

CS ENERGY PROCEDURE FOR
WORKING IN HEAT
CS-OHS-24

Responsible Officer: Title

Approved : Title

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1. Purpose

To establish and maintain systems to enable persons at CS Energy sites to reduce the effects of exposure to thermal hazards.

2. Scope

This procedure applies to all CS Energy sites where there is a potential for excessive exposure to hot thermal environments.

3. Actions

3.1 Training

Training shall be conducted for First aiders and all personnel likely to be exposed to:

- High thermal environments;
- Physically demanding work at elevated temperatures; or
- The use of plastic or other impermeable clothing.

Any combination of the above situations will further increase the risk.

The training should encompass the following:

1. Mechanisms of heat exposure;
2. Potential heat exposure situations;
3. Early recognition of symptoms of heat illness;
4. Prevention of heat illness;
5. First aid treatment of heat stress; and
6. Management & control.

Training of all personnel in the area of heat stress management shall be recorded on their personal training record.

A training package has been developed and is available at: K:\Corprocs\O_h_s\Training\Managing Heat in the Power Industry.

3.2 Water Replacement

Of primary importance in the control of heat related illness is the adequate supply of cool and palatable water. Cool drinking water shall be made available at the site for all jobs in hot conditions. Where access to drink fountains is limited, personnel shall be supplied with insulated drink containers for use in these areas.

3.3 Self-Determination

Through training, individuals should be able to identify the early onset of symptoms of heat related illnesses and determine the controls to be used ie. short breaks, drinking water.

With the initial recognition of the early signs of heat related illness, the progression on to the serious illnesses can be avoided.

3.4 Work Scheduling

Persons responsible for work schedules involving work in situations that may lead to thermal illnesses should where practical, re-schedule jobs to early morning or late in the day rather than during the hotter parts of the day.

3.5 Personal Protective Equipment

Where the work environment cannot be fully controlled via engineering or administrative controls the utilisation of personal protective equipment may be required.

Items such as reflective suits, cooling jackets or vests and personal air cooling devices such as Vortex tubes may be required.

3.6 Acclimatisation

This is a response by the body that results in increased heat tolerance. Whilst 90% acclimatisation is obtained in 4-5 days, it is readily lost in approximately the same amount of time.

Acclimatisation shall be considered when planning work that may involve employees recently back from extended recreation leave in cooler climates.

3.7 Assessment

A risk assessment shall be undertaken for potential heat stress situations (see 3.1). The level and extent of the assessment will vary and be dependent on the complexity and nature of each situation but should proceed using the following protocol.

1. Identification of a potential heat stress situation.
2. Undertake a basic thermal risk assessment (see Attachment 1). This will require the measurement of some environment parameters ie. WBGT
3. If the results indicate there is a likelihood of a heat-induced illness occurring, then a full thermal risk assessment should be carried out. Depending on the situation this may involve the use of a second level assessment tool such as ISO 7933 Required Sweat Rate Index. From this assessment suitable controls should be developed.
4. If results from the full assessment indicate an allowable exposure time of less than 30 minutes then physiological monitoring should be considered and control measures taken to reduce the risk of exposure.
5. Work involving the use of impermeable clothing in hot conditions should be assessed using physiological monitoring.
6. Physiological monitoring results are to be recorded.

3.8 Medical Screening

Where an employee's job may involve exposure to high thermal environments for the majority of a shift cycle or on an ongoing basis, it is advisable that pre-employment medicals be directed at areas addressing heat intolerance. Examples may be maintenance crews that undertake condenser cleans or on-line cooling tower work on a regular basis

Some areas and indicators are:

- Circulation impairments;
- Obesity;
- Skin conditions affecting sweating;
- Age; and
- Heart condition.

3.9 Health Monitoring

Whenever a heat illness case presents itself, details should be accurately recorded.

This data may then be used to:

- Assist in the identification of problem areas;
- Identify trends that may be developing; and
- Monitor the effectiveness of controls.

An example of a heat illness record is included as Attachment 2.

4. Definitions

None.

5. Reference Documentation

Heat Stress Management Program for Nuclear Power Plants, Electric Power Research Institute Project Number NP-4453, 1986.

International Standards Organisation. “*Hot Environments - Analytical Determination and Interpretation of Thermal Stress Using Calculation of Sweat Rate*”. ISO 7933: 1989.

Occupational Exposure to Hot Environments - Revised Criteria, DHHS (NIOSH) Pub No 86-113, 1986.

Parsons, K. C., *Human Thermal Environments*, Burgess Science Press, 1993.

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6. Attachments

6.1 Basic Thermal Risk Assessment

6.2 Heat Illness Record

7. Document History

Issue Date	Nature of Changes
7/10/99	Original Issue
17/11/99	Training package reference
04/01/01	Attachment 1 in 6.1 revised

6.1 Attachment 1

BASIC THERMAL RISK ASSESSMENT

HAZARD TYPE	Assessment Point Value		
	1	2	3
Hot Surfaces	Contact Neutral <input type="checkbox"/>	Hot on Contact <input type="checkbox"/>	Burn on Contact <input type="checkbox"/>
Exposure Period	< 30 min <input type="checkbox"/>	30 min - 2 hours <input type="checkbox"/>	> 2 hrs <input type="checkbox"/>
Confined Space	No <input type="checkbox"/>		Yes <input type="checkbox"/>
Task Complexity	Simple <input type="checkbox"/>	Moderate <input type="checkbox"/>	Complex <input type="checkbox"/>
Climbing, ascending, descending	None <input type="checkbox"/>	Moderate <input type="checkbox"/>	Significant <input type="checkbox"/>
Distance from cool rest area	<50 Metres <input type="checkbox"/>	50-100 Metres <input type="checkbox"/>	>100 Metres <input type="checkbox"/>
Distance from Drinking Water	<30 Metres <input type="checkbox"/>	30-50 Metres <input type="checkbox"/>	>50 Metres <input type="checkbox"/>
Clothing (permeable)	Single layer (light) <input type="checkbox"/>	Single layer (mod) <input type="checkbox"/>	Multiple Layer <input type="checkbox"/>
Respiratory Protection (negative pres.)	None <input type="checkbox"/>	Half Face <input type="checkbox"/>	Full Face <input type="checkbox"/>
Acclimatisation	Acclimatised <input type="checkbox"/>		Unacclimatised <input type="checkbox"/>
SUB-TOTAL A			

