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| Authored By: Susan Lambert | Blanchard Refining Company LLC Galveston Bay Refinery | Doc No.: RSW-000061-GB Rev No: 0 |
| Doc Custodian: Safety Supervisor | | Refinery Safe Work Procedure |
| Approved By: Eric Kaysen | PR-13 Heat Stress Prevention | |
| Date Approved: 4/15/2020 | Next Review Date: 6/30/2025 | Effective Date: 6/1/2020 |

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1.0 Purpose

The purpose of this procedure is to minimize the potential for heat-related illness among site personnel.

2.0 Scope

This procedure will apply to all employees involved in work activities that create the potential for the development of heat-related illnesses.

3.0 Procedure

3.1 General Requirements

- 3.1.1 Personnel should understand the basic principles of preventing and recognizing symptoms of heat-related illnesses and heat stress. See Attachment A.
- 3.1.2 Control measures for heat stress will be determined based on the heat index for Texas City. See Attachment B.
 - 3.1.2.1 Heat index will be posted daily on monitors throughout the plant.
 - 3.1.2.2 A flag system will also be implemented and displayed on monitors throughout the plant. Each colored flag represents current heat index and corresponding control measures that should be implemented. Attachment B is color coordinated to the flag system.
- 3.1.3 It is the responsibility of each employee's supervisor to determine appropriate work/rest schedules for working in hot temperatures. All heat stress and heat-related illnesses shall be reported to supervision immediately.
- 3.1.4 Management and supervision must maintain a work environment that allows workers to work within their personal limits and must be diligent in recognizing workers who may work beyond those limits and require them to take an appropriate cool-down break.
- 3.1.5 Equipment that is needed to reduce the potential for heat stress will be made available to employees. The following equipment will be available for routine or short duration jobs:
 - 3.1.5.1 Cooling vests/phase change vests.
 - 3.1.5.2 Portable fans/blowers/air conditioning units (with or without water mist).
 - 3.1.5.3 Portable shades.
 - 3.1.5.4 Access to cold drinking water and/or electrolyte drinks.
- 3.1.6 It will be the responsibility of supervision to plan and schedule jobs in such a way as to reduce potential heat stress. The following will be considered during job planning and scheduling:
 - 3.1.6.1 If possible, schedule strenuous jobs for cooler parts of the day (or at night).
 - 3.1.6.2 Ensure adequate manpower levels for the work to be planned.
 - 3.1.6.3 Maintain communication between operations and maintenance to ensure personnel are not waiting in the heat.
- 3.1.7 Hydration is a key element in preventing heat stress. Hydrate prior to and during shift. Water is the first choice for rehydrating. Electrolyte drinks can be used, if they are not the sole source of fluids. See Attachment B for hydration recommendations.

3.2 Cool-down Breaks / Work-rest Regimens

- 3.2.1 Cool-down breaks should, whenever possible, be taken based on the individual worker's

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needs and personal limits for preventing heat-related illness. See Attachment B for requirements.

3.2.2 Employees wearing additional PPE (not including FRC) must be given time to remove this PPE during the cool down period.

3.3 Cool Down Station Requirements

3.3.1 Temporary cool down areas shall be constructed for turnarounds and projects during periods of hot weather (May 1st through September 30th). See Attachment C for approved locations.

3.3.1.1 Coordination and planning for cool down stations shall begin in the March to April timeframe, with guidance from PSM and Industrial Hygiene, when needed.

3.3.1.2 For non-turnaround and non-project work, cool down stations will be based on need (the number of workers and length of project).

3.3.1.3 See Attachment C for approved locations. Any cool down stations requested outside of the plotted points on the map must be approved by PSM and/or Industrial Hygiene department.

3.3.1.4 Cool down stations should be constructed within 300 feet of work for major projects and turnaround activities, if it meets PSM requirements.

3.3.2 The cool down areas may be constructed to provide shade and may be equipped with benches, water coolers, lighting, and fans.

3.3.2.1 Any fabric used to provide shade must be made of FR rated materials.

3.3.2.2 Cool down stations shall be no larger than 150 square feet in size and constructed of materials that can withstand a 3 psi blast

3.3.3 All portable and/or temporary electrical equipment (i.e. extension cords, cables, receptacles) must be compliant with site standards and must utilize ground fault circuit interrupters (GFCI). When applicable, fans must meet Class I Div II specifications. See Reference section.

3.3.4 Each cool down station should display contact information for water cooler replacement, electrical servicing group, and planning group for cool down stations. MPC employees are not responsible for servicing or maintaining fans with misting capabilities

3.4 Medical Surveillance Requirements

3.4.1 Employees that feel any initial signs or symptoms of a heat-related illness are to report to their supervisor

3.4.2 Site emergency procedures will be initiated in the event of a heat-illness requiring emergency medical treatment, such as heat exhaustion or heat stroke.

