الشركة العمانية للغاز الطبيعي المسال ش.م.م

Oman LNG L.L.C.

HEAT ILLNESS PREVENTION POLICY

This document contains 13 pages

Documents Classification:-

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Risk Classification

Critical

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Unclassified

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ISSUE HISTORY

Changes from previous issue are indicated by use of the {insert -comments} option

Issue	Description	Date
0	Developed following the Ministerial directive on Summer months working hours.	16/08/2011
1	First issue	22/10/2011
2	-Revised Requirements and Responsibilities -Added to Line Manager responsibilities. Perform a risk assessment with QHSE/3, if a task being scheduled could potentially add to the heat load of the individuals performing the task. -Added Contractor Management to Responsibilities -Added 3 appendices (2,3,4) - Document's reference and author changed from QHSE/2 to QHSE/3 – and title changed from "Heat stress procedure to "Heat Illness Prevention Policy" Refer to procedural MOC number PCRF-QHSE-P223	14/03/2017

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1 PURPOSE

The purpose of this procedure is to manage health hazards associated with working during hot weather conditions.

2 SCOPE

This procedure is applicable to OLNG staff, contractors, and visitors in the Qalhat Complex. This procedure is applicable from April to September.

3 Definitions/Abbreviations

3.1 Definition

- Humidex: is an index number used by meteorologists to describe how hot the weather feels to the average person, by combining the effect of heat and humidity. The Humidex formula is as follows:

$$\text{Humidex} = \text{Air temperature} + 0.5555 \times \left(6.11 \times e^{5417.7530 \times \left(\frac{1}{273.16} - \frac{1}{\text{dewpoint in kelvins}}\right)} - 10\right)$$

- Acclimatization: Temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

3.2 Abbreviations

- HSI - Heat Stress Index
- PTW – Permit to Work

4 Requirements

KEY CONTROLS FOR PREVENTION

- All personal involved in managing, supervising and/or coordinating work are aware of this procedure and have received heat related illness awareness training.
- All personnel are aware of the signs, symptoms and prevention of heat related illnesses.
- Heat related illness hazards for each activity is addressed through PTW and Toolbox talks.
- Sufficient number, as determined by risk assessment, of shaded rest areas are available on site to use for rest breaks.
- Monitoring and prompt notification of the Heat Index Flag Color.
- Rigorous following of work/rest/drinking water requirements as per the Heat Index Flag Color status.
- Easy access to cool and clean drinking water is available at the shaded rest areas, work areas, etc.
- Self-monitoring by workers to adjust their pace of work/rest/drinking water.
- Workers don't skip meals and consult doctor/nurse if they are taking medication (e.g. blood pressure)

5 Responsibilities

5.1 Line Manager

- To ensure that activities are planned to prevent the workforce from needless exposure to extreme temperature conditions.
- Suitable and adequate welfare (including drinking water) and shaded rest facilities are provided in work areas.
- All activities requiring a person to be exposed to extreme temperatures are properly planned, coordinated, and executed.
- Where chemical protective suits are required, work shall be planned to minimize the time chemical protective suits must be worn.
- If a control is found to be malfunctioning, not achieving the desired effect or if working conditions change; work shall be stopped until the controls are evaluated and corrected.
- Perform a risk assessment with QHSE/3, if a task being scheduled could potentially add to the heat load of the individuals performing the task. For example, working near fin fans, complex confine space entries such as sea cooling headers, mol-sieve beds, turbine houses, upgraded PPE, etc.

5.2 QHSE Manager

- Ensuring that this procedure is effectively communicated implemented and diligently observed by all employees and contractors and that the programme is subject to regular audits.
- Ensure that Site HSE Induction Program includes appropriate guidelines on avoidance of heat stress.
- Regular inspections of heat stress prevention measures.

5.3 QHSE/3

- Ensure that arrangements are in place in OLNG Site Clinic for the immediate treatment of potential heat stress victims.
- Ensure that first-aiders are effectively trained and refreshed on the diagnosis and first aid treatment of heat stress cases.
- Assist in the development and delivery of heat stress training material.

