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**Safe Work Requirement**

**HEAT MANAGEMENT PLAN**

**ECDC-QHSE-PR-03**

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| INTRODUCTIONPurpose This plan is designed to reduce the risk of heat related disorders for the employees working on land drilling and work over rig site in SA. Any outdoor operations conducted in hot weather, such as drilling, work over, civil work, construction work, equipment operation, or hazardous confined space activities may cause heat stress problems for workers and is covered by this plan.  This program is built on the following key understandings:   1. A person’s physical condition has been shown by the military to be an important factor in preventing heat-related problems. Workers will be medically evaluated prior to being allowed to work in hot environments. 2. Acclimatization has been demonstrated to be an important effect in preventing heat stress illness. Consequently, exposure to hot work will increase gradually, over the schedule suggested by the National Institute for Occupational Safety and Health. 3. Environmental monitoring using the Wet Bulb Globe Temperature (WBGT) is valuable in predicting a work-rest schedule that can prevent most heat-related illnesses. 4. Increasing the intake of fluids during hot work helps to prevent heat stress problems. 5. Heat stroke cases are medical emergencies and require immediate attention. This requires worker on the site to have first aid training on how to deal with heat stress emergencies. Additionally, equipment for effective cooling of victims must be kept on site. 6. Training is an effective tool for preventing heat-related illnesses. This requires all workers on the site to be trained on preventing problems, recognizing symptoms, and handling emergencies.  Acronyms and Definitions ECDC- Egyptian Chinese Drilling Co.  PPE- Personal Protective Equipment  HS- Heat Stress BACKGROUNDS ON HEAT STRESS    Causes 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. Prior heat injury predisposes an individual to additional injury.  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. Heat Stroke Heat stroke occurs when the body's system of temperature regulation fails and body temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behaviour; loss of consciousness; convulsions; a lack of sweating (usually); hot, red, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41degrees C (105.8 degrees F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of work load and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict. Nearly half of heat stroke victims die or have permanent brain damage. Consequently, rapid cooling treatment must take place immediately and professional medical assistance must be summoned simultaneous to treatment to save a heat stroke victim’s life. Heat Exhaustion The signs and symptoms of heat exhaustion are headache, nausea, vertigo, weakness, thirst, giddiness, cool clammy skin, and paleness. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency. Workers suffering from heat exhaustion should be removed from the hot environment and given fluid replacement. They should also be encouraged to get adequate rest.  **NOTE: Giving fluids to an unconscious person should never be attempted.** Heat Collapse ("Fainting") In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable. To prevent heat collapse, the worker should gradually become acclimatized to the hot environment. Heat Cramps Heat cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. Cramps can be effected by both too much and too little salt. Cramps appear to be caused by the lack of water replenishment. Excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.  Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Recent studies have shown that drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery. Heat Rashes Heat rashes are the most common problem in hot work environments. