

	HEAT STRESS ALL-HSE-PRC-649	Retention Code: CG01 - CA
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1.0 Purpose

This procedure ensures workers are protected from potential adverse effects of overexposure to heat.

It supports CPC employees and contractors by providing strategies to:

- Recognize the symptoms of heat stress.
- Assess the risk associated with potential exposure.
- Ensure effective controls are in place to mitigate risks.

This procedure applies to all ConocoPhillips Canada (CPC) operations where the risk of heat stress exists.

2.0 Hazards to Mitigate

Hazards include, but are not limited to:

- High temperatures.
- High humidity.
- Radiant heat sources (including the sun).
- Physical exertion.
- Excessive clothing.
- Inadequate acclimatization.
- Inadequate hydration.

The following may increase the risk of health effects from heat exposure:

- Age (older people are more easily affected).
- Poor physical condition.
- Certain diseases (e.g. multiple sclerosis).
- Certain medications (e.g. allergy or blood pressure medications).

3.0 Procedure-Specific Roles and Responsibilities

3.1. Work Supervisor

- Ensure that jobs and environments with the potential for heat stress are identified and hazards are appropriately controlled.
- Ensure that workers are aware of the symptoms of heat stress.

3.2. Workers

- Protect themselves from heat stress (e.g. drink sufficient water).
- Understand the symptoms of heat stress.
- Identify potential risk factors in themselves and adjust accordingly (e.g. ensure adequate rest breaks during work execution).
- Identify symptoms of heat stress in themselves and others.
- Notify work supervisor of any identified potential heat stress situations.

3.3. CPC Occupational Health Team

- Provide advice and assistance on medical treatments or conditions as required.

3.4. CPC Industrial Hygienist

- Provide advice on the assessment of high heat environments.
- Provide support on development of exposure control strategies.

4.0 Procedure

4.1. Identification and Evaluation of Heat Stress Potential

Assess environmental conditions and the types of work to be performed in advance of work. Address the potential for heat stress in the Pre-job Hazard Assessment (PJHA), Permit to Work or other applicable hazard assessment.

When assessing heat stress, in addition to temperature and humidity, take into consideration the physical condition of the worker, clothing and other risk factors (see Section 2.0).

To help determine if activities/operations may pose a risk of heat stress refer to:

- Heat Response Guidance Table (Appendix E).

Note: Assume that in normal operating conditions on CPC work sites the humidity whether inside or outdoors is between 30% and 40%.

Regardless of the anticipated exposure, worker symptoms must not be ignored.

4.2. Prevention and Control of Heat Related Illness

Workers must monitor themselves (e.g. fluid intake, physical exertion etc.). In order to be done effectively however, workers must:

- Understand the factors that lead to heat stress (See Appendix D).
- Recognize early symptoms of heat stress.
- As required, alter their:
 - Pace of Work.
 - Rest Breaks.
 - Fluid Intake.

4.2.1. Engineered Controls

When practical, use engineered controls to control for heat stress. For example:

- Air conditioning.
- Isolation of the worker (e.g. in a control room).
- Heat shielding.
- Isolation of radiant heat sources.

4.2.2. Administrative Controls

- Work-rest schedule (See Heat Response Guidance Table - Appendix D).
- Schedule heavy work for the coolest part of the day when possible.
- Avoid direct sunlight when possible.
- Avoid caffeine and other diuretics.
- Ensure an adequate supply of water.
- Work in pairs or groups to ensure early identification or symptoms by others.
- Scheduling for acclimatization.

Note: Those workers new to high heat work will need more time to acclimatize than workers who have had previous exposure. Scheduling adjustments should be considered. Also see Appendix E.

Acclimatization:

- Can be lost if away from the hot work environment for more than a week.
- Can often be regained in 2 to 3 days upon returning to a hot job.
- Is often maintained more easily by physically fit workers.
- Is affected by seasonal temperature shifts.
- Is not affected by air conditioning.

Where practical, allow for acclimatization prior to starting high temperature work (7 to 14 day period).

4.2.3. Personal Protective Equipment and Clothing

- Absorptive undergarments and light breathable fabrics.
- Cooling vests in extreme cases.
- Avoid having more clothing than required.
- Also See Personal Protective Equipment Specification.

5.0 References

- Cold Weather Exposure ALL-HSE-PRC-145.
- Exposure Control Plan ALL-HSE-PRC-154.
- Industrial Hygiene Program ALL-HSE-PRC-155.
- Personal Protective Equipment specification All-HSE-SPC-643.

- Alberta OHS Code, Part 2, Hazard Assessment, Elimination and Control.
- Work Safe Alberta Best Practice – Working Safely in the Heat and Cold (2014) GS006.
- BC OHS Regulation Part 7, Division 4, Thermal Exposure.
- WorkSafeBC Preventing Heat Stress at Work (2007).
- Saskatchewan OHS Regulations Part 6, General Health Requirements.

6.0 Document Retention

Records must be retained in accordance with ConocoPhillips' Document Retention Schedule.