3.4.3 Non-emergency heat-related illness, such as heat rash or heat cramps, will be treated through the Medical Department.

3.4.4 Employees who have been ill or are taking prescription medications, i.e., antibiotics, diet/weight loss pills, diuretics, blood pressure medications, and any other medication that may increase their susceptibility to heat illnesses will check with the Medical Department before resuming normal duties.

3.5 Training

3.5.1 Employees that work in environments susceptible to heat-related illnesses will receive heat stress prevention training every year.

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3.5.2 Training materials will be developed and provided by the Training Department with assistance from the Medical and Safety Departments.

3.5.3 All training records will be maintained by the Training Department.

3.6 Contractors

3.6.1 Personnel should understand the basic principles of preventing and recognizing symptoms of heat-related illnesses and heat stress.

3.6.2 Contractors shall develop and implement their own heat stress policies and/or work practices appropriate for the work they perform.

3.6.3 Contractor heat stress policies / practices shall encourage workers to work within their own personal limits and to include provisions for training, proper hydration, acclimatization, and appropriate cool-down breaks to prevent heat-related illness.

3.6.4 Rented portable or stationary A/C units must be labelled with contact information for both the rental company and servicing group (MPC representative).

3.7 Risk Factors

3.7.1 Environmental Risk Factors – Working conditions that create the possibility that heat-related illness could occur, including air temperature, relative humidity, radiant heat from the sun, process equipment, and other conductive heat sources.

3.7.1.1 Workers that are required to wear PPE beyond FRC (i.e. asbestos, lead abatement, Alky unit work, slicker suits, Tyvek) may require more stringent heat stress controls and engineering controls (i.e. portable air conditioning units or fans). See Attachment B for guidance.

3.7.1.2 Workers that are subject to conditions that increase heat stress or work near equipment that generates heat (i.e. internal vessel work, high temperature lines, pumps, vessels, heat exchangers, furnaces, hot work) may require more stringent heat stress controls and engineering controls (i.e. portable air conditioning units or fans). See Attachment B for guidance.

3.7.2 Personal Risk Factors – Factors such as an individual’s age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription or over-the-counter medications that affect the body’s water retention or other physiological responses to heat.

4.0 **Definitions**

4.1 **Heat Index** – A measure indicating the level of discomfort the average person experiences as a result of the combined effects of the temperature and humidity of the air.

4.2 **Heat-related Illness** – A medical condition that may occur as a result of heat exposure.

4.3 **Heat Stress** – A series of conditions where the body is under stress from overheating.

5.0 **References**

5.1 OSHA’s Heat Illness Prevention Campaign, <https://www.osha.gov/heat/>

5.2 OSHA standard 29 CFR 1926.404, <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.404>

5.3 RSP-1162-000 Electrical Safe Work Practices

5.4 RSP-1314 Building and Tent Siting

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5.5 RGD-PS-000011-GB Buildings and Tent Siting Plan

6.0 Attachments

6.1 Attachment A: Heat-Related Illness, Signs & Symptoms & First Aid Measures

6.2 Attachment B: Heat Stress Control Measures

6.3 Attachment C: Approved Locations for Cool Down Stations

7.0 Revision History

| Revision Number | Description of Change | Written by | Approved by | Revision Date | Effective Date |
|-----------------|--|------------|--------------|---------------|----------------|
| 0 | Original issue. New integrated site procedure replaces GBR-HESS-PR-13 RSW-0048-TC under MOC 72646. | S. Lambert | E. R. Kaysen | 4/15/2020 | 6/1/2020 |

