant legislation.

# Authority

This procedure can only be altered with the approval of the Kaius Mine Site Senior Executive (SSE).

# Responsibilities

**Site Senior Executive (SSE)**

Site Senior Executive shall ensure:

* That all of the provisions of this SOP are implemented, and that compliance is achieved, and
* Adequate resources are provided to maintain compliance with the requirements of this SOP, and
* The application and requirements of this SOP are periodically audited and reviewed.

**Supervisors**

Supervisors shall ensure:

* The requirements of this SOP are implemented.
* That workers, including contractors, are trained in the requirements of this SOP.
* All work undertaken within their area of responsibility is conducted in accordance with the requirements of this SOP.
* They monitor compliance with this SOP.
* This Standard is readily available to all workers and contractors.

**Mine Workers**

Mine Workers shall:

* Undertake the training and assessment provided by the SSE.
* Act in accordance with this SOP, and
* Not undertake any tasks for which they are unable to safely complete.

# Definitions and Abbreviations

The following definitions and abbreviations are used in this procedure.

|  |  |
| --- | --- |
| Area Supervisor | Designated Supervisor under the CMSHA with requisite competencies |
| BOM | Bureau of Meteorology |
| KRES | Kaius Mine |
| MQSHA | Mining and Quarrying Safety and Health Act (1999) |
| MQSHR | Mining and Quarrying Safety and Health Regulation (2017) |
| Competent Person | A person who has the necessary training, skills and capability to carry out the task. |
| DCP | Dry Chemical Powder |
| PHMP | Principal Hazard Management Plan |
| Shall | Indicates that a statement is mandatory |
| Should | Indicates a recommendation |
| SOP | Standard Work Procedure |
| SSE | Site Senior Executive |
| TKPH | Ton-Kilometre-Per-Hour: the amount of work which will keep the tyre within a safe range to avoid over-heating |

# Procedure

## Fire Prevention

The following steps shall be taken as part of fire prevention on site.

* The work area shall be kept free of debris or rubbish.
* Long grass shall be slashed down to the soil.
* Gas monitoring shall be undertaken by trained and competent personnel.
* Smoking is only permitted in designated areas, as approved by the SSE, and identified during the site familiarisation session. Ignition sources (such as cigarette butts and matches) shall be disposed of in appropriate non-flammable receptacles.
* Flammable fuel and/or hazardous substances and dangerous goods shall be securely stored in a purpose-built storage facility;
* Electrical equipment shall be earthed, if deemed necessary by risk assessment, and
* Hot work permits shall be completed, and appropriate controls implemented before commencing hot work.
* Additional considerations for fire hazards at exploration sites on the Kaius Mine are included in Appendix 01.

## General Fire Control

As part of fire controls, all workers shall:

* Inspect firefighting equipment for serviceability as part of pre-start equipment checks.
* Report any defects or faults found with firefighting equipment to the Supervisor on shift immediately, so that replacement equipment or repairs can be carried out as soon as possible.
* Tag faulty equipment with an Out of Service Tag. The tag is to display the reason for the defect and the equipment's location at that time.
* Be competent in both fire reporting procedures and firefighting techniques.
* Inspect their work area prior to commencing work, to ensure there is no flammable material, and
* Report any problems or suggestions on improvement to the Supervisor.

## Fire Fighting Training

Firefighting training and fire knowledge shall be provided to all personnel as part of the site induction processes.

Refresher training will be completed for firefighting, as required.

Firefighting guidance and simulations shall be included as part of the emergency response plan and procedures.

## Fire Fighting Safety

On discovery of a fire, workers shall proceed immediately up-wind of the fire, or to an area known to be free from smoke and fumes and activate the emergency procedure.

Where it is safe to attempt to extinguish the fire, do so as quickly as possible from a place of safety.

Personnel are to ensure their own protection from fire and other dangers in accordance with the principles of first aid prior to attempting to control an incident.

If there is doubt regarding the ability to control the fire, personnel are to retreat to a place of safety.

Contact details for the nearest fire brigade can be found within the KRES Emergency Management Plan or on Emergency Contact Details lists.