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by un-evaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment. ACCLIMATIZATION    Background Acclimatization to heat involves a series of physiological and psychological adjustments that occur in an individual during the first week of exposure to hot environmental conditions. The recommended heat stress threshold limit values (TLVs) are valid for acclimated workers who are physically fit American Conference Governmental Industrial Hygienists (ACGIH). After a period of acclimatization, the same activity will produce fewer cardiovascular demands. The worker will sweat more efficiently (causing better evaporative cooling), and thus will more easily be able to maintain normal body temperatures. The military demonstrated a five to tenfold reduction in the seasonal incidence in heat casualties when a program was instituted that required, among other things, a breaking-in period for new recruits of exposure to heat (Minard 1961). Policy All workers on sites where heat stress may be a problem will be exposed for progressively longer periods. Workers who have had previous exposures to high heat are not at as great a risk as those with no previous exposure. Based on NIOSH recommendations (1986), workers who have had previous experience, will be exposed to heat on the following regimen: 50% exposure on day 1, 60% on day 2, 80% on day3, and 100% on day 4. For new workers who will be similarly exposed, the regimen should be 20% on day 1, with a 20% increase in exposure each additional day. These schedules do not apply to workers wearing impermeable suits. Their exposures must be much shorter. Roles and Responsibilities    HSSE department Implementation of the heat stress management plan, provide information and support on hygiene, medical, first aid, emergency and healthy checking. Supervise and urge all rig crew, subcontractor, other department of project and all line managers put heat stress precautions into practice. Rig manager  1. Arrange work based on the requirements of this management plan. 2. Prior to assigning tasks the rig manager must: 3. Describe tasks and job demands that may include, but not limited to: 4. Work in hot weather with proper PPE. 5. Walking and bending to pick up light objects. 6. Heavy lift using shoves/pitch forks. 7. Manual lifting. 8. Advice the individuals that they must in good health and able to perform the general labor skills described. 9. specifically ask if people are able to perform the expected tasks if someone indicates that they cannot perform the requirements of the assignment (or is otherwise clearly unable to perform the job), the Rig manager must look for alternate assignments that the person is capable of performing. If an alternate assignment is not available, the Rig manager should meet with the individual and ask if there is an assignment the individual believes he or she can do. We do not need to make significant modifications to any assignment but must consider reasonable requests for modifications that would allow the employee to perform the core job functions. If no alternative position is available or modifications possible, the individual should be released. 10. Provide enough recovery area for workers. 11. Guide task force on work/rest schedules. 12. Ensure sufficient water and/or low sugar electrolyte replacement. 13. Monitor the task force for signs and symptoms of heat stress. 14. Provide necessary training.  Medical  1. Provide healthy guide. 2. Provide medical supportive and first aid. 3. Provide Heat stress awareness training. 4. Conduct Healthy check and healthy assessment.  Heat Stress Prevention    Fluid Replacement Cool (50-60 degrees F) water must be made readily accessible to workers. Ideally, the water should be placed close to the workplace so that the worker can reach it without abandoning the work area. On hazardous waste jobs where workers are in contaminated environments, wearing respiratory protection, and break areas must be established.  Thirst is not a good indicator of the need for replenishment. On a hot job, workers can lose up to one quart an hour but it is difficult to drink that much at any one time. Consequently, workers should be encouraged to drink small amounts frequently, e.g., one cup every 15-20 minutes.  Workers should be encouraged to salt their food well during the hot season and particularly during hot spells. If the workers are un-acclimatized, salted drinking water should be made available in a concentration of 0.1% (1 level tablespoon of salt to 15 quarts of water). The added salt should be completely dissolved before the water is distributed, and the water should be kept reasonably cool. Commercial replacement drinks, such as Gatorade, can be used instead of salted water. These drinks are valuable at the beginning of hot work but are not necessary for acclimatized individuals. Preparing for the Heat One of the best ways to reduce heat stress on workers is to minimize heat in the workplace.  However, there are some work environments where heat production is difficult to control, such as when furnaces or sources of steam or water are present in the work area or when the workplace itself is outdoors and exposed to varying warm weather conditions.  