

# Procedure

## Extreme Work Environments



### 1. Purpose

The purpose of this procedure is to eliminate or minimise injury or illness caused by work conducted in extreme work environments.

### 2. Scope

This procedure applies to all DPTI workers.

### 3. Definitions

TERM	DEFINITIONS
<b>Extreme work environment</b>	<p>Work conducted in extreme environments refers to a workplace that is influenced by at least one of the following:</p> <ul style="list-style-type: none"> <li>• Extreme conditions, such as:               <ul style="list-style-type: none"> <li>○ Hot or cold temperatures</li> <li>○ High humidity</li> <li>○ Heavy rain, hail, sleet or snow</li> <li>○ Lightning</li> <li>○ High wind</li> <li>○ Dust storms</li> </ul> </li> <li>• Type and method of work</li> <li>• Physical condition of the worker</li> <li>• Type of personal protective equipment (PPE) required to be used</li> <li>• Conditions generated by plant and equipment</li> <li>• Duration of exposure to the:               <ul style="list-style-type: none"> <li>○ Extreme environment</li> <li>○ Type and method of work.</li> </ul> </li> </ul>
<b>Heat Illness</b>	Excessive exposure to heat from a combination of environmental, climatic and physiological factors, that may lead to a number of heat related illnesses ranging from mild to life threatening as it progresses.
<b>Heat Exhaustion</b>	A serious heat related illness which may progress to heat stroke if left untreated. Signs and symptoms include drowsiness, weakness, headache, shortness of breath, loss of appetite, fainting, feeling cold and clammy and reduced concentration.
<b>Heat Stroke</b>	A rise in core body temperature to dangerous levels of 41°C or above. Signs and symptoms may include confusion, nausea, vomiting, and uncoordinated movement, moist or dry sweating, staggering or collapse. These cases are medical emergencies with a high fatality rate in untreated cases.
<b>Reasonably practicable</b>	<p>Whatever is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters including:</p> <ul style="list-style-type: none"> <li>• the likelihood of a hazard or risk occurring;</li> <li>• the degree of harm that might result from the hazard or risk;</li> </ul>

	<ul style="list-style-type: none"> <li>• what the person concerned knows, or ought reasonably to know, about the hazard or risk, and ways of eliminating or minimising the risk;</li> <li>• the availability and suitability of ways to eliminate or minimise the risk; and</li> <li>• whether the cost is grossly disproportionate to the risk.</li> </ul>
<b>Ultraviolet Radiation</b>	Is the part of sunlight that causes sunburn and skin damage, with or without heat, leading to premature ageing of the skin and skin cancer.

## 4. Procedure detail

### 4.1 Managing the risk

#### 4.1.1 Identifying hazards

Managers and supervisors in consultation with workers must ensure hazards associated with operating in extreme work environments are identified prior to the commencement of works.

Hazards may include:

- The nature/type of the task to be performed
- The length of time a worker may be performing the task
- The time of day when a worker may be performing the task
- The individual competencies of workers
- Work location
- Availability and accessibility to communication
- Hazardous manual tasks
- Environmental factors
- Falling objects
- Workers who are at greater risk of suffering an injury or illness while performing tasks in extreme work environments.

#### 4.1.2 Risk Assessment

The purpose of a risk assessment is to identify appropriate controls that can be implemented to either eliminate or minimise the risks of injury or illness to workers undertaking tasks within extreme work environments.

The manager/supervisor must ensure hazards have been identified and a risk assessment is completed to determine the level of risk to workers while operating in extreme work environments.

Job Safety Analysis (JSA) and Pre-start checks can also be used to assess extreme work environments and implement controls prior to the commencement of works.

Risk assessments, JSA's and Pre-start checks must be conducted in accordance with the [WHS Risk Management Procedure](#).

#### 4.1.3 Controls

Risk controls are needed where there is a risk of injury or illness associated with extreme work environments. Risks associated with working in extreme work environments must be eliminated as the first preference. Where this is not reasonably practicable such risks must be minimised using the Hierarchy of Controls.

