



Az SPU Heat Stress Management Programme

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1.0 Purpose/Scope

The purpose of this document is to provide information necessary to establish, operate and maintain effective programmes to protect the health of employees, contractors and others from exposure to heat stress while working for BP Exploration Caspian Sea Ltd.

This controlled document applies to Azerbaijan Strategic Performance Unit (SPU) engaged in the exploration, drilling, production and transportation of oil; including all related construction activities.

2.0 Definitions

Calorie	The amount of heat required to raise 1 gram of water 1 degrees C (based on a standard temperature of 16.5 to 17.5 degrees C)
Conduction	The transfer of heat between materials that contact each other. Heat passes from the warmer material to the cooler material. For example, a worker's skin can transfer heat to a contacting surface if that surface is cooler, and vice versa
Dry bulb temperature	The temperature as measured by a thermal sensor, such as an ordinary mercury-in-glass thermometer, that is shielded from direct radiant energy sources
Evaporative cooling	Cooling that occurs when sweat evaporates from the skin. High humidity reduces the rate of evaporation and thus reduces the effectiveness of the body's primary cooling mechanism
Globe temperature	The temperature inside a blackened, hollow, thin copper globe
Heat	A measure of energy in terms of quantity
Heat Cramp	There is a sudden onset of pain and cramps in the extremities; occurs after prolonged vigorous exercise especially in hot environments. There may be nausea and hypotension (low blood pressure) and in some cases hyperventilation.
Heat Exhaustion	A progression from heat cramp and it is a more severe condition. It is more likely in the dehydrated, unfit, the elderly and those who have high blood pressure. It is caused by both salt and water loss.
Heat Hyperpyrexia, or Heat Stroke	Caused by exactly the same conditions as heat exhaustion. It begins as heat exhaustion, but when the body's system for losing heat is overwhelmed the core body temperature rises rapidly and tissue

	damage occurs. This affects mainly the brain, kidneys and liver. The circulation collapses. This condition can be fatal if not treated rapidly.
Heat Strain	The net physiological load resulting from heat stress
Heat Stress	The heat load on the body with contributions from both metabolic heat production and external environmental factors
Heat Syncope	A heat related condition where blood, which would normally be circulated to the heart and brain, tends to pool in the leg veins, thereby causing fainting.
Metabolic heat	A by-product of the body's activity.
Natural wet bulb temperature	The temperature measured by exposing a wet sensor, such as a wet cotton wick fitted over the bulb of a thermometer, to the effects of evaporation and convection. The term natural refers to the movement of air around the sensor.
Radiation	The transfer of heat energy through space. A worker whose body temperature is greater than the temperature of the surrounding surfaces radiates heat to those surfaces. Hot surfaces and infrared light sources radiate heat that can increase the body's heat load

3.0 General Requirements

[OGP Health Aspects of Work in Extreme Climates within the E& P Industry.](#)

[Labor Code of the Republic of Azerbaijan \(Eng\)](#)

[Labor Code of the Republic of Azerbaijan \(Az\)](#)

4.0 Key Responsibilities

Line Managers/Supervisors shall

- Be responsible for assessment and management of health risks within their areas of responsibility
- Provide input when required to the heat stress risk assessment processes
- Review health risk assessment findings and recommendations, as well as the systems established to implement and track the resulting actions
- Ensure that people assigned for work in high temperature are medically assessed for their fitness for task
- Ensure findings and recommendations from the health risk assessment are communicated to all necessary personnel, including contractors and

- visitors to the site
- Ensure a heat stress risk assessment is completed for the tasks where the hot working conditions could be a problem
- Ensure all measures and recommendations resulting from the heat stress risk assessment are undertaken
- Ensure all people working within their area of control are made aware of any health risks, including those related to heat stress, associated with their activities or work place and of the necessary precautions
- Ensure the suitability of the personal protective equipment provided for people carrying out, or affected by, the activity
- Record and report any illness and/or problem that is associated with heat stress via the established HSE reporting procedures

Health Manager (or designee) shall

- Ensure maintenance and periodic review of this document
- Provide technical support, guidance and advice as requested on heat stress related issues
- Ensure that relevant training programmes are available

Employees shall

- Take all necessary precautions for working in hot conditions see [Precautions for Working in Hot Environment](#).

5.0 Procedure

5.1 Heat Stress Causes

5.1.1 Individual Susceptibility

It is difficult to predict just who will be affected and when, because individual susceptibility varies. In addition, environmental factors include more than the ambient air temperature. Radiant heat, air movement, conduction, and relative humidity all affect an individual's response to heat.

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, use of alcohol or drugs, and a variety of medical conditions such as hypertension all affect a person's sensitivity to heat. Even the type of clothing worn must be considered.

Note: Prior heat injury predisposes an individual to additional injury.

5.1.2 Temperature

The higher the air temperature, the less heat the body can lose by convection, conduction and radiation. If the temperature of the environment increases above

skin temperature, the body will actually gain heat from the environment instead of losing heat to it. There are three relevant temperatures:

- Air temperature
- Radiant temperature
- Surface temperature

5.1.3 Air Humidity

The amount of moisture present in the air determines whether moisture (sweat) in vapour form flows from the skin to the environment or vice versa. In general the moisture concentration at the skin will be higher than in the environment, making evaporative heat loss from the skin possible.

When the humidity is low, a large amount of evaporation takes place and increased cooling results. In a very humid climate evaporation of body sweat is difficult since the surrounding air is already highly saturated with water.

This explains why hot humid days produce more heat problems than hot dry days.

5.1.4 Wind Speed

Convective and evaporative heat loss increases with increasing wind speed.