Humans are, to a large extent, capable of adjusting to the heat. This adjustment to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more endurable.  On the first day of work in a hot environment, the body temperature, pulse rate, and general discomfort will be higher. With each succeeding daily exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body becomes acclimated to the heat, the worker will find it possible to perform work with less strain and distress.  Gradual exposure to heat gives the body time to become accustomed to higher environmental temperatures. Heat disorders in general are more likely to occur among workers who have not been given time to adjust to working in the heat or among workers who have been away from hot environments and who have gotten accustomed to lower temperatures. Hot weather conditions of the summer are likely to affect the worker who is not acclimatized to heat.  Likewise, workers who return to work after a leisurely vacation or extended illness may be affected by the heat in the work environment. Whenever such circumstances occur, the worker should be gradually reacclimatized to the hot environment. Lessening Stressful Conditions Many industries have attempted to reduce the hazards of heat stress by introducing engineering controls, training workers in the recognition and prevention of heat stress, and implementing work-rest cycles. Heat stress depends, in part, on the amount of heat the worker's body produces while a job is being performed. The amount of heat produced during hard, steady work is much higher than that produced during intermittent or light work. Therefore, one way of reducing the potential for heat stress is to make the job easier or lessen its duration by providing adequate rest time. Mechanization of work procedures can often make it possible to isolate workers from the heat sources (perhaps in an air-conditioned booth) and increase overall productivity by decreasing the time needed for rest. Another approach to reducing the level of heat stress is the use of engineering controls which include ventilation and heat shielding. Number and Duration of Exposures Rather than be exposed to heat for extended periods of time during the course of a job, workers should, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work-rest cycles. Work-rest cycles give the body an opportunity to get rid of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.  Workers employed outdoors are especially subject to weather changes. A hot spell or a rise in humidity can create overly stressful conditions. The following practices can help to reduce heat stress:   1. Postponement of nonessential tasks 2. Permit only those workers acclimatized to heat to perform the more strenuous tasks 3. Provide additional workers to perform the tasks keeping in mind that all workers should have the physical capacity to perform the task and that they should be accustomed to the heat.  Thermal Conditions in the Workplace In general, the simplest and least expensive methods of reducing heat and humidity can be accomplished by:   1. Opening windows in hot work areas 2. Using fans 3. Using other methods of creating airflow such as exhaust ventilation or air blowers.  Rest Areas Providing cool rest areas in hot work environments considerably reduces the stress of working in those environments. There is no conclusive information available on the ideal temperature for a rest area. However, a rest area with a temperature near 76 degrees F appears to be adequate and may even feel chilly to a hot, sweating worker, until acclimated to the cooler environment.  The rest area should be as close to the workplace as possible. Individual work periods should not be lengthened in favor of prolonged rest periods. Shorter but frequent work-rest cycles are the greatest benefit to the worker. Protective Clothing Clothing inhibits the transfer of heat between the body and the surrounding environment.  When air temperature is higher than skin temperature, clothing helps to prevent the transfer of heat from the air to the body. However, this advantage may be nullified if the clothes interfere with the evaporation of sweat.  In dry climates, adequate evaporation of sweat is seldom a problem. In a dry work environment with very high air temperatures, protective clothing could be an advantage to the worker. The proper type of clothing depends on the specific circumstance. Certain work in hot environments may require insulated gloves, insulated suits, reflective clothing, or infrared reflecting face shields. Employee Heat Awareness and Training The key to preventing excessive heat stress is educating the employer and worker on the hazards of working in heat and the benefits of implementing proper controls and work practices.  