Managers/supervisors in conjunction with workers must regularly monitor extreme work environments during operations. This can be achieved by rechecking severe weather and fire danger warnings and making general observations.

Examples of effective risk controls may include, but are not limited to the following listed in tables below.

## 4.2 Hot Conditions

In hot working conditions, including high humidity managers/supervisors should consider the following control measures:

Control Level	Control
Elimination	<ul style="list-style-type: none"> <li>Remove workers from the conditions, wherever reasonably practicable.</li> </ul>
Substitute	<ul style="list-style-type: none"> <li>Use Machines, where practical to reduce manual labour.</li> <li>Schedule heavy work and tasks that require hot or heavy personal protective equipment for cooler times of the day.</li> <li>Replace outdoor work with alternative indoor options such as administrative work or training activities.</li> <li>Provide alternative, light work in the shade.</li> </ul>
Isolation	<ul style="list-style-type: none"> <li>Isolate workers from heat source, where possible.</li> <li>Ensure that heat from plant and processes are reduced as far as possible by insulating plant, pipes, walls or roofs to minimise radiant heat.</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>Remove heat from buildings by using extraction fans or similar devices.</li> <li>Ensure that work areas are ventilated to provide adequate airflow.</li> <li>Ensure vehicles are fit for purpose and fitted with effective climate control or shade options.</li> <li>Provide shade for workers during their regular duties where practicable.</li> <li>Use air circulating fans or portable coolers where practical.</li> </ul>
Administration	<ul style="list-style-type: none"> <li>Ensure there is sufficient support for workers who may suffer from heat exposure.</li> <li>Allow workers to acclimatise before undertaking a full workload.</li> <li>Shorten the duration of each exposure.</li> <li>Manage the hours worked by varying start and finish times or altering lunch breaks.</li> <li>Provide frequent rest breaks and rotate duties to allow people to cool down.</li> <li>Ensure there is sufficient cool drinking water available at workplaces.</li> <li>Provide cool areas for rest and recovery, where possible.</li> <li>Avoid assigning workers who have medical conditions to tasks that may put them at risks.</li> <li>Consider the impact of hot conditions when developing safe work method statements or other safe working procedures.</li> <li>Develop procedures for regular contact between remote and isolated workers and the office/depot in extreme work environments.</li> <li>Monitor temperature, humidity and workers physical response to extreme work environments.</li> <li>Train employees to recognise symptoms of heat related illnesses.</li> </ul>
Personal Protective Equipment	<ul style="list-style-type: none"> <li>Use general radiant heat protection (hat, sunglasses, sunscreen, sun protective clothing and shade, where possible).</li> <li>Consider the use of cooling garments and accessories such as ice jackets and wet gel pads, if appropriate.</li> </ul>

### 4.2.1 Heat related conditions/illness

During extreme hot weather, it is easy to become dehydrated or for the body to overheat. If this happens you may develop heat cramps, heat exhaustion or even heat stroke which can result in irreversible damage to your body, or even death. It is important to know the effects of extreme heat, how to avoid getting ill and what you should do if you experience any heat-related illness.