5.4 Individuals

Every person tolerates heat differently. No empirical measure can determine when an individual begins to sense a heat related illness.

- Closely monitor the Heat Index Flag Color and follow the requirements.
- Monitor own hydration state (Appendix 4 urine chart).
- Minimize personal risk factors by adhering to the following:

    - **Acclimatization** – Pace yourself until you are acclimatized. Pace both work intensity and duration.
    - **Risk Factors** – Know your personal and environmental risk factors (Appendix 3).
    - **Fluid intake (Hydration)** – Drink water and electrolyte replacement drink before, during and after work. Ensure you are hydrated the day before work and ensure you rehydrate following work. Drink even if you are not thirsty. As a general rule, drink 250 ml (1 glass) every 10 to 20

minutes. CAUTION: If you are on a sodium-restricted diet, consult your physician before using electrolyte replacement drink.

- **Limit caffeine and alcohol intake** – Eliminate or minimize consumption of caffeine and alcohol before, during and after work. These increase risk of dehydration.
- **Self-regulation/breaks** – Pay attention to your body, know your limitations and take breaks before symptoms of heat illness develop. Regulate work intensity and duration.
- **Watch for signs and symptoms of heat illness** – Know the symptoms of heat illness and notify your supervisor if you experience symptoms.
- **Pay attention to others** – Check on coworkers and look for symptoms of fatigue and heat illness. Remind coworkers to take breaks.
- **Diet** – Eat healthy foods and do not skip meals. Do not consume large, heavy meals before and during work. Cool, healthy foods are recommended.
- **Fitness** – Exercise regularly to stay in shape. Watch your weight.
- **Rest** – Get plenty of sleep the night before and after work.

5.5 Permit Issuer and Permit Holder

- All Permit Issuers and Permit Holders (AGSI and AGST) shall be aware of heat stress conditions; its consequences, ability to recognize early symptoms of heat stress, corrective measures, acclimatization process and the controls used by OLNG to manage Heat Stress as defined in this document. This shall be part of the Permit Issuer and Permit Holder training and refresher module.

5.6 Contractor Management

- Ensure that this procedure is effectively implemented, observed and communicated to their employees.
- Have a formal process to confirm compliance (procedures, training, audits, etc.)
- Will provide fresh cool drinking water at each company provided shaded rest area for their employees. Cooler shall be taped shut and marked with date and time of fill on the tape. At a minimum, water cooler will be replaced once per shift.
- Provide heat stress awareness training to employees.

6 Procedure

6.1 Monitoring Schedule

During summer month (April to September) or incidental temperature peak (ad-hoc request initiated by Shift Superintendent); there will be monitoring of HSI (Heat Stress Index) based on appendix 1 (Heat Stress Table) and the performance criteria used as per the below Table 1:

Level	Frequency & Time	Performance criteria	Rest period & Water needed
N/A	Daily - 2 readings taken at about 12:00 & 14:00. If HSI value is in Green area (i.e. Humidex >26c) Category: CAUTION	Confirm whether HSI value is in green area. If not refer to next step Permit holder ensures sufficient rest/work rotation among the crew and provision of potable water	Rest period : Normal/Schedule Water: 1 glass (250ml) every 20 minutes
1	If HSI value is in Orange area (i.e. Humidex >31c) Category: EXTREME CAUTION Reading taken at 2 hours interval	Area informs all permit holders in his area working outside (not climate controlled rooms). Permit holder ensure sufficient rest/work rotation among the crew and provision of potable water as per appendix 1 (Heat Stress Index)	Rest period : ~7 minutes every hour Water: 1 glass (250ml) every 15 minutes
2	If HSI value is in Red area (i.e. Humidex >38c) Category: DANGER Reading taken at 2 hours interval	Area informs all permit holders in his area working outside (not climate controlled rooms). Permit holder ensure sufficient rest/work rotation among the crew and provision of potable water as per appendix 1 (Heat Stress Index)	Rest period : ~10 minutes every hour Water: 1 glass (250ml) every 10 minutes
3	If HSI value is in Black area (i.e. Humidex >54c) Category: EXTREME DANGER Reading taken at 1 hour interval	Area operator raises Black flag and informs all permit holders in his area working outside (not climate controlled rooms) to stop work and awaits re-validation for work under black flag conditions (PTW will be signed by Permit Holder and Area operator to confirm mitigations measures are met). Shift Superintendent to be informed for activating conditions for work under black flag. Company nurse to be on duty at the work site during black flag alert Manage all outside work as per table 2 (Refer to section 3 - Working on black flag days)	Rest period : ~15 minutes for 15 minutes work Water: 1 glass (250ml) every 10 minutes