The employer should establish a program designed to acclimatize workers who must be exposed to hot environments and provide necessary work-rest cycles and water to minimize heat stress.  Heat stress training program should include at least the following components:   1. Knowledge of the hazards of heat stress, 2. Recognition of predisposing factors, danger signs, and symptoms, 3. Awareness of first-aid procedures for, and the potential health effects of heat stroke, 4. Employee responsibilities in avoiding heat stress, 5. Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments, 6. Use of protective clothing and equipment, and  Special Considerations During unusually hot weather conditions lasting longer than 2 days, the number of heat illnesses usually increases. This is due to several factors, such as progressive body fluid deficit, loss of appetite (and possible salt deficit), buildup of heat in living and work areas, and breakdown of air-conditioning equipment. Therefore, it is advisable to make a special effort to adhere rigorously to the above preventive measures during these extended hot spells and to avoid any unnecessary or unusual stressful activity. Sufficient sleep and good nutrition are important for maintaining a high level of heat tolerance. Workers who may be at a greater risk of heat illnesses are the obese, the chronically ill, and older individuals.  When feasible, the most stressful tasks should be performed during the cooler parts of the day (early morning or at night). Double shifts and overtime should be avoided whenever possible.  Rest periods should be extended to alleviate the increase in the body heat load.  The consumption of alcoholic beverages during prolonged periods of heat can cause additional dehydration. Persons taking certain medications (e.g., medications for blood pressure control, diuretics, or water pills) should consult their physicians in order to determine if any side effects could occur during excessive heat exposure. Daily fluid intake must be sufficient to prevent significant weight loss during the workday and over the workweek. Heat Stress Table Heat stress table is used to assess heat stress and provide guidelines for the necessary controls. It shall be display in the prominent place of meeting room, rest room and accommodations. See appendix1 for heat stress table. Workers Monitoring The incidence of heat stress depends on a variety of factors, consequently, all workers, even those not wearing protective equipment, should be monitored.     Personal monitoring Personal monitoring can be done by checking the heart rate, recovery heart rate, oral temperature, or extent of body water loss. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.  The recovery heart rate can be checked by comparing the pulse rate taken at 30 seconds with the pulse rate taken at 2.5 minutes after the rest break starts. The two pulse rates can be interpreted using a table. Research conducted by the Coast Guard has indicated that recovery heart rate is probably the best indicator of heat tolerance end points for work in encapsulating, impermeable clothing.  Oral temperature can be checked with a clinical thermometer after work but before the employee drinks water. If the oral temperature taken under the tongue exceeds 37.6degrees C, shorten the next work cycle by one third.  Body water loss can be measured by weighing the worker on a scale at the beginning and end of each work day. The worker's weight loss should not exceed 1.5% of total body weight in a work day. If a weight loss exceeding this amount is observed, fluid intake should increase. Urine chart Urine chart is used to identify the dehydrated condition of employees, it shall be posted in each work site toilet to help the employees to identify and assess their dehydrated condition.  Description: C:\Users\USER\AppData\Roaming\Tencent\Users\1045450198\QQ\WinTemp\RichOle\@SCM%E)H)2Y}[DB[@2H}A$W.png Environmental Monitoring The environmental temperature and relative humidity shall be monitored during hot weathers. Emergency Procedures    First aid for Heat Stroke If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and their clothing removed quickly. Full decontamination should not be attempted prior to removing chemically-resistant suits .The worker's skin should be wetted and air should be moved aggressively around the worker to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment. Regardless of the worker's protests, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order. First Aid for Heat Exhaustion Workers showing symptoms of heat exhaustion should be taken out of protective clothing and moved to a shaded, and hopefully cool, area. They should be given fluids and allowed to rest. They may not need medical attention but they must not be returned to work that day.  NOTE: Do not attempt to give fluids to an unconscious person. |  |