Condition	Symptoms	What you should do
Dehydration	<ul style="list-style-type: none"> <li>• Profuse Sweating</li> <li>• Increase in body temperature</li> <li>• Lethargy and tiredness</li> <li>• Being thirsty</li> <li>• Irritability</li> <li>• Reduced or dark urine output</li> </ul>	<ul style="list-style-type: none"> <li>• Cease activity immediately if you are feeling unwell and go to a cool shaded place.</li> <li>• Drink plenty of water/fluids (avoid caffeine)</li> <li>• Try to keep cool by:                             <ul style="list-style-type: none"> <li>○ Turning on a fan or air conditioner</li> <li>○ Using a spray bottle of water on the face and body.</li> </ul> </li> <li>• <b>If you remain unwell, seek medical advice as soon as possible.</b></li> </ul>
Heat Cramps	<ul style="list-style-type: none"> <li>• Muscle Spasms</li> <li>• Painful muscle cramps in the limbs or abdomen</li> <li>• Twitching</li> <li>• Moist cool skin</li> </ul>	<ul style="list-style-type: none"> <li>• Cease activity immediately if you are feeling unwell and go to a cool shaded place to lie down, with legs supported and slightly elevated.</li> <li>• Drink plenty of water/fluids (avoid caffeine)</li> <li>• Try to keep cool by:                             <ul style="list-style-type: none"> <li>○ Turning on a fan or air conditioner</li> <li>○ Using a spray bottle of water on the face and body or a wet towel</li> <li>○ Having a cool shower if available.</li> </ul> </li> <li>• <b>If you remain unwell, seek medical advice as soon as possible.</b></li> </ul>
Heat Exhaustion	<ul style="list-style-type: none"> <li>• Headaches</li> <li>• High temperature</li> <li>• Profuse sweating</li> <li>• Cold, clammy pale skin</li> <li>• Fatigue, weakness and restlessness</li> <li>• Nausea and vomiting</li> <li>• Weak but rapid pulse</li> <li>• Poor coordination</li> <li>• Circulatory collapse</li> </ul>	<p><b>Ring 000 immediately for an ambulance.</b></p> <ul style="list-style-type: none"> <li>• May be aggravated by cardiovascular disease and certain medications.</li> <li>• Cease activity immediately if feeling unwell</li> <li>• Go to a cool place to lie down, with legs supported and slightly elevated.</li> <li>• Try to keep cool by:                             <ul style="list-style-type: none"> <li>○ Turning on a fan or air conditioner</li> <li>○ Using a spray bottle of water on the face and body or a wet towel</li> <li>○ Having a cool shower if available.</li> </ul> </li> <li>• Put cool packs under the armpits, in the groin or on the back of the neck (or all 3 places) to reduce body heat.</li> <li>• If heat cramps present, massage limbs gently to ease the spasms, or firmly if cramped, then apply ice packs.</li> <li>•</li> </ul>
Heatstroke	<ul style="list-style-type: none"> <li>• Confusion, headaches, dizziness and nausea</li> <li>• Skin flushed, hot and unusually dry</li> <li>• Intense thirst</li> <li>• Dry, swollen tongue</li> <li>• Sudden rise in high body temperature (40°C+)</li> <li>• Disorientation, delirium</li> <li>• Slurred speech</li> <li>• Aggressive or bizarre behaviour</li> </ul>	<p><b>HEATSTROKE is an EXTREME MEDICAL EMERGENCY Ring 000 immediately</b> for an ambulance.</p> <ul style="list-style-type: none"> <li>• May be aggravated by cardiovascular disease and certain medications.</li> <li>• Cease activity immediately if feeling unwell.</li> <li>• Go to a cool place to lie down, with legs supported and slightly elevated.</li> <li>• Have plenty of sips of water or fruit juice (avoid caffeine)</li> </ul>

	<ul style="list-style-type: none"> <li>• Sleepiness</li> <li>• Convulsions</li> <li>• Unconsciousness may develop rapidly</li> <li>• Seizures or coma</li> </ul>	<ul style="list-style-type: none"> <li>• Try to keep cool by:                             <ul style="list-style-type: none"> <li>○ Turning on a fan or air conditioner</li> <li>○ Using a spray bottle of water on the face and body or a wet towel</li> <li>○ Having a cool shower if available.</li> </ul> </li> <li>• Put cool packs under the armpits, in the groin or on the back of the neck (or all 3 places) to reduce body heat.</li> <li>• If heat cramps present, massage limbs gently to ease the spasms, or firmly if cramped, then apply ice packs.</li> </ul> <p><b>Providing Assistance</b></p> <ul style="list-style-type: none"> <li>• <b>Do not give aspirin or paracetamol to a person affected by heat.</b></li> <li>• <b>If conscious</b> – give small sips of water or fruit juice and try to keep the person calm. Stay with them until the ambulance arrives.</li> <li>• <b>If unconscious</b> – check airways for breathing and monitor pulse rate until the ambulance arrives.</li> </ul>
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#### 4.2.2 Working in Ultraviolet Radiation (UVR)

When the UV index is a three or above, sun protection should be used as the solar UVR is strong enough to damage the skin. Refer to [Personal Protective Equipment Procedure](#).