Note: all measurement shall be done at pre-defined locations for ease of reference and comparison

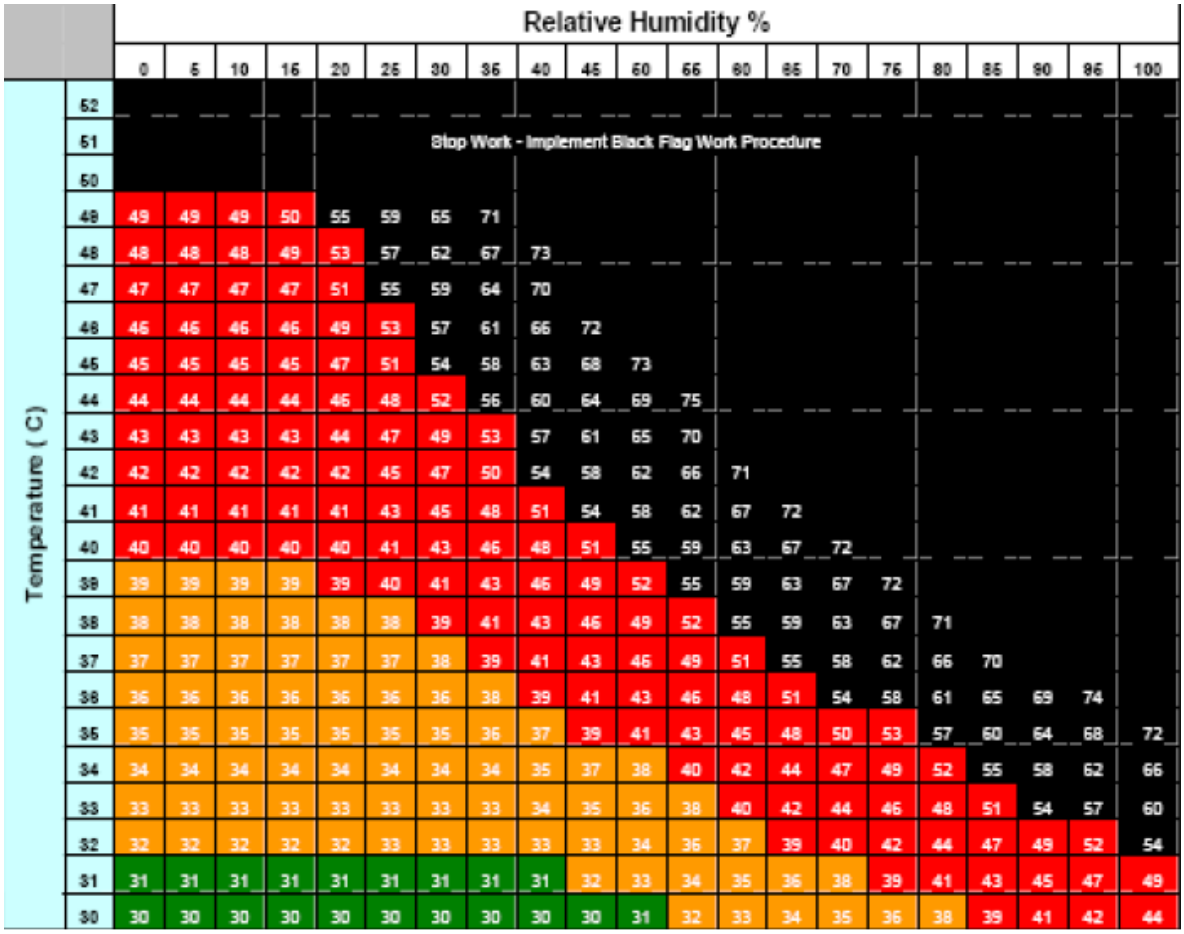
6.2 Working with black flag conditions

If monitoring of weather parameters indicates Humidex value >54c; refer to below Table 2:

WORK AREA	INSTRUCTION	MITIGATION MEASURES
AREA UNDER SHADE or NIGHT WORK	Work may continue under the shaded areas with the proper mitigation measures in place. No special approval is needed.	Area operator shall check with each permit holder that the conditions are met as follows prior to re-validating the PTW Permit Holder is responsible to ensure the precautions are maintained. Additional precautions are: • Potable water at the work site • All non-acclimatized workers stop work • The Permit Holder monitor rest/work rotation for the crew and close monitoring of heat stress symptoms • A qualified first-aider who is able to manage heat related symptoms shall be available near the work area • At least two persons at work area at all times
OPEN AREA (under direct sunlight)	Stop all the work and make sure that all the workers are moved to shaded areas or sheds to be provided at work place Exception: If specific activities have already started and must continue during the black flag condition (e.g. concrete pouring, critical lifting activities etc.); the maintenance engineer or permit holder to inform Operations AGSI for clearance to proceed with specific mitigations measures agreed and documented by manual amendment on the Permit to Work	
CONFINED SPACE AND WORK AT HEIGHT	Confined space areas are considered at high risk for the heat stress illness. If the humidex value is above 54 inside the confined space, all the work inside the confined space should be stopped. During black flag condition; working at height is not allowed.	No deviation unless emergency approved by Plant Manager, Operations Manager, or Incident Commander. Exception: For Confined space fitted with air conditioning unit; AGSI will approve continuation of work with temperature & humidity reading every hour.

Note: do not drink more than 1.5 liters per hour (maximum absorption rate for human body)

APPENDIX 1: HEAT STRESS INDEX TABLE



Heat Index Humidex Value	Heat Stress Level (Flag Colour)	Rest Period (Every Hour)	Water Needed
27-31	Green	Normal / Scheduled	1 Glass / 20 Minutes
32-38	Orange	7 Minutes	1 Glass / 15 Minutes
39-53	Red	10 Minutes	1 Glass / 10 Minutes
>54	Black	<u>Stop Work:</u> • Open Area (No Shade) • Confined Space Work • Working At Height <u>Continue Work:</u> • Critical Activities (Concrete pouring, critical lifting etc.) • 15 min. rest / 15 min. work	1 Glass / 10 Minutes

Note: Do not drink more than 1.5 Litres of water per hour (Maximum Absorption Rate of Hyman Body)

APPENDIX 2: Recognizing Signs and Symptoms of Heat Stress

Heat disorders or illnesses occur when the body is unable to effectively dissipate heat. The primary means by which the body dissipates heat in the industrial environment is through the evaporation of sweat. Therefore, in hot environments, when sweat evaporation is hindered, the risk of heat illness greatly increases. The following are the various levels of heat disorder or illness ranging from minor heat problems to heat stroke and with symptoms ranging from a rash to death.