5.1.5 Clothing Insulation

Clothing functions as a barrier to heat and moisture transfer between skin and environment. In this way it can protect against extreme heat and cold, but at the same time it hampers the loss of excessive body heat generated during physical effort.

5.2 Temperature Monitoring

Since the measurement of deep body temperature is impractical for monitoring the workers' heat load, the measurement of environmental factors is required.

Using portable heat stress meters or monitors, environmental heat measurements should be made at (or as close as possible to) the specific work area where the worker is exposed. When a worker is not continuously exposed in a single hot area but moves between two or more areas having different levels of environmental heat (or when the environmental heat varies substantially at a single hot area) environmental heat exposures should be measured for each area and for each level of environmental heat to which the worker is exposed.

Measurement methods, calculations, exposure limits and recommendations are provided in [Heat Measurement Methods and Formula.](#)

5.3 Prevention and Control of Heat Stress

5.3.1 Engineering Controls

The five major types of engineering controls used to reduce heat stress in hot work environments are:

- Ventilation
- Air cooling
- Fans
- Shielding
- Insulation

Heat reduction can also be achieved by using power assists and tools that reduce the physical demands placed on a worker.

5.3.2 Acclimatisation

Acclimatization of an individual is a major factor in preventing heat-related problems. Any person when exposed for the first time to heat will develop signs of strain, such as elevated body temperature, high pulse rate and sweating. But the body will, over a series of days spent working in the heat, make a series of adjustments.

Acclimatization to the heat through short exposures followed by longer periods of work in the hot environment can reduce heat stress.

New employees and workers returning from an absence of two weeks or more should have 5-day period of acclimatization. This period should begin with 50 % of the normal workload and time exposure the first day and gradually building up to 100% on the fifth day.

5.3.3 Fluid Replacement

Cool water (between 10° C and 15° C) or any cool liquid (except alcoholic beverages) should be made readily available to workers to encourage them to drink small amounts frequently (for example, one cup every 20 minutes). Ample supplies of liquids should be placed close to work areas, and workers encouraged to salt their food well.

People who sweat profusely must be encouraged to drink large amount of water whether they are thirsty or not. Thirst is a poor indicator in preventing dehydration because by the time thirst is felt the problem already exists.

5.3.4 Food and Salt

Eating well balanced meals at regular intervals is important.

The body requires a certain amount of salt to function correctly but the routine use of salt tablets is not recommended. Salt tablets cause stomach irritation, which may provoke nausea and vomiting.

It is important that employees who work in a high heat environment be encouraged to eat a normal diet from which they will find all of the necessary salt.

5.3.5 Education

Employee education is important because it can ensure that workers:

- Are aware of the need to replace fluids and salt lost through sweat
- Can recognize dehydration, exhaustion, fainting, heat cramps, salt deficiency, heat exhaustion, and heat stroke as heat disorders
- Are aware of first aid measures during heat stress

See [Heat Stress](#).

5.3.6 Work and Rest Periods

Pursuant to Article 233 of the Labour Code of Azerbaijan, if the temperature goes above 41 °C the work in hot and open area workplaces, as well as in offices with no air conditioning, shall be stopped and employees shall be given breaks for cooling. The 41 °C criteria is effective from 17 May 2009, previous criteria was 45 °C.

Alternating work and rest periods, with longer rest periods in a cool area, can help workers avoid heat stress.

Where possible, work should be moved indoors or to cooler areas.

Work area should be shielded from the dust and sun.

Provision should be made for workers to have access to shady areas to rest during work breaks.

If possible, heavy work should be scheduled during the cooler parts of the day and appropriate protective clothing provided.

Extra workers should be assigned to very demanding and strenuous tasks.

Supervisors should be able to detect early signs of heat stress and should permit workers to interrupt their work if they are uncomfortable or unwell.

5.3.7 Work Monitoring

Only fit, healthy workers should be allowed to work in conditions where severe heat stress is a possibility.

Every worker who works in extraordinary conditions that increase the risk of heat stress should be personally monitored. Personal monitoring can be done by checking the heart rate, recovery heart rate, oral temperature, or extent of body water loss.

5.3.8 Protective Clothing / PPE

Certain work in hot conditions may require Personal Protective Equipment including insulated gloves, insulated suits, ice vests, wetted or reflective clothing.

Before selecting an item of Personal Protective Equipment, it is necessary that an assessment of suitability of that equipment be undertaken. The assessment should:

- Identify the risk with respect to a job or particular circumstances
- Take into account the characteristics and standards of the proposed personal protective equipment
- Establish the suitability of the equipment for the risk involved and for the personal characteristics of the user

6.0 Key Documents/Tools/References

1. [Heat Disorders and Health Effects.](#)
2. [Evaluating Heat Stress and Strain.](#)
3. [Heat Measurement Methods and Formula.](#)
4. [Fitness for Task Health Assessment Scope and Frequency.](#)
5. Presentations on [Heat Stress.](#)
6. Posters
 - [Heat Stress and First Aid](#)
 - [Am I Dehydrated?](#)
7. Leaflets
 - [HSE "Sun Protection Advice for Employers of Outdoor Workers"](#)
 - [HSE "Heat Stress in the Workplace. What you need to know as an Employer"](#)
 - [Working in the Sun](#)
8. Occupational Health, J.M. Harrington, Fourth Edition
9. American Conference of Governmental Industrial Hygienists (ACGIH). Documentation of the Threshold Limit Values and Biological Exposure Indices

Revision/Review Log

Revision Date	Authority	Custodian	Revision Details
30.07.2007	Alan McNulty	Almaz Agazade	Periodic Review
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