Thermal Stress Management Plan

Health, Safety and Environment

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1. Purpose and Scope

The primary aim of Roy Hill Thermal Stress Management Plan is to protect the health of people at work by ensuring that exposure to elevated thermal conditions is limited to the lowest practicable levels. This will be achieved by monitoring worker's potential exposure and controlling temperature and related conditions to levels that won't adversely affect their health. It does not include the assessment of thermal comfort.

The Thermal Stress Management Plan provides requirements to support sustained conformance with Roy Hill Operations HSES Management Standards. This plan applies to all persons entering the Roy Hill operations, other workplaces or any area which Roy Hill has responsibility.

2. Requirements

The management of Thermal Stress shall be aligned with the Roy Hill Risk Management Procedure and follow the principles of identification, assessment and control. The level of assessment shall be appropriate to the level of risk posed by the hazard.

3. Planning

If the potential for high thermal stress exposure cannot be avoided, the operation should complete hazard identification and risk assessment for jobs, tasks, processes and areas with potential and/or actual occupational thermal risk.

4. Risk of Contact

The potential for heat-induced illnesses is not dependent on any one factor but is usually associated with a combination of task, environmental and personal conditions. Task and environmental factors that need to be considered are:

- Temperature;
- Humidity;
- Air movement;
- Radiant temperature of surroundings (e.g. from sunlight);
- Clothing (can interfere with evaporative heat loss);
- Personal protective equipment (PPE); and

Physical activity (contributes to metabolic heat generation). Personal factors which can influence the onset of heat illness include:

- Age;
- General health including recovering from illness;
- Weight and physical fitness;
- Hydration state (amount of water in the body);
- Acclimatisation;
- Alcohol; and
- Prescription and non-prescription Drugs.

5. Effects on humans

The human body operates within a very narrow core temperature band. Normal internal core body temperature usually ranges between 36.8°C and 37.2°C. The initial symptoms of heat strain (i.e. deterioration of concentration and fine motor skills and in some cases, exhaustion) may start to manifest themselves within a rise in core body temperature of 2°C. Heat stroke can begin when core body temperature reaches 40°C with death possible at 42°C and upwards.

Heat illnesses can range from prickly heat, heat cramps, heat syncope (fainting), and dehydration through to the more serious heat exhaustion and heat stroke. There is large variability in the response of individuals to hot conditions. Some individuals may be seriously affected by a body temperature of less than 39°C, as there have been documented instances of body temperatures exceeding 40°C without significant impairment of function.

5.1 Heat Stroke

Heat stroke, which is a state of thermoregulatory failure, is the most serious of the heat illnesses. Heat stroke is usually considered to be characterised by cessation of sweating so the body can no longer cool itself hot, dry skin; rapidly rising body temperature; collapse; loss of consciousness; and convulsions. If deep body temperature exceeds 40°C, the danger of heat stroke is imminent. Without initial, prompt, and appropriate medical attention, including removal of the victim to a cool area and applying a suitable method for reduction of the rapidly increasing body temperature, heat stroke will be fatal.

5.2 Heat Exhaustion

Heat exhaustion, while serious, is initially a less severe heat illness than heat stroke, although it can escalate to heat stroke if not treated appropriately. Heat exhaustion is generally characterised by clammy, moist skin; weakness or extreme fatigue; nausea; headache; severe cramps; no excessive increase in body temperature; and low blood pressure with a weak pulse. Without prompt treatment, collapse is inevitable. Heat exhaustion most often occurs in persons whose total blood volume has been reduced due to dehydration (i.e. depletion of body water as a consequence of deficient water intake), but can also be associated with inadequate salt intake even when fluid intake is adequate. Individuals, who have a low level of cardiovascular fitness and/or are not acclimatised to heat, have a high potential to become, and may be recurrent, heat exhaustion victims, particularly where self-pacing of work is not practised. Note that where self-pacing is practised, both fit and unfit workers tend to have a similar frequency of heat exhaustion. Lying down in a cool place and drinking cool (10-15°C; slightly salted water (0.1% NaCl) or an electrolyte supplement, will usually result in rapid recovery of the victim of heat exhaustion, but a physician should be consulted prior to resumption of work. Salt-depletion heat exhaustion may require further medical treatment under supervision.