Heat Disorder or Illness	Signs and Symptoms	First Aid
Prickly Heat	• Skin Rash Caused by heat and humidity. When sweat doesn't evaporate, the sweat ducts become clogged and sweat glands become inflamed.	• Move to cool environment or shade • Loosen or remove heavy clothing or chemical protective clothing • Fan to provide air movement
Heat Cramps	• Painful muscle spasms typically in arms, legs or abdomen • Inability to move the muscle Occurs primarily in people who sweat profusely in heat without replacing electrolyte losses.	• Move to cool environment or shade • Loosen or remove heavy clothing or chemical protective clothing • If conscious, drink cool water & electrolyte replacement, 125 ml every 10 minutes. • Fan to provide air movement • If cramps do not cease, get medical attention 111
Heat Syncope	• Fainting May occur when an individual unacclimitized to heat stands still in heat. Keep moving to prevent blood from pooling in legs.	• Move to cool environment or shade • Loosen or remove heavy clothing or chemical protective clothing • Lie down and elevate legs • Fan to provide air movement • Get medical attention 111
Heat Exhaustion	• Excessive sweat • Clammy, moist skin • Weakness and extreme fatigue • Nausea / Vomiting • Dizzy / Lightheaded • Irritability • Headache • Normal or slightly increased body temperature • Low blood pressure with weak pulse Occurs due to dehydration caused by insufficient water and electrolyte intake.	• Move to cool environment or shade • Loosen or remove heavy clothing or chemical protective clothing • If conscious, drink cool water & electrolyte replacement, 125 ml every 10 minutes • Wet or mist the skin with water • Fan to provide air movement • Apply cold packs to armpits, neck, wrists, ankles and groin. Do not apply directly to the skin. Place fabric between pack and skin • Get medical attention 111
Heat Stroke	• Hot, dry skin • Rapidly rising body temperature • Confusion, delirium • Heavy breathing • Collapse, loss of consciousness • Convulsions • Death Occurs when the body can no longer regulate its core temperature. The body can no longer shed excess heat.	**MEDICAL EMERGENCY! CALL FOR HELP IMMEDIATELY 111** • Move to cool environment or shade • Loosen or remove heavy clothing or chemical protective clothing • If conscious, drink cool water & electrolyte replacement, 125 ml every 10 minutes • Wet or mist the skin with water • Fan to provide air movement • Apply cold packs to armpits, neck, wrists, ankles and groin. Do not apply directly to the skin. Place fabric between pack and skin • Remain with the individual until help arrives

APPENDIX 3: Personal and Environmental Risk Factors

Personal Risk Factors

Heat tolerance and the incidence and severity of heat illness will vary widely among people, even under identical environmental conditions. This is due to individual variability in personal risk factors.
Remember – heat affects each person differently.

Certain medical conditions, personal conditions and lifestyle choices are risk factors for experiencing heat-related illnesses or disorders. Those in italics are usually easier to control.

- Cardiovascular disease
- Lung disease
- Diabetes mellitus
- Malnutrition
- Alcohol consumption (acute or chronic)
- Electrolyte disturbances
- Hyperthyroidism
- Impaired sweat production due to rashes or healed burns
- History of prior heat stroke
- Age over 45
- Caffeine consumption
- Overweight
- Unacclimatized to heat
- Insufficient water and electrolyte intake
- Poor physical fitness
- Certain medications
- Dehydration
- Illness – Infection, Fever
- Work load (metabolic heat production)
- High blood pressure
- Lack of sleep