When the UV index is at three or below it is safe to go out in the sun without protection. However it is recommended sun protection is used when the UV index is below three for:

- Outdoor workers who spend extended periods of time outdoors
- Those who work in alpine regions
- Those who work near highly reflective surfaces

Categories	UV Index
Low	UV index of 1-2
Moderate	UV index of 3-5
High	UV index of 6-7
Very High	UV index of 8-10
Extreme	UV index 11+

#### 4.2.3 Rail Infrastructure Management and Maintenance

Hot weather restrictions apply as outlined in section six of the Track and Civil Infrastructure Code of Practice – Rail Stress Control CP-TS-964.

#### 4.3 Cold Conditions

When the work environment is affected by cold weather, managers/supervisors should consider the following control measures:

Control Level	Control
Elimination	<ul style="list-style-type: none"> <li>• Remove workers from the conditions, wherever reasonably practicable.</li> </ul>
Substitute	<ul style="list-style-type: none"> <li>• Use machines, where practical to reduce manual labour.</li> <li>• Replace outdoor work with alternative indoor options such as administrative work or training activities.</li> </ul>

Isolation	<ul style="list-style-type: none"> <li>• Isolate workers from cold sources, when possible.</li> <li>• Avoid prolong contact with metal.</li> <li>• Limit the use of tools that cause significant vibration.</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>• Eliminate draughts without decreasing ventilation.</li> <li>• Ensure vehicles are fit for purpose and fitted with effective climate control.</li> <li>• Insulate ceiling spaces and walls to minimise heat loss, where possible.</li> </ul>
Administration	<ul style="list-style-type: none"> <li>• Ensure there is sufficient support for workers who may suffer from exposure to the cold.</li> <li>• Allow workers to acclimatise before undertaking a full workload.</li> <li>• Shorten the duration of each exposure</li> <li>• Avoid assigning workers who have medical conditions to tasks that may put them at risks.</li> <li>• Consider the impact of cold weather when developing safe work method statements.</li> <li>• Develop procedures for regular contact between remote and isolated workers and the office/depot in extreme work environments.</li> <li>• Monitor temperature, humidity and workers physical response to extreme work environments.</li> <li>• Train employees to recognise symptoms of cold related illnesses.</li> </ul>
Personal Protective Equipment	<ul style="list-style-type: none"> <li>• Provide 'warm-up' areas, where possible.</li> <li>• Provide warm drinks.</li> <li>• Provide appropriate PPE for the conditions (such as wet weather clothes, waterproof boots and/or wind jackets).</li> </ul>

### 4.3.1 Cold related illness

Condition	Symptoms	What you should do
Cold Stress	<ul style="list-style-type: none"> <li>• Shivering</li> </ul>	<ul style="list-style-type: none"> <li>• Warm up by wrapping blankets around the body</li> <li>• Move indoors or inside a shelter</li> <li>• If available, sit near a radiant heat source</li> <li>• Have a warm, sweetened beverage.</li> </ul>
Hypothermia	<ul style="list-style-type: none"> <li>• Shivering</li> <li>• Fatigue</li> <li>• Loss of coordination</li> <li>• Confusion and disorientation</li> <li>• Blue skin</li> <li>• Dilated pupils</li> <li>• Slowed pulse and breathing</li> <li>• Loss of consciousness</li> </ul>	<ul style="list-style-type: none"> <li>• Request immediate medical assistance.</li> <li>• Move the person to a warm, dry room or shelter.</li> <li>• Remove wet clothing, shoes and socks.</li> <li>• Keep the person in a horizontal position and cover him or her with layers of blankets or towels and a vapour barrier (e.g. tarp, garbage bag). Cover the head and neck but not the face.</li> <li>• If alert, offer a warm, sweetened beverage.</li> <li>• Place warm bottles or hot packs in armpits, the groin area and along sides of the chest.</li> <li>• If worker has no pulse, begin cardiopulmonary resuscitation (CPR).</li> </ul>
Frostbite	<ul style="list-style-type: none"> <li>• Reduced blood flow to hands and feet (fingers or toes can freeze)</li> <li>• Numbness</li> <li>• Tingling or stinging</li> <li>• Aching</li> <li>• Pale or waxy white or grey skin</li> </ul>	<ul style="list-style-type: none"> <li>• Move to a warm dry area</li> <li>• Remove wet or tight fitting clothes</li> <li>• Avoid walking on frostbitten toes or feet</li> <li>• Gently place affected area in warm water – DO NOT use water any hotter than 40°C</li> <li>• DO NOT use a heating pad, heat lamp or stove, fireplace or radiator for warming</li> <li>• DO NOT rub affected area, this can cause more damage</li> <li>• After warming, the injured area should be wrapped in sterile gauze, keeping the affected fingers and toes separated</li> </ul>