Attachment A: Heat-Related Illness, Signs & Symptoms & First Aid Measures

| HEAT-RELATED ILLNESS | SIGNS & SYMPTOMS | FIRST AID MEASURES |
|------------------------|--|---|
| Heat Rash | Red skin and clusters of red bumps on the neck, upper chest, and skin folds. | Move person to cool environment. Keep affected areas clean. Report to supervisor. Report to Medical, if necessary. |
| Heat Cramps | Cramps and discomfort in muscles, usually arms, legs or abdomen. Generally, occurs immediately after exertion. | Move person to cool environment. Give 3-4 ounces every 5-10 minutes (i.e. water, electrolytes, natural fruit juices, etc.). If cramps are not relieved, get prompt medical attention. Report to supervisor. Report to Medical, if necessary. |
| Heat Exhaustion | Fatigue, irritability, thirst, nausea or vomiting, dizziness, <i>heavy sweating</i> , elevated body temperature, increased heart rate. | <u>MEDICAL EMERGENCY</u> <i>Get prompt medical attention. First aid must be given until medical attention is received.</i> Move person to cool environment. Give 3-4 ounces every 5-10 minutes (water, electrolytes, natural fruit juices, etc.). |
| Heat Stroke | Confusion, slurred speech, unconsciousness, seizures, <i>hot/dry skin</i> , high body temperature, rapid heart rate. | <u>MEDICAL EMERGENCY</u> <i>Get medical attention immediately</i> (call Ext. 200 or push orange man-down button on radio). <i>First aid must be given immediately until emergency response arrives.</i> Delayed treatment may result in damage to the brain, kidneys, and heart. Move to cool environment. Remove unnecessary clothing and spray the body with cool water. Fan individual. If person is conscious, give sips of cool water. |

Attachment B: Heat Stress Control Measures

When working in a group or with a partner, utilize a buddy system to ensure you're monitoring each other's condition and taking measures to prevent heat stress.

The control measures listed below are recommended based on a one-hour work period.

| Heat Index: greater than 90°F | |
|---|--|
| FRC only | Wearing Additional Protective Outerwear |
| Drink 1/4 quart of water self-paced for each break | Drink 1/2 quart of water self-paced for each break Select TWO of the following: |
| <input type="checkbox"/> Cool down periods self-paced | <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Rotate personnel <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Cool down period every 30 minutes |
| Heat Index: 95°F – 100°F | |
| FRC only | Wearing Additional Protective Outerwear |
| Drink 1/4 quart of water self-paced for each break Select ONE of the following: | Drink 1/2 quart of water self-paced for each break Buddy system Select TWO of the following: |
| <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Cool down period every 30 minutes | <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Rotate personnel <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Cool down period every 30 minutes |

Attachment B Continued

| Heat Index: 101°F – 105°F | |
|---|--|
| FRC only | Wearing Additional Protective Outerwear |
| <p>Drink 1/2 quart of water self-paced for each break</p> <p>Buddy system</p> <p>Select TWO of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Rotate personnel <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Cool down period every 30 minutes | <p>Drink 3/4 quart of water self-paced for each break</p> <p>Buddy system</p> <p>Select THREE of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Rotate personnel <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Shading the work area <input type="checkbox"/> Supplied air hood respiratory protection <input type="checkbox"/> Cool down period every 20 minutes |
| Heat Index: 106°F – 110°F | |
| FRC only | Wearing Additional Protective Outerwear |
| <p>Drink 1/2 quart of water self-paced for each break</p> <p>Buddy system</p> <p>Select TWO of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Rotate personnel <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Cool down period every 30 minutes | <p>Drink 3/4 quart of water self-paced for each break</p> <p>Buddy system</p> <p>Select THREE of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> External cooling device <input type="checkbox"/> Personal cooling device <input type="checkbox"/> Rotate personnel <input type="checkbox"/> Plan work at cooler time of the day <input type="checkbox"/> Radiant heat barrier <input type="checkbox"/> Cool down station within 300 feet of work <input type="checkbox"/> Shading the work area <input type="checkbox"/> Supplied air hood respiratory protection <input type="checkbox"/> Cool down period every 20 minutes |

Attachment B Continued

| Heat Index: greater than 110°F | |
|---|---|
| FRC only | Wearing Additional Protective Outerwear |
| Drink 3/4 quart of water self-paced for each break | Drink 1 quart of water self-paced for each break |
| Buddy system | Buddy system |
| Select THREE of the following: | Select FOUR of the following: |
| <input type="checkbox"/> External cooling device | <input type="checkbox"/> External cooling device |
| <input type="checkbox"/> Personal cooling device | <input type="checkbox"/> Personal cooling device |
| <input type="checkbox"/> Rotate personnel | <input type="checkbox"/> Rotate personnel |
| <input type="checkbox"/> Plan work at cooler time of the day | <input type="checkbox"/> Plan work at cooler time of the day |
| <input type="checkbox"/> Radiant heat barrier | <input type="checkbox"/> Radiant heat barrier |
| <input type="checkbox"/> Cool down station within 300 feet of work | <input type="checkbox"/> Cool down station within 300 feet of work |
| <input type="checkbox"/> Shading the work area | <input type="checkbox"/> Shading the work area |
| <input type="checkbox"/> Supplied air hood respiratory protection | <input type="checkbox"/> Supplied air hood respiratory protection |
| <input type="checkbox"/> Cool down period every 20 minutes | <input type="checkbox"/> Cool down period every 10 minutes |

Attachment C: Approved Locations for Cool Down Stations