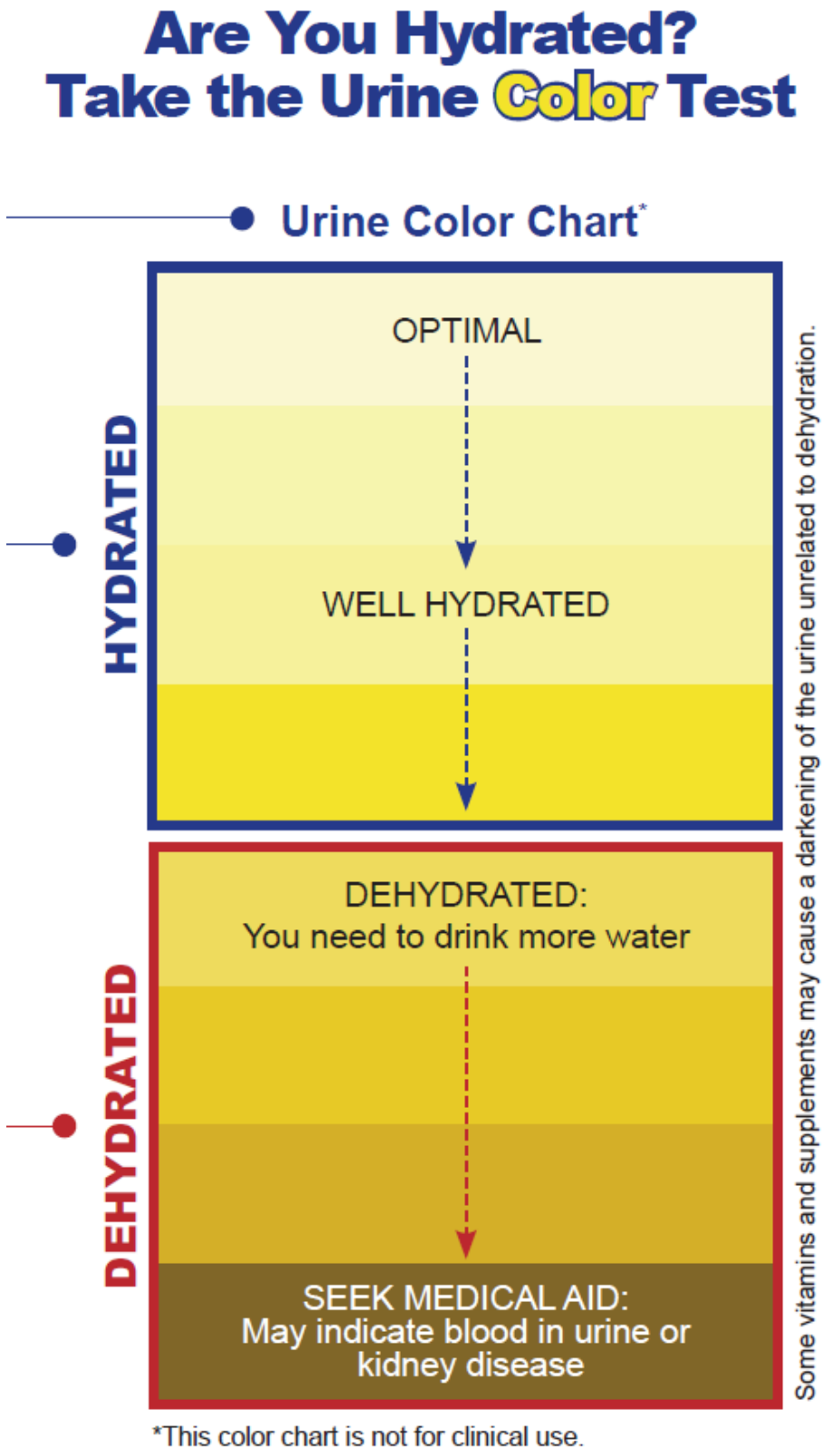
Environmental Risk Factors

The environment presents a number of risk factors, both natural and man-made which increase the risk of heat illness. All can be controlled in certain situations.

- Elevated air temperature – When air temperature exceeds body temperature, the body will gain heat.
- Restricted air movement – When there is no air movement, there is no air change out near the skin. Air reaches the same temperature as the skin and humidity rises. Sweat no longer evaporates and the body does not dissipate heat. No heat transfer by convection or evaporation.
- Elevated relative humidity – When relative humidity nears 100% and air temperature is near skin temperature (35°C), evaporation of sweat is reduced and the body does not dissipate heat. No heat transfer by evaporation.
- Increased radiant heat – When the radiant temperature is above 35°C, the body will gain heat.
- Increased conductive heat – When the temperature of an object exceeds body temperature and the skin is in contact with the object, the body will gain heat.

Chemical Protective Clothing – Chemical protective clothing (coveralls, overalls, jackets, hoods, boots, gloves) traps air and humidity near the skin; it creates a microenvironment inside the clothing. Chemical protective clothing nearly eliminates the primary means by which the body dissipates heat – evaporation of sweat. Therefore, use of chemical protective clothing in hot environments greatly increases the risk of heat illness. The use of chemical protective “impervious” suits such as coveralls, overalls, jackets and hoods are of greatest concern.

APPENDIX 4: Urine Color Chart



APPENDIX 5: References

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2. “Employer Sample Procedures for Heat Illness Prevention”, Cal OSHA, 2011.

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