		<ul style="list-style-type: none"> <li>• If normal sensations haven't returned in 30 minutes, seek medical attention</li> </ul>
Trench Foot	<ul style="list-style-type: none"> <li>• Reddening of the skin</li> <li>• Numbness</li> <li>• Leg cramps</li> <li>• Swelling</li> <li>• Tingling pain</li> <li>• Blisters or ulcers</li> <li>• Bleeding under the skin</li> <li>• Gangrene (the foot may turn dark purple, blue, or grey)</li> </ul>	<ul style="list-style-type: none"> <li>• Remove shoes/boots and wet socks.</li> <li>• Dry their feet.</li> <li>• Avoid walking on feet, as this may cause tissue damage.</li> </ul>
Chilblains	<ul style="list-style-type: none"> <li>• Redness</li> <li>• Itching</li> <li>• Possible blistering</li> <li>• Inflammation</li> <li>• Possible ulceration in severe cases</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid scratching</li> <li>• Slowly warm the skin</li> <li>• Use corticosteroid creams to relieve itching and swelling</li> <li>• Keep blisters and ulcers clean and covered</li> <li>• Seek medical advice</li> </ul>

#### 4.4 Other Conditions/environments

While hazards relating to temperature extremes are the most commonly encountered, managers must also be aware of the potential for other extreme work conditions and manage those risks accordingly. Such conditions include but are not limited to:

- Heavy rain, sleet or snow
- High Wind
- Dust Storms
- Reflective environments
- [Catastrophic Fire Danger Rating Days](#).
- Lightning  
Regularly monitor weather conditions and local forecast prior to scheduled works. Suspend work activities and seek shelter when the lightning and thunder gap is less than 30 seconds, if not prior.

When working outdoors the following personal safety must be observed:

- If available, seek shelter in a substantial building with at least normal headroom, small sheds offer uncertain protection or seek shelter within a totally enclosed, metal-bodied vehicle such as a car or a truck with a metallic roof. If in a vehicle, close the windows and avoid contact with metallic parts and remove any hands-free mobile telephone attachments from the body.
- If in the open and remote from a substantial building or a totally enclosed, metal-bodied vehicle, keep as low and as small a profile as possible, i.e. crouch keeping the feet together and do not touch any objects or people near you. A dry ditch, valley or any depression in the ground is safer than an elevated or flat terrain.
- Avoid driving the vehicle as a strike of lightning may blow out the tyres. Do not stay in open vehicles such as tractors or any other type of open or closed vehicle without a metallic roof.
- Do not shelter under trees, particularly an isolated tree. If surrounded by trees, seek a position outside the foliage and crouch, keeping feet together.
- Do not shelter in small sheds, pergolas, walkways etc. with low unearthed metallic roofs supported on wooden or other electrically insulating materials.
- Do not lie on the ground as this could cause dangerous voltage to develop across the body by earth currents generated by a nearby lightning strike.