## General Fires (NOT Tyre Fires)

The following basic rules and precautions should be applied when fighting fires:

* Apply Take 5 principles to the situation.
* Always approach a fire from up-wind to avoid gases produced by the fire.
* Assess the fire for the use of the appropriate extinguisher(s).
* Attack small fires immediately with what is at hand, e.g. water (except on electrical fires) or an extinguisher.
* If you cannot extinguish the fire, preservation of life is your prime objective. Warn all persons working in the area of the outbreak of fire and initiate the relevant emergency response procedure without further delay. Make your telephone/two-way radio message as brief and concise as possible, and
* Back-up response shall be called if needed.

## Use of Water Truck

The water truck may be used for the provision of firefighting water. It can be used by either directly reversing the truck to the site and using the water sprays or connecting fire hoses to the outlet and using as fire tender. Care should be taken that the truck is not put in danger due to diesel tank too close to the fire. Correct nozzles and equipment shall be used for fighting fires.

Water truck operators shall not approach tyre fires unless directed by the scene controller

## Fires that Should Not be Fought Unless Specifically Trained

## The following fires shall not be fought. The area shall be evacuated until specialist personnel and equipment can be sourced or the fire self-extinguishes. Fires involving:

* Heavy equipment tyres, and
* Large volumes of hazardous substances (e.g. Diesel).

## Mobile Equipment Fire

For fire on-board mobile equipment, the following steps should be taken.

* **SHUT** the **MACHINE** down as soon as possible.
* Initiate **EMERGENCY** **RADIO** **PROCEDURES**, and
* **ACTIVATE** the **FIRE** **SUPPRESSION** **SYSTEM** **IF** **APPLICABLE**.
* Where practicable, **EXIT** the equipment from the **OPPOSITE** **SIDE** to the fire.
* If safe to do so, **OBTAIN** the **HANDHELD** **EXTINGUISHER**, use if necessary and be at the ready until help arrives.

## Fires near to a Fuel Source

In the event of a fire close to a fuel source such as a fuel tank:

* If the fire can be quickly extinguished, and it is safe to do so, immediately extinguish the fire.
* If the fire cannot be quickly extinguished, or there is concern for safety, the person discovering the fire shall:
	+ Cause the area to be immediately evacuated.
	+ Alert the Supervisor, and
	+ Establish a 500-metre exclusion zone around the area.

No person shall attempt to fight the fire until the fire has been assessed and the relevant approval is given by the Incident Management Team Leader in accordance with the KRES Emergency Management Plan.

## Heavy Equipment Tyre Fires

Heating of tyres can result in a tyre fire or a tyre explosion. Heating of tyres can be caused by:

* Lightning strike
* Contact with overhead high voltage power lines.
* Heat transfer from mechanical means, e.g. excessive use of brakes, heating of rims, etc.
* Heat generation from wheel motors or final drives, and
* Exceeding manufacturers design limitations (TKPH), e.g. load, speed, pressures, etc.

When a tyre fire occurs on heavy equipment the following steps shall be taken:

* Park the equipment up as quickly as possible in a safe area.
* **SHUT DOWN** the engine.
* Where practicable, **EXIT** the equipment from the **OPPOSITE SIDE** to the fire.
* Walk away from the vehicle, staying in line with the front or rear and not to the side.
* **DO NOT** walk to the side of the vehicle or inspect tyres – these places the worker in the line of fire for a tyre explosion.
* Move as far away from the vehicle as safely possible
* **DO NOT** approach the fire or attempt to extinguish it with **PORTABLE EXTINGUISHERS**.
* A 500m exclusion zone shall be established

## Fire Involving Heavy equipment tyres and large volume hazardous substances

Assess the immediate potential for explosion, or if there is a fire or other ignition source in direct contact with heavy equipment tyres and large volume hazardous substances

If after assessing the situation the hazards are still not clear, immediately evacuate the area. The safe evacuation distance for all emergencies involving heavy equipment tyres and large volume hazardous substances is 1000m.

## Potential Fire Risks

The fire risks and the control mechanisms shall be identified on site.

