****

**Kaius Resources**

**Standard Operating Procedure – Heat Stress**

Reference: SOP-008

Table of Contents

[1. Scope 3](#_Toc75784496)

[2. Authority 3](#_Toc75784497)

[3. Responsibilities 3](#_Toc75784498)

[4. Definitions and Abbreviations 4](#_Toc75784499)

[5. Procedure 4](#_Toc75784500)

[5.1 Introduction 4](#_Toc75784501)

[5.2 Controls to Minimise the Exposure to Heat 5](#_Toc75784502)

[5.3 Acclimatisation 5](#_Toc75784503)

[5.4 Temperature Monitoring 6](#_Toc75784504)

[5.5 Effect of Heat on the Body 6](#_Toc75784505)

[5.6 Personal Hydration 6](#_Toc75784506)

[5.7 Medication 7](#_Toc75784507)

[5.8 Medical Assessment 7](#_Toc75784508)

[5.9 Heat Illness 8](#_Toc75784509)

[5.10 First Aid response to Heat Illness 8](#_Toc75784510)

[5.10.1 Heat Cramps 8](#_Toc75784511)

[5.10.2 Heat Exhaustion 8](#_Toc75784512)

[5.10.3 Heat Stroke 9](#_Toc75784513)

[5.11 Training 9](#_Toc75784514)

[6. Review Criteria 9](#_Toc75784515)

[7. Safety and Environment 9](#_Toc75784516)

[8. Attachments, References and Related Documents 9](#_Toc75784517)

[8.1 References and Related Documents 9](#_Toc75784518)

Purpose This Standard Operating Procedure outlines the requirements for the prevention and management of health and safety risks from exposure to heat that could lead to heat stress, heat exhaustion and heat stroke.

# 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 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.
* Adequate resources are provided to maintain compliance with the requirements of this SOP.
* The application and requirements of this SOP are periodically audited and reviewed.

**Supervisors**

Supervisors shall ensure:

* That 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.

|  |  |
| --- | --- |
| 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 |
| Shall | Indicates that a statement is mandatory |
| Should | Indicates a recommendation |
| Heat Stress | The total heat load as a result of activity and environmental conditions |
| Heat Exhaustion | The over-taxing of body’s cooling mechanisms |
| Heat Stroke | The effects of heat exhaustion resulting in collapse, loss of consciousness, convulsions, or death |
| SOP | Standard Operating Procedure |
| SSE | Site Senior Executive |
| KRES | Kaius Resources  |

# Procedure

## Introduction

The effects of heat on the body are influenced by a number of factors including:

**Environmental Factors**

* Air Temperature
* Air Movement
* Humidity
* Radiant Temperature

**Personal Factors**

* Clothing worn
* Level of activity
* Hydration
* Acclimatisation
* Medical history
* Physical condition

All tasks shall be assessed to identify possible work practices or environments which have the potential to expose employees to health and safety risks due to excessive exposure to heat for example:

* Working in open areas where exposure to sunlight and/or radiation is unavoidable.
* Working in enclosed areas.
* Working near heat generating/radiating equipment.
* Heavy physical work, particularly when wearing (non-breathing) protective clothing e.g. welding coveralls, disposable overalls, respirators, etc., and
* Conducting emergency procedures such as firefighting.

## Controls to Minimise the Exposure to Heat

The extent and application of the controls needed depends largely on the outcome of the task risk assessment. The following information is intended to provide general guidelines on control strategies that can be applied, in the order of effectiveness as per the ‘hierarchy of controls.’

* **Elimination** – removal of the heat source, for example - Shutdown heat generating equipment.
* Substitution – replace process or task with less hazardous one, for example - Re-schedule work to a cooler time of the day.
* **Isolation/Engineering** – shield or isolate heat source from personnel, for example
	+ Installing heat shields around hot components, and
	+ Air condition the work environment.
	+ Install portable shade structure (gazebo/tent/tarpaulin)
* **Administration** – procedural and instructional controls, for example –
	+ Provide cool drinking water and schedule rest periods at appropriate intervals.
	+ Written Work Instructions to include precautions and controls for prevention of heat stress.
	+ Ensure persons are medically assessed as being able to work in the current environment.
* **Personal Protective Equipment** – contingencies to protect employees, for example:
	+ Wear appropriate protective clothing and equipment.
	+ Slip-Slop-Slap-Wrap – cover up, apply sunscreen, and wear a hard hat and brim to protect against sunlight.
	+ Provide a shaded area for rest and work breaks.

## Acclimatisation

Workers in hot environments can become acclimatised as a way of reducing the heat strain. Acclimatisation produces a lower heart rate and higher sweat rate with more diluted sweat.

It is important to note that workers who have been on extended leave, new employees and contract labour from cooler locations will not be acclimatised and this should be taken into consideration when scheduling work in hot environments. Generally, new workers in hot environments should become acclimatised in 7-14 days and will be monitored regularly.

## Temperature Monitoring

Supervisors shall monitor conditions and respond according to Kaius Resources Project Working in Heat TARP

## Effect of Heat on the Body

If a worker is exposed to excessive heat the following effects may occur:

**Fatigue** – heat induced fatigue may cause reduced performance or lapses in concentration.

**Prickly Heat** – acute localised dermatitis resulting from perspiration and clothing irritating the skin.

**Fainting** – results from insufficient blood flow to the brain. Blood flow increases to the surface of the skin as the body attempts to cool down, depriving blood supply to vital organs.