# Appendix1- heat stress table.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **HEAT STRESS TABLE**  **Locate the current temp on the left column and then locate the relative humidity on the top row. Follow**  **the temperature across and the humidity down until they meet. This measure is the heat index.**  **Compare reading with heat stress index table below and comply with recommended controls.**  **NOTE: YOU MUST ADD THREE (3) DEGREES WHEN WEARING NOMEX COVERALLS**. | | | | | | | | | | | | | | | | | | | | | |
| **oC** | **Relative Humidity (%)** | | | | | | | | | | | | | | | | | | | | |
|  | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 51 | **STOP NON-ESSENTIAL WORK, RE-EVALUATE & IMPLEMENT LOCAL HEAT CONROL PROCEDURES BEFORE WORK RECOMMENCES.** | | | | | | | | | | | | | | | | | | | | |
| 50 |
| 49 | 49 | 49 | 50 | 53 | 56 | 60 | 63 | 66 | 69 | - | - | - | - | - | - | - | - | - | - | - | - |
| 48 | 48 | 48 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | - | - | - | - | - | - | - | - | - | - | - | - |
| 47 | 47 | 47 | 47 | 50 | 53 | 56 | 59 | 62 | 65 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 46 | 46 | 46 | 46 | 49 | 52 | 54 | 57 | 60 | 63 | 65 | 68 | - | - | - | - | - | - | - | - | - | - |
| 45 | 45 | 45 | 45 | 47 | 50 | 53 | 55 | 58 | 61 | 63 | 66 | - | - | - | - | - | - | - | - | - | - |
| 44 | 44 | 44 | 44 | 46 | 48 | 51 | 53 | 56 | 58 | 61 | 63 | 66 | - | - | - | - | - | - | - | - | - |
| 43 | 43 | 43 | 43 | 45 | 47 | 49 | 52 | 54 | 56 | 59 | 61 | 64 | 66 | - | - | - | - | - | - | - | - |
| 42 | 42 | 42 | 42 | 43 | 45 | 48 | 50 | 52 | 54 | 57 | 59 | 61 | 64 | 66 | - | - | - | - | - | - | - |
| 41 | 41 | 41 | 41 | 42 | 44 | 46 | 48 | 50 | 53 | 55 | 57 | 59 | 61 | 63 | - | - | - | - | - | - | - |
| 40 | 40 | 40 | 40 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | - | - | - | - | - | - |
| 39 | 39 | 39 | 39 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 58 | 60 | 62 | - | - | - | - | - |
| 38 | 38 | 38 | 38 | 38 | 40 | 42 | 43 | 45 | 47 | 49 | 51 | 52 | 54 | 56 | 58 | 60 | 62 | 63 | - | - | - |
| 37 | 37 | 37 | 37 | 37 | 38 | 40 | 42 | 44 | 45 | 47 | 49 | 50 | 52 | 54 | 56 | 57 | 59 | 61 | 63 | - | - |
| 36 | 36 | 36 | 36 | 36 | 37 | 39 | 40 | 42 | 44 | 45 | 47 | 49 | 50 | 52 | 54 | 55 | 57 | 58 | 60 | 62 | - |
| 35 | 35 | 35 | 35 | 35 | 36 | 40 | 39 | 40 | 42 | 43 | 45 | 46 | 48 | 50 | 51 | 53 | 55 | 56 | 57 | 59 | 60 |
| 34 | 34 | 34 | 34 | 34 | 34 | 36 | 37 | 39 | 40 | 42 | 43 | 45 | 47 | 48 | 49 | 51 | 53 | 54 | 56 | 58 | 58 |
| 33 | 33 | 33 | 33 | 33 | 33 | 34 | 36 | 37 | 40 | 41 | 43 | 43 | 44 | 45 | 47 | 48 | 50 | 51 | 52 | 54 | 55 |
| 32 | 32 | 32 | 32 | 32 | 32 | 33 | 34 | 36 | 37 | 38 | 40 | 41 | 42 | 43 | 45 | 46 | 47 | 49 | 50 | 51 | 53 |
| 31 | 31 | 31 | 31 | 31 | 31 | 32 | 33 | 34 | 35 | 37 | 38 | 39 | 40 | 42 | 43 | 44 | 45 | 46 | 48 | 49 | 50 |
| 30 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 33 | 34 | 35 | 36 | 37 | 38 | 40 | 41 | 42 | 43 | 44 | 45 | 47 | 48 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **GENERAL HEAT STRESS INDEX - NOTE these are minimum standards.** | | | | |  |
| **Danger Category** | **Humidex Value** | **Heat Syndrome** | **Resting Time**  **(to be taken in sheltered areas)** | **Water Need**  **(1 glass\* =250 mls)** |
| **Extreme Danger** | **55 and Above** | **Heat Stroke or Sun Stroke Imminent** | **15 minutes / hour** | **1 glass\* / 10 minutes** |
| **Danger** | **46 - 54** | Sunstroke, Heat Cramps, or Heat Exhaustion likely. Heat Stroke possible with prolonged exposure and physical activity. | **10 minutes / hour** | **1 glass\* / 10 minutes** |
| **Extreme Caution** | **40 - 45** | Sunstroke, Heat Cramps, or Heat Exhaustion possible with prolonged exposure and  Physical activity. | **7 minutes / hour** | **1 glass\* / 15 minutes** |
| **Caution** | **30 - 39** | Fatigue possible with prolonged exposure and physical activity. | **No Requirement** | **1 glass\* / 20 minutes** |
| **REMINDER - Cover skin where able, wear a hat and apply regular sun screen at SPF of >30**  **IMPORTANT - Do not drink more than 1.5 litres per hour (maximum water absorption rate of human body).** | | | | |
|  | | | | |