5.3 Heat syncope (fainting)

Exposure of fluid-deficient persons to hot environmental conditions can cause a major shift in the body's remaining blood supply to the skin vessels in an attempt to dissipate the heat load and ultimately results in an inadequate supply of blood being delivered to the brain. The latter condition may also occur even without significant reduction in blood volume in conditions such as wearing encapsulating clothing assemblies, or with postural restrictions.

5.4 Heat cramps

Heat cramps, are characterised by painful spasms in one or more skeletal muscles. Heat cramps may occur in persons who sweat profusely in heat without replacing salt losses or un-acclimatised personnel with higher levels of salt in their sweat. Resting in a cool place and drinking 250 mL of saline solution (0.9% NaCl) will alleviate the cramps rapidly. Use of salt tablets is undesirable. Thereafter, such individuals should be counselled to maintain a balanced electrolyte intake, with meals if possible. Note that when heat cramps occur, they occur most commonly during the heat exposure, but can occur sometime after heat exposure.

5.5 Prickly heat (heat rash)

Heat rashes usually occur as a result of continued exposure to humid heat with the skin remaining continuously wet from unevaporated sweat. This often results in blocked glands, itchy skin and reduced sweating. In some cases, prickly heat can lead to lengthy periods of disablement. Where conditions may encourage occurrence of prickly heat (e.g. exposure to damp situations in tropical or deep underground mines), control measures are important to prevent lengthy periods where they may be unable to perform their duties. Keeping the skin clean and as cool and dry as possible to allow the skin to recover is generally the most successful approach.

5.6 Chronic Illness

Chronic illness resulting from extended exposure to elevated temperatures is not as well documented as the short-term impacts. Numerous studies have indicated possible links to issues associated with:

- the liver,
- the heart,
- digestive system,
- central nervous system, and
- skin illnesses.

5.7 Reproductive effects

There is also a possibility of effects on human reproduction. Temporary infertility may occur in both females and males (where core temperatures are above 38°C). Also, increased risk of malformation of the unborn foetus during the first trimester of pregnancy may occur if a female's core temperature exceeds 39°C for extended periods.

5.8 Other hazards

In addition to stress and productivity losses as noted above, heat stress can contribute to decreased cognitive performance, fatigue and as such is of particular importance for safety-critical jobs. In fact, higher summer temperatures may be partially responsible for increased injury incidence among workers and physically active individuals.

Protective clothing for performing hazardous jobs, such as encapsulating suits, impede sweat evaporation and heat loss, essentially creating a saturated microclimate within the suit. These conditions preclude the use of environmental monitoring indices and demand a health assessment for job fitness and physiological monitoring.

6. Hydration and fluid requirements

The hydration status of an individual is a key factor in the ability for the human body to function efficiently in a hot thermal climate. The total body water mass is approximately 60% and this level is constantly varying when work is undertaken in these environments. Fluids are lost via a number of routes, which include; sweating, evaporation from the respiratory tract and excretion. The most effective means of regulating temperature is via the evaporation of sweat, which may account for up to 98% of the cooling process. If fluid is not replaced it can impact on the individual in a number of ways. It can reduce physical work capacity, fatigue is increased and there are also psychological changes associated with dehydration. It has also been shown to increase the perceived rate of exertion as well as impairing mental and cognitive function.

6.1 Urine specific gravity

Studies have consistently shown that water intake at one's own discretion results in incomplete water replacement for individuals working in the heat and there is consistent evidence that relying solely on thirst as an indicator of fluid requirement will not restore water balance. Specific gravity (SG) is defined as the ratio weight of a substance compared to the weight of an equal volume of distilled water; hence the SG of distilled water is 1.000. Various studies completed within the Pilbara region of Western Australia (Donoghue, Sinclair and Bates 2008) have indicated a specific gravity of less than 1.015 indicates a person is optimally hydrated. Values above 1.015 indicate varying degrees of hypo hydration whilst values above 1.030 represent a clinical state of severe dehydration.