Managers should consider the following control measures where appropriate:

Control Level	Control
Elimination	<ul style="list-style-type: none"> <li>Remove workers from the conditions, wherever reasonably practicable.</li> </ul>
Substitute	<ul style="list-style-type: none"> <li>Rotate workers and use relief workers.</li> <li>Replace outdoor work with alternative indoor options such as administrative work or training activities.</li> <li>Instruct workers not to use electric and/or motorised equipment except where it is safe to do so.</li> </ul>
Isolation	<ul style="list-style-type: none"> <li>Isolate workers from the conditions, if elimination or substitution is not reasonable practical.</li> <li>Shorten the duration of each exposure.</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>Ensure vehicles are fit for purpose and fitted with effective climate control.</li> </ul>
Administration	<ul style="list-style-type: none"> <li>Ensure there is sufficient support for workers who may suffer from exposure to extreme weather.</li> <li>Monitor workers physical responses to the environmental conditions.</li> <li>Avoid assigning workers who have medical conditions to tasks that may put them at risks.</li> <li>Consider the work conditions when developing safe work method statements.</li> <li>Develop procedures for regular contact between remote and isolated workers and the office/depot in extreme work environments.</li> <li>Monitor temperature, humidity and workers physical response to extreme work environments.</li> <li>Train employees to recognise symptoms of extreme weather related illnesses.</li> </ul>
Personal Protective Equipment	<ul style="list-style-type: none"> <li>Provide appropriate PPE for the conditions (such as wet weather clothes, waterproof boots, wind jackets, dust masks, eye protection, and ear plugs). High visibility clothing must be worn in wet and low visibility conditions.</li> </ul>

### 5. Record management

Any records and documentation associated with this procedure must be maintained in accordance with legislative and departmental record keeping processes. Refer to the [DP009 Recordkeeping Policy](#) for information regarding records management.

### 6. Roles and responsibilities

ROLE	RESPONSIBILITIES
Managers/Supervisors	<p>Must:</p> <ul style="list-style-type: none"> <li>take reasonably practical steps to identify hazards associated with working in extreme environments;</li> <li>assess risks to health and safety, and apply reasonably practical controls to address the risks;</li> <li>consult with workers about health and safety hazards related to working in extreme work environments;</li> <li>develop and implement safe systems of work so that workers can perform their work safely;</li> <li>monitor all work undertaken in extreme work environments and undertake timely corrective actions in response to reported hazards and incidents;</li> <li>provide instruction and training for working in extreme work environments;</li> <li>provide information, training , instruction and supervision in the use, maintenance and disposal of personal protective equipment; and</li> <li>respond to emergencies related to working in extreme work environments.</li> </ul>



<b>Workers</b>	<p>Must:</p> <ul style="list-style-type: none"> <li>• participate in the identification and assessment of risks associated with working in extreme work environments;</li> <li>• participate in the development and implementation of measures to eliminate or minimise risks associated with working in extreme work environments;</li> <li>• immediately report any hazards, risk or incidents relating to working in extreme work environments to their manager/supervisor;</li> <li>• not adversely affect their own or other workers health and safety;</li> <li>• comply with reasonable instructions in relation to working in extreme work environments; and</li> <li>• use personal protective equipment and clothing in accordance with the manufacturer’s instructions and as appropriate for the task.</li> </ul>
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**7. Supporting documentation**

- [SafeWork SA – Heat stress and solar ultraviolet radiation exposure](#)
- [Safe Work Australia - Guide for Managing the Risk of Working in Heat](#)
- [SA Health – Heat](#)
- [Catastrophic Fire Danger Rating Days Guideline](#)
- [Rail Infrastructure Catastrophic Fire Danger Policy](#)
- [GL-SR-RM-300 Working in Extreme Temperatures Guideline](#)

**8. References**

- *Work Health and Safety Act (SA) 2012*
- *Work Health and Safety Regulations (SA) 2012*
- *Code of Practice - Managing the Work Environment and Facilities*
- *Safe Work Australia Guide for managing the risk of working in heat*
- *Safe Work Australia Guide on exposure to solar ultraviolet radiation (UVR)*

**9. Document Amendment Record**

Date	Version	Revision Description
22 October 2018	1.0	Original Version
<b>Document Review Schedule</b>		3 Yearly