**Heat Cramps** – cramps normally develop in the leg muscles may also result in abdominal and shoulder spasms, moist/cool/pale skin, nausea, tiredness. It may also indicate a salt and water imbalance in the body, due to fluid loss.

**Heat Exhaustion** – over-taxing of body’s cooling mechanisms.

Characterised by:

* Moist, pale skin
* Weakness and fatigue
* Nausea and/or vomiting
* Weak, rapid pulse, and
* Headache, giddiness, fainting, confusion, lack of coordination.

**Heat Stroke** – can result in collapse, loss of consciousness, convulsions, or death. Characterised by:

* Hot, DRY skin
* Rapidly rising body temperature.
* Nausea and/or vomiting
* Confusion leading to possible aggression.
* Weak, rapid pulse, and
* Headache, extreme thirst.

## Personal Hydration

All people working in hot conditions shall have ready access to a supply of cool, potable water or other fluid replacement beverage – avoid coffee and tea or other drinks containing caffeine. The supply of cool water, as opposed to iced water will assist in the maintenance of adequate hydration levels.

All workers have a responsibility to be well hydrated. Ideally when working in hot conditions, 1 – 1.5 litres of water should be consumed per hour by drinking small amounts of water at frequent intervals.

Urine colour charts will give people guidance on personal levels of hydration.



## Medication

People taking over-the-counter medications that could affect their ability to work in heat, such as cold/flu medications or drugs containing codeine, antihistamines or pseudoephedrine, or other drugs known to affect working-in-heat (such as anti-depressants) should:

* Advise their supervisor
* Complete - Drug Medication Declaration Form, and
* Follow MOP 011 Fitness for Work.

Similarly, workers taking prescription drugs should advise their physician that they work in hot conditions. The physician should ensure any prescribed drugs or treatment plan is safe in these circumstances and provide a medical clearance before the person resumes work in thermally stressful conditions.

## Medical Assessment

Where considered necessary by the SSE or site supervisor, workers may be required to undergo medical assessment by a physician who is to advise the SSE as to the person’s suitability for working in heat. The intervention of the physician is to ensure that medical conditions which may otherwise place the person’s health at greater risk while working in hot conditions are identified. This is especially important where persons are exhibiting symptoms of colds, flu, diarrhoea, or other dehydration-causing illness.

## Heat Illness

All suspected cases of heat illness shall be recorded and properly investigated in line with the accident/incident reporting process. No person suffering heat illness is to be left alone or travel by themselves unless they have been assessed as safe to do so by a competent person.

On the first instance of heat illness, the person will be re-educated on the need to come to work fully hydrated and stay hydrated during their shift. Where possible, they may also be required to have a urinary hydration test at the beginning and end of each shift for the next week at work.

On the second instance of heat illness, the person will have a medical assessment by a physician. Where possible, they will also be required to have a urinary hydration test at the beginning and end of each shift for the next week at work.

All cases of heat rash will be reported and properly investigated in line with the accident/incident reporting process.

## First Aid response to Heat Illness

Administer first aid, if required, as follows (refer to Kaius Resources Project Emergency Management Plan for escalation beyond initial response):

###  Heat Cramps

|  |  |
| --- | --- |
|  | **Seek Medical assistance / advice if Heat** **Cramps is suspected.** |

* Move to a cool environment.
* Apply ice or cold packs to cramped muscles.
* Gently stretch muscles (do not massage).
* Loosen tight clothing
* Give plenty of cool water.
* Provide rest, and
* Seek first aid or medical assistance
* Escalate as an emergency if required

###  Heat Exhaustion

|  |  |
| --- | --- |
|  | **Seek Medical assistance / advice if Heat** **Exhaustion is suspected.** |

* Move to a cool environment.
* Apply cool (not iced) water to the body.
* Give plenty of cool (not iced) water if person is conscious.
* Loosen tight clothing
* Apply ice or cold packs to cramped muscles, and
* Gently stretch muscles (do not massage).
* Escalate as an emergency if required

###  Heat Stroke

|  |  |
| --- | --- |
|  | **Seek Medical assistance / advice if Heat** **Stroke is suspected – call Emergency if required** |

DRSABCD: Check for **D**anger 🡪 Check for **R**esponse 🡪 **S**end for Help 🡪 Check **A**irway 🡪 Check **B**reathing 🡪 Check **C**irculation 🡪 **D**efibrillator

* Move to cool environment, if possible.
* Apply cool / iced water to the body (do not supercool).
* Lay the person down, if possible.
* Give plenty of cool water if person is conscious.
* Loosen tight clothing, and
* Apply ice packs to groin, neck, arm pits.

## Training

All mine workers likely to be working in hot conditions shall complete training in this procedure and the MOP 008 First Aid.

# 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

## References and Related Documents

Coal Mining Safety and Health Act 1999

Coal Mining Safety and Health Regulation 2017

DNRM Hazard Database

Minerals Exploration Safety Guidance Note Nov 2004

Principles of Occupational Health and Hygiene, AIOH, 2007

http://www.dmp.wa.gov.au/Documents/Safety/MSH\_G\_ManagementAndPreventionOfHeatStress.pdf

TAR 005 - Working in Heat TARP

SOP RSK 008 - Heat Stress SOP Risk Assessment