Hydration Status	Urine Specific Gravity	Actions to be undertaken
Euhydrated (optimal hydration)	1.000 – 1.015	No action
Slight hypo hydration	1.015 – 1.022	No action
Moderate dehydration	1.022 – 1.027	Consume 1 litre of water
Dehydrated	1.027 – 1.029	Education on hydration status, consume 1.5 litres of water
Clinically dehydrated	≥1.030	Supervisor notified, Personnel not to return to work until USG levels reduced below 1.025

Figure 1: Recommended Urine Specific Gravity Levels and actions to be undertaken

6.2 Fluids and re-hydration

Re-hydration of lost fluids resulting from work in hot environments is a key aspect in effectively managing work in these adverse conditions. Trying to get employees to maintain a sufficient water intake to counter losses associated with sweat evaporation in hot environments has always been an issue. Relying purely on the thirst mechanism to maintain fluid volumes has been shown to be ineffective, often resulting in "involuntary dehydration". The sensation of thirst will usually not be initiated until between 1% and 2 % of body weight loss has already occurred. Many studies have been conducted to identify the ideal replacement fluid which is palatable and provides a rapid rate of absorption into the body. Palatability should not be under-estimated. A number of studies have shown that factors such as colour, odour, temperature and taste can affect the human senses, hence are critical to palatability and intake.

One problem is that fluid absorption is limited to about 1.2 litres/hour, which can be significantly less than sweat loss under some work conditions in hot thermal environments. Also, the makeup of the drink can influence the emptying of the stomach into the intestines where the absorption takes place. Fluids with high solids concentrations (carbohydrate, electrolytes, sweeteners and preservatives) are significantly delayed in the stomach as are fluids with more than 2.5 % glucose. This measure of the number of particles in a solution is sometimes referred to as the "osmolality" of the fluid.

Another key impact can be the carbohydrate content of the fluid, which can reduce absorption and in some cases, result in gastro-intestinal discomfort. A study of marathon runners observed that athletes using a 6.9%

carbohydrate content solution experienced double the amount of stomach discomfort than those who drank a 5.5% solution or plain water. In fact, water was found to be one of the quickest fluids absorbed.

6.3 Water intoxication (hyponatraemia)

In recent times there has been increased awareness relating to the condition known as hyponatraemia, which is a condition that can occur when there is an imbalance in the body's electrolytes (particularly sodium in the blood). This can occur when there is a large loss of sweat over an extended period that is replaced by plain water and when the nutritional balance of food being consumed provides insufficient salt to replace those losses in sweat.

Sodium helps to regulate the water levels in and around cells in the body and when excess water is consumed under the above conditions, the sodium levels drop, the body's water levels rise and the cells begin to swell, resulting in health problems which can include: mental confusion, weakness and fainting. Death has been known to occur under very severe conditions.

6.4 What is the most appropriate fluid to drink when working in the heat?

There is still much discussion and research occurring in relation to this question. Water is the simplest and is readily absorbed, but it will not replace essential electrolytes such as sodium and to a lesser extent potassium, lost as a result of extended periods of sweating. Nor will it provide energy. Research has established that fluid requirements during work in the heat that lasts less than 90 minutes can be met by drinking adequate amounts of plain water. Particularly in the case of an acclimatised individual, the salt levels lost are usually replaced by the salt content of the average diet.

For work of extended duration over more than 90 minutes but less than 240 minutes, consideration should be given to the inclusion of fluid which contains some form of carbohydrate additive of less than 7% concentration. For periods which exceed 240 minutes, fluids should also be supplemented with an electrolyte, which includes sodium (~20-30mmol/L) and trace potassium (~5mmol/L) to replace those lost in sweat. Low concentration of sodium in beverages appear to improve palatability, encourages the consumption of more fluid, enhances the rate of stomach emptying and assists the body in retaining the fluid once it has been consumed. Whilst not common, potassium depletion (hypokalemia) can result in serious symptoms such as disorientation and muscle weakness.

Sports and electrolyte replacement drinks have become popular as replacement fluids and come in a variety of formulations.

6.5 What not to drink

Tea, coffee and drinks such as colas and energy drinks containing caffeine are not recommended. Caffeine is readily absorbed with blood levels peaking within 20 minutes. One of the adverse effects relating to these drinks is that the caffeine may have a diuretic effect (increased urine production) in some people and hence increase fluid loss, possibly leading to dehydration and hindering rehydration before and after work. Alcohol also has a diuretic effect and will negatively impact on the hydration of an individual.

Due to their protein and fat content, milk, liquid meal replacements, low fat fruit "smoothies" commercial liquid sports meals (e.g. Sustagen) will take longer to leave the stomach, giving a feeling of fullness and could limit the consumption of other fluids to replace losses during physical activities in the heat.