Record	Owner	Classification	Retention
Hazard Assessments	BUs or Functional Departments as applicable.	HE11-CA	Event

Appendix A – Acronyms

PJHA	Pre-Job Hazard Assessment
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Appendix B – Definitions

Terms that are important to understanding Heat Stress are defined below:

Acclimatization	<p>Is the beneficial physiological adaptations that occur during repeated exposure to a hot environment. These physiological adaptations include:</p> <ul style="list-style-type: none"> • Increased sweating efficiency (earlier onset of sweating, greater sweat production, and reduced electrolyte loss in sweat). • Stabilization of the circulation. • The ability to perform work with lower core temperature and heart rate. • Increased skin blood flow at a given core temperature.
Humidex	<p>A temperature index used to describe how hot the weather feels to a person by adding the effect of heat and humidity.</p>
Radiant Heat	<p>The transfer of heat energy through space. A worker whose body temperature is greater than the temperature of the surrounding environment radiates heat outwards. Also, hot surfaces and infrared light sources radiate heat that can increase the body's heat load when they strike the surface of the body (e.g. the sun).</p>
Un-acclimatized Worker	<p>A worker who is not accustomed to working in hot or cold environments or who has been removed from a hot or cold environment for 7 consecutive days.</p>

Appendix C – Revision Record

Page#	March 26, 2015	Previous Information	Change Assessment
	New Procedure		

Appendix D – Health Effects of Heat Exposure

Potential health effects of heat exposure include:

Heat Effects	Cause	Symptoms
Heat Rash	<ul style="list-style-type: none"> Hot, humid environment. Plugged sweat glands. 	<ul style="list-style-type: none"> Red bumpy rash. Severe itching.
Heat Cramps	<ul style="list-style-type: none"> Salt imbalance due to physical exertion and heavy sweating. Inadequate salt and water intake. 	<ul style="list-style-type: none"> Painful cramps (arms, legs or abdomen).
Heat Syncope	<ul style="list-style-type: none"> Fluid loss. Inadequate water intake. Standing still - decreased blood flow to brain. Inadequate acclimatization. 	<ul style="list-style-type: none"> Sudden fainting. Cool moist skin. Weak pulse.
Heat Exhaustion	<ul style="list-style-type: none"> Fluid loss. Inadequate salt and water intake. 	<ul style="list-style-type: none"> Heavy sweating. Cool, moist skin. Body temperature over 38°C. Weak pulse. Normal or low blood pressure. Person is tired or weak. Nausea and vomiting. Very thirsty. Panting or breathing rapidly. Blurred vision.
Classic Heat Stroke	<ul style="list-style-type: none"> While possible in anyone, more prevalent in older adults or those with chronic illness. Used up water and salt reserves. Stops sweating and rise in body temperature. 	<ul style="list-style-type: none"> High body temperature (over 40°C). Weakness. Confusion. Upset or acting strangely.
Exertional Heat Stroke.	<ul style="list-style-type: none"> Young persons who engage in vigorous physical activity. Body cooling mechanism can no longer remove excessive heat. 	<ul style="list-style-type: none"> Hot, dry, red skin. Fast pulse. Headache or dizziness. Later stages - pass out or have convulsions.

Appendix E – Heat Response Guidance Table

The relative humidity is assumed to be 40% to ensure conservative guidance for CPC’s normal operating conditions.

Moderate physical work, un-acclimatized worker	Response	Moderate physical work, acclimatized worker, or light physical work un-acclimatized worker.
Temperature (°C/°F)		Temperature (°C/°F)
24-27/75-81	<ul style="list-style-type: none"> Supply water to workers as needed. 	29-31/84-88
28-29/82-84	<ul style="list-style-type: none"> Post heat stress alert notice. Encourage workers to drink extra water. Ensure workers are able to recognize symptoms. 	32-33/89-92
30-32/86-90	<ul style="list-style-type: none"> Post heat stress warning notice. Remind workers that they need to drink extra water. Ensure workers are trained to recognize symptoms. 	34-35/93-95
33/91	<ul style="list-style-type: none"> Provide 15 minutes relief per hour Provide adequate cool (10-15°C/ 50-59°F) water Remind workers to drink at least 1 cup (250 mL) of water every 20 minutes. Workers with symptoms should seek medical attention. 	36/96-97
34/92-93	<ul style="list-style-type: none"> Provide 30 minutes relief per hour in addition to the provisions listed previously. 	37/98-99
35-36/94-97	<ul style="list-style-type: none"> If feasible provide 45 minutes. relief per hour in addition to the provision listed above If a 75% relief period is not feasible then stop work until the temperature drops from extreme ranges 	38/100
37/98 and over	<ul style="list-style-type: none"> Closely monitor workers. If manageable, stop work until the above ranges for humidex are met. 	39/101 and over

Sources: This table was created by CPC using: Occupational Health Clinics for Ontario Workers (OHCOW) - "Humidex Based Heat Response" and Environment Canada "Humidex from Temperature and Relative Humidity Readings".

Note: At Humidex exposures above 45, heat stress should be managed as per the ACGIH TLV®.

Note: Round measured temperatures up.

LOW
MED
MODERATE
HIGH
EXTREME