	2	4	6
Metabolic Work Rate*	Low <input type="checkbox"/>	Medium <input type="checkbox"/>	High <input type="checkbox"/>
SUB-TOTAL B			

	1	2	3	4
Wet Bulb Globe Temperature	< 24°C <input type="checkbox"/>	>24°C ≤ 27°C <input type="checkbox"/>	>27°C ≤ 30°C <input type="checkbox"/>	> 30°C <input type="checkbox"/>
SUB-TOTAL C				

TOTAL = A plus B Multiplied by C =

***Metabolic Work Rate – Examples of Workload**

Low: Light work – sitting or standing to control machines; hand and arm work assembly or sorting of light materials.

Medium: Moderate work – sustained hand and arm work such as hammering, handling of moderately heavy materials.

High: Heavy work – pick and shovel work, continuous axe work, carrying loads up stairs.

6.1 Attachment 1

Instructions for use of the basic Thermal Risk Assessment

- Mark each box according to the appropriate conditions.
- When complete add up using the value at the top of the appropriate column for each mark.
- Add the sub totals of Table A & Table B and multiply with the sub-total of Table C for the final result.
- If the total is **less than 25** then the risk due to thermal conditions are low to moderate.
- If the total is **25 to 55** there is a potential of heat induced illnesses occurring if the conditions are not addressed.
- If the total **exceeds 55** then the onset of a heat induced illness is very likely and action should be taken as soon as possible.

It is important to note that that this assessment is to be used as a guide only. A number of factors are not included in this assessment such as employee health condition and the use of high levels of PPE (particularly impermeable suits). In these circumstances experienced personnel should carry out a more extensive assessment.

6.2 Attachment 2

HEAT ILLNESS RECORD

Date:

...../...../.....

SURNAME:	CHRISTIAN NAME:	AGE:
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TIME STARTED WORK:	TIME FINISHED CRIB:	TIME OF ONSET:	TIME OF PRESENTATION:
--------------------	---------------------	----------------	-----------------------

HISTORY: (Mark with if mentioned without prompting - X if prompted)

- | | | |
|-------------------------------------|------------------------------------|---|
| <input type="checkbox"/> GIDDY | <input type="checkbox"/> VOMITTED | <input type="checkbox"/> THIRSTY |
| <input type="checkbox"/> LIGHTEADED | <input type="checkbox"/> DIARRHOEA | <input type="checkbox"/> WEAK LEGS |
| <input type="checkbox"/> HEADACHE | <input type="checkbox"/> FELT HOT | <input type="checkbox"/> CRAMPS (LEGS OR ABDOMEN) |
| <input type="checkbox"/> FAINTED | <input type="checkbox"/> FELT COLD | <input type="checkbox"/> BLURRED VISION |
| <input type="checkbox"/> NAUSEA | <input type="checkbox"/> SWEATING | |

COMMENTS:

TEST RESULTS URINE S.G.

EXAMINATION (15 MINUTE INTERVALS)	1	2	3	4
TEMPERATURE				
PULSE				
B:P - LYING				
B:P - STANDING				
SKIN (Warm, Cool, Wet, Dry)				

NERVOUS STATE: (Tick where applicable)

- | | |
|---|--------------------------------------|
| <input type="checkbox"/> NORMAL | <input type="checkbox"/> TREMORS |
| <input type="checkbox"/> SLEEPY | <input type="checkbox"/> CONVULSIONS |
| <input type="checkbox"/> SEMI CONSCIOUS | <input type="checkbox"/> CRAMPS |
| <input type="checkbox"/> UNCONSCIOUS | <input type="checkbox"/> OTHER |

PREDISPOSING FACTORS:

- | | |
|---|---|
| <input type="checkbox"/> LESS THAN 6HRS SLEEP | <input type="checkbox"/> EXTRA SHIFTS |
| <input type="checkbox"/> UNACCLIMATISED | <input type="checkbox"/> RECENT ILLNESS |
| <input type="checkbox"/> ALCOHOL (WITHIN 24 HRS) | <input type="checkbox"/> MISSED MEALS |
| <input type="checkbox"/> MEDICINE / PILLS (SPECIFY) | |

COMMENTS:

JOB AND LOCATION (In Detail):

READINGS (When available):

Wet Bulb. _____ Globe Temp. _____
 Dry Bulb. _____ Humidity _____

WORK LOAD:

- | | |
|--------------------------------|-------------------------------------|
| <input type="checkbox"/> LIGHT | <input type="checkbox"/> MODERATE |
| <input type="checkbox"/> HEAVY | <input type="checkbox"/> VERY HEAVY |

WORK CONDITIONS (Patients Appreciation):

MEDICAL FOLLOW-UP (Before next shift):

6.2 Attachment 2

Urine SG: specific gravity which can be measured using 1 drop of urine and a urine refractometer. It gives an indication of the bodies salt/fluid balance.