6.6 When to drink

Dehydration does not occur suddenly. It builds up over a period of time, hence fluid consumption should also occur in a progressive manner. Due to the variability of individuals and different types of exposures it is difficult to detail a precise fluid consumption regime. However below provides some indication of a suitable regime.

- Before: Ideally, approximately 450mL should be consumed 2 hours prior to the shift with a further 300mL 15 to 20 minutes immediately before commencing work. In some situations where drinking during the task may not be possible, the levels consumed at this initial point should be increased.

- During: The aim is to replace fluids loss as soon as possible after they occur and drinking small quantities (150 - 250mL) frequently is recommended. The goal should be to replace all of the expected loss from sweating and produce a urine output of >400mL per day (pale straw in colour).

- After: After work, at least 1 litre of fluid should be consumed within the first 2 hours.

6.7 Urine production and colour

Urine colour as a measure of dehydration has been investigated in a number of studies and found to be a useful tool to track levels of dehydration. The level of urine production will decrease as dehydration increases and levels of less than approximately 250mL produced twice daily would indicate dehydration. Colour also intensifies as the urine concentrates with a dark yellow colour indicating severe dehydration through to a pale straw colour when hydrated. It should be noted that colour may be affected by illness, medications, vitamin supplements (e.g. Berocca), and food colouring. Colour charts may be purchased from a number of suppliers (e.g. MVAust) and displayed in toilets as an aid to educating the workforce.

6.8 Acclimatisation

Heat acclimatisation is a complex physiological process where the body adjusts as a response to the thermal environment (Table 5). Each of these physiological changes (e.g. cardiovascular stability, fluid and electrolyte balances, sweat rates and temperature responses) has its own rate of change during this process.
Heat acclimatisation occurs over a period of time, however not all changes occur at the same rate within the continuum. There are different rates of change in the acclimatisation process, such that the internal body temperature, skin temperature, heart rate, blood pressure, sweat rate, internal body fluid shifts and renal conservation of fluid each progress at different rates.
Three phases have been identified, which simultaneously progress during the so-called continuum in the acquisition of heat acclimatisation:

- Initial Phase: Occurs during early consecutive days of exposures to heat. Usually, 33% of optimum by day 4.
- Intermediate Phase: When cardiovascular stability has been assured and surface and internal body temperatures are lower. Usually, 44% of optimum by day 8, although further studies suggest that about 70 to 80% will be achieved after about 7 to 10 days.
- Third Phase: A decrease in sweat and urine osmolality, and other compensations to conserve body fluids and restore electrolyte balances. Usually, greater than 65% of optimum by day 10, 93% by day 18, and 99% by day 21.

Mere exposure to heat does not confer acclimatisation. Elevated metabolic rate for about 2 hours per day, to achieve acclimatisation, is required. Acclimatisation is specific to the level of heat stress and metabolic load. Acclimatisation to one heat-stress level does not confer adequate acclimatisation to a higher level of heat stress and metabolic heat production.

Someone with heat acclimatisation exposed to environmental and activity related heat stress has:

- More finely tuned sweating reflexes, with increased sweat production rate at lower electrolyte concentrations;
- Lower rectal and skin temperatures than at the beginning of exposure;
- More stable and better regulated blood pressure with lower pulse rates; and
- Improved productivity and safety

Heat acclimatisation is acquired slowly over weeks of continued activity with heat stress. While the general consensus is that heat acclimatisation is gained faster than it is lost, less is known about the time required to lose acclimatisation. Studies suggest that 7 to 21 days is a consensus period for loss of acclimatisation. The weekend loss is transitory and is quickly made up, such that by Tuesday or Wednesday an individual is as well acclimatised as they were on the preceding Friday. If, however, there is a week or more of no exposure, loss is such that the regain of acclimatisation requires the usual 4 to 7 days. An acclimatisation period is recommended for any new workers to site or those that have returned from extended leave (e.g. >14 days) in a more temperate climate, as acclimatisation can be lost.