As a minimum requirement, Kaius Mine shall have fire extinguishers equal to or larger than 2.5kg. All extinguishers shall be fitted with a hose. Specific requirements for fire extinguishers and fire suppression systems are set out in the KRES VEMP compliance forms.

| **Potential fire hazard** | **Prescribed firefighting equipment** | **Controls** |
| --- | --- | --- |
| Light/Medium Vehicles | Extinguisher carried on vehicle2.5kg DCP | Condition monitoring and maintenance |
| Heavy Rigid Vehicles | Extinguisher carried on vehicle4.5kg DCP | Condition monitoring and maintenance |
| Earthmoving Equipment  | Extinguishers carried on vehicle9kg DCPLOP Fire suppression systemWater truck | Condition monitoring and maintenance |
| Electrical | 2.5kg DCP | Isolate energy sourceCondition monitoring and maintenanceElectrical SOPs |
| Hot work | 2 x 9kg DCP Fire extinguishersWater truck | Hot Work SOP |
| Flammable materials | 2 x 9kg fire extinguisher of appropriate type for the material at storage compound | Removal after useHazardous substances SOP |
| Chemicals  | 2 x 9kg fire extinguisher of appropriate type for the material at storage compound | Removal after useRestriction on useHazardous substances SOP |
| Fuel tank | 2 x 9kg DCP Fire extinguishers | Hazardous substances SOP |
| Bush fires | Local fire brigadeSite fire extinguisher. | Periodic land clearing and slashing as required |
| Smoking or other ignition source e.g. sparks from grinding | Fire extinguishers and water truck | Exclusion zoneHot work SOP |

###  Fire extinguisher identification:

|  |  |  |  |
| --- | --- | --- | --- |
| **Extinguisher** | **Colour** | **Type of Fire** | **Example** |
| Water | Red | Most fires except electrical or flammable liquids (hydrocarbons, oil, fuel, grease) | C:\Users\ctowsey\Pictures\water_ext.jpg |
| Dry Chemical | Red with White band | All fires | C:\Users\ctowsey\Pictures\dry_chem_ext.jpg |
| Carbon Dioxide CO2 | Red with Black band | All fires | C:\Users\ctowsey\Pictures\co2_ext.jpg |
| BCF or Vaporising Liquid | Red with Yellow band (formerly all yellow) | All fires | C:\Users\ctowsey\Pictures\vapourising_liq_ext.jpg |
| Foam | Red with Blue band (formerly all blue) | All fires except electrical | C:\Users\ctowsey\Pictures\foam_ext.jpg |

# Review Criteria

This document shall be reviewed:

* Every three years
* When there is a change of method and/or technology that may affect the accuracy of this document, and
* When a significant incident has occurred that is relevant to this document and its subject matter.

# Safety and Environment

Safety and Environment are covered in the body of this procedure.

# Attachments, References and Related Documents

Appendix 01 Exploration Sites

## References and Related Documents

Coal Mining Safety and Health Act 1999

Coal Mining Safety and Health Regulation 2017

DNRM Hazard Database

Minerals Industry Safety Handbook Jan 2004

Minerals Exploration Safety Guidance Note Nov 2004

TAR 002 – Fire Management TARP

SOP RSK 001 - Fire SOP Risk Assessment

# Appendix 02 Exploration Sites

Additional requirements for exploration sites include:

**Fire prevention**

* Long grass shall be slashed or graded for a 20m radius (40m x 40m work area) around the exploration site down to the soil, and
* Fire extinguishers are to be removed from their travel position on drill sites and placed in an at-ready position, on the ground.

**Bush fire**

If a ‘grassfire’ is identified within the tenement boundary, notify the site manager and prepare to move to a safe area. Fight the fire, only if safe to do so. If a ‘bushfire’ is identified in the vicinity immediately shutdown the rig, evacuate to a safe area, and notify the site manager.

**Exclusion zone**

A 20-metre radius (40m x 40m work area) exclusion zone is to be established around each operating drill rig for the prevention and control of fires. Smoking is not permitted within the exclusion zone. Flammable materials (paper, rags) and cigarette butts should be disposed of in a container as required and removed as soon as possible.

**Emergency egress**

A minimum of two vehicle emergency egress options shall be made available for each site to assist in the evacuation of personnel. The emergency egresses shall be communicated to personnel by the Site Manager and documented in the emergency response plan.