7. Workplace monitoring and heat stress indices

The workplace air temperature conditions should be measured at regular intervals and whenever there are changes in engineering controls and production methods. The nature and degree of exposure to high temperature can be determined by conducting both workplace and/or personal monitoring. Although the latter is preferred, the former is often the more practical. Fixed-place climatic monitoring should be conducted where workers are most often working. A structured assessment protocol is the best approach, with the flexibility to meet the occasion. A recommended method would be as follows:

1. A walk-through survey carrying out a basic thermal risk assessment application (Basic Thermal Risk Assessment Application) Note that work / rest regimes should not be considered at this point – the aim is simply to determine if there is a potential problem. If there is, implement general heat stress exposure controls;

2. If a potential problem is indicated from the initial step, then progress to a second level of assessment (e.g. Thermal Work Limit (TWL), etc.), to enable a more comprehensive investigation of the situation and general environment. Data will be obtained from Roy Hill weather stations in which will be used to calculate the black globe temperature, Natural Wet Bulb Temperature and the Thermal Work limit. The aim is to determine the practicability of job-specific heat stress exposure controls. Refer to appendix 1 which indicates the calculations required to establish the above information.

3. The TWL indices is intended to predict the risk of heat disorders from climate characteristics, the clothing of the workers and their average metabolic work rate, using predicted responses of the body such as sweating and elevated core temperature. To extend the usefulness of the indices, the thermal characteristics (i.e. insulation effect) of a variety of protective clothing combinations has been included in the calculation. The indices assume light clothing is worn (e.g. cotton clothing or cotton/polyester blends), and assumes the body responds similarly in all persons working under the same conditions.

8. Controlling exposure

The most effective means of limiting health effects resulting from high temperatures is by controlling exposure. Area supervisors and employees should develop and implement work practices, through standard operating procedures, which limit exposure to high temperatures. Other ‘job-specific’ controls should be assessed and implemented in a staged manner; such that the hierarchy of controls is appropriate to the risk:

- Elimination or substitution of the hazard - the permanent solution. Hot work should be avoided whenever possible. For example, use a lower temperature process, relocate to a cooler area or reschedule work to cooler times. It is preferable to schedule hot jobs for cooler parts of the day. For instance, consider starting heavy work very early in the day and finishing before temperatures begin to increase (e.g. by 10 am).
- Engineering controls such as rest areas with a provision of cool drinking water and cool conditions (e.g. air conditioning and shade); good ventilation both for general air movement and for removal of process heat and water vapour (e.g. use of fans for air movement); providing chilled air (e.g. use of an air conditioner); insulation or shielding for items of plant causing radiant heat; or mechanical aids to reduce manual handling requirements.
- Administrative controls such as documented procedures for inspection, assessment and maintenance of the engineering controls as well as the use of urinary specific gravity (SG) limits for being able to start a shift might also be considered.
- Personal protective equipment (PPE) should only be used in situations where the use of higher level controls is not commensurate with the degree of risk for short times, while higher level controls are being designed, or for short duration tasks. Suitable PPE would include appropriate clothing. Wear the lightest clothing that provides sun or other potential adverse exposure protection. A balance is needed between clothing for sun protection, including a hat, and clothing that allows heat loss through evaporation.

9. Abbreviations

Abbreviation	Definition
AIOH	Australian Institute of Occupational Hygienist’s
BET	Basic Effective Temperature
ML	Millilitre
PPE	Personal Protective Equipment
PHS	Predicted Heat Strain
SG	Specific Gravity
TWL	Thermal Work Limit
USG	Urine Specific Gravity
WBGT	Wet Bulb Globe Thermometer

Table 1 – Abbreviations

10. Definitions

Term	Definition
Acclimatisation	A set of gradual physiological adjustments that improve an individual’s ability to tolerate heat. (The process may take 10 to

Core body temperature	The temperature of the internal organs of the body, including the brain. It ranges between 36.8° Cat rest and 38o under maximum stress for un- acclimatised workers and 38.5oC for
Heat strain	The overall physiological response by the cardiovascular, thermoregulatory, respiratory, renal and endocrine systems
Heat stress	The net heat load to which a worker may be exposed from the combined contributions of work, environmental factors and clothing requirements.
Impermeable or restricted clothing	Clothing which does not permit free two-way passage of air or water vapour. Examples are chemical barrier suits and fire-fighting clothing.
Limiting conditions	Are a number of physiological parameters on temperature and heart rate, if any of which are exceeded would be an indicator of heat strain.
Metabolic work rate	The correct assessment of the amount of mechanical work and heat generated in a human body by a physical work process.
Physiological monitoring	Measuring one of the parameters of core body temperature or its surrogate, or heart rate.
Predicted Heat Strain	The likely rise in core body temperature resulting from the particular work under certain known conditions
Prescriptive Zone	The core body temperature zone with an upper limit of 38oC for a un- acclimatised worker and 38.5°C for an acclimatised worker.
Wet Bulb Globe Temperature (WBGT)	A first order index (a single expression) of a temperature which takes into account air temperature, radiant globe temperature and humidity and their contribution to heat stress. The WBGT is usually measured by an instrument designed for that purpose.

Table 2 – Definitions

11. References

Document number	Title
Australian Institute of Occupational Hygienist	Heat Stress Standard & Documentation Developed for Use in the Australian
US National Institute for Occupational Safety and Health (NIOSH)	Working in Hot Environments
US Occupational Safety & Health Administration (OSHA)	OSHA Technical Manual – Heat Stress
US Mine Safety & Health Administration (MSHA)	Heat Stress - What to do
NSW WorkCover publication	Work in Hot Environments

Table 3 – References

12. Appendix 1 – Calculations for Thermal Work Limit Assessment

Calculating Black Globe Temperature

BGT = 1.33 x DB – 2.65 x Square Root of DB + 3.21 x log (SR + 1) + 3.5

Where:

DB = Dry Bulb Temperature;
SR = Solar Radiation;

Calculation Natural Wet Bulb Temperature

NWB = (-5.806+0.672*DB -0.006*DB*DB + (0.061+0.004*DB+0.000099*DB*DB)*RH+ (-0.000033-0.000005*DB -0.0000001*DB*DB)*RH*RH)

Where:

DB = Dry Bulb Temperature;
RH = Relative Humidity;

Calculating the Thermal Work Limit

An index termed the "Thermal Work Limit" (TWL) has been used successfully, and rigorously tested, in in the Pilbara region of north-west Australia. TWL is defined as the limiting (or maximum) sustainable metabolic rate that hydrated, acclimatised individuals can maintain in a specific thermal environment, within a safe deep body core temperature (<38.2oC or 100.8°F) and sweat rate (< 1.2 kg/hr). The index is designed specifically for self-paced workers and does not rely on estimation of actual metabolic rates. Work areas are measured and categorised based on a metabolic heat balance equation, using environmental parameters such as dry bulb, wet bulb and air movement to measure air-cooling power.

The TWL uses five environmental parameters
- Dry bulb,
- Wet bulb
- Globe temperatures,
- Wind speed, and
- Atmospheric pressure.

With the inclusion of clothing factors, it can predict a safe maximum continuously sustainable metabolic rate (W m-2) for the conditions being assessed. At high values of TWL, (220 Wm-2) the thermal conditions impose no limits on work with some adjustment of work rate required, as the values increase above 115 Wm-2, adequately hydrated self-paced workers will be able to manage the thermal stress with varying levels of controls. As the TWL gets progressively lower, heat storage is likely to occur and TWL can then be used to predict safe work rest-cycle schedules. At very low values (<115 Wm-2), no useful work rate may be sustained and hence work should cease. These limits are provided in more detail in Appendix 2.

Thermal Work Limit Calculator

13. Appendix 2 – Thermal Work Limit Working Zones

TWL ($W.m^{-2}$)	Working zone	Interventions
> 140	Unrestricted	**No limits on self-paced work** for educated, hydrated, acclimatised workers.
115-140	Buffer	**Buffer zone exists to identify situations in which environmental conditions may be limiting to work** • Any practicable intervention to reduce heat stress should be implemented e.g. provide shade, improve ventilation etc. • Working alone to be avoided if possible • Unacclimatised[a] workers not to work in this zone • Fluid intake of ≥1 litre per hour required • Work-rest cycling or rotation required*.
< 115	Withdrawal	**Work limited to essential maintenance or rescue operations** • No person to work alone • No unacclimatised person to work[a] • Documentation required authorising work in hostile thermal conditions for specific purpose • Specific induction required emphasising hydration and identifying signs of heat strain • Apply 20 minutes work - 40 minutes rest schedule • Dehydration testing recommended at end of shift* • Personal water bottle (2 litre capacity) must be on the job at all times

[a]Note: unacclimatised workers are defined as new workers or those who have been off work for more than 14 days due to illness or leave (outside the tropics)