SaskPower Operations	**Working in Cold Conditions**	Standard Operating Procedure

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1.0 Persons Affected

This Standard Operating Procedure (SOP) affects:

All employees/contractors that are required to work in cold conditions.

2.0 Purpose

This SOP provides:

Information for working in cold conditions.

3.0 Rationale

This SOP ensures the following:

- To protect employees/contractors and reduce the risk of worker injury from the hazards of working in cold conditions.

4.0 Scope

In-the-Scope of the Procedure

- The procedure includes the following:
  - Roles and responsibilities
  - The signs and symptoms of hypothermia and frostbite
  - The first aid treatment for hypothermia and frostbite
  - Warm up break schedule

Out-of-the-Scope of the Procedure

- The procedure does not include the following:
  - Cold weather maintenance of equipment

5.0 Policies and Regulatory Requirements

This SOP is a result of the following policies, regulations, industry standards, and corporate directives and standards:

Policies:

- Personal Protective Equipment Policy
- Job Hazard Assessment Policy
- Emergency Response Planning Policy
- Hazard Controls Policy
- T&D Working Alone Policy

Regulatory Requirement(s)

Saskatchewan Occupational Health & Safety Regulations

- Part VI, Section 70, Subsection (3)

Other

- SaskPower Safety Rulebook

- Environment Canada

6.0 Roles, Responsibilities and Prerequisites

In-the-Scope of the Procedure Role(s)	Quantity Required	Responsibilities	Prerequisites
Employees/ Contractors	1 or more	1. Consider temperature before starting work	1. Understand and follow this SOP.

7.0 Tools and Equipment

Tools and Equipment and Quantity Required:

- First Aid/Emergency Kit
- Thermometer or other source to determine the current temperature

8.0 Planning and Preparation Checklist

Things to Check Before Starting the Procedure:

☐ Complete Hazard and Risk Assessment

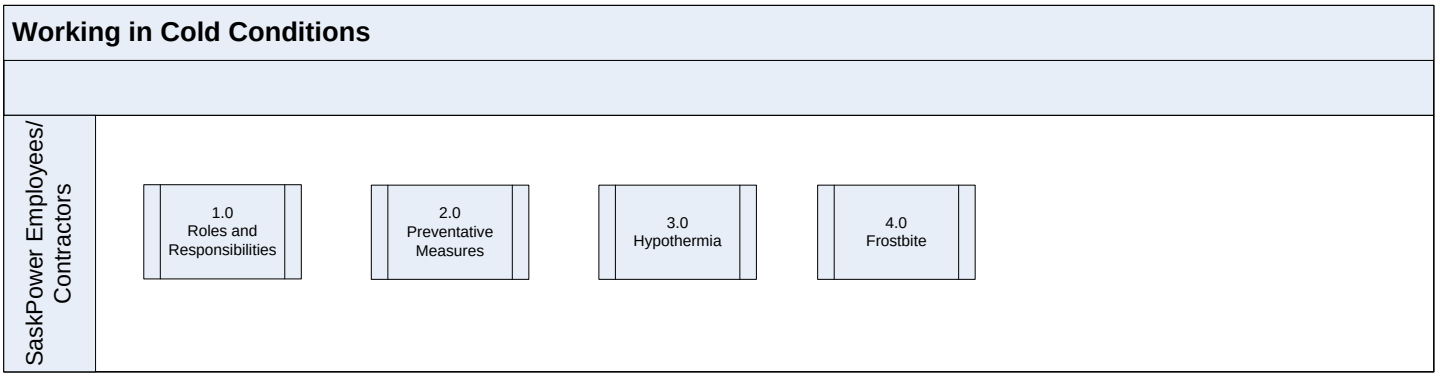
☐ Applicable Personal Protective Equipment (PPE) is available and in good condition

☐ Appropriate clothing for conditions to be worked in

☐ Method of Communication while working alone

9.0 Procedure

High Level Flowchart



The Procedure

NOTE: A plan for working in cold conditions begins with the identification of the cold exposure hazards during a hazard and risk assessment. All work will be performed within the thermal conditions guidelines of *The Saskatchewan Employment Act, 2014.*

1.0 Roles and Responsibilities

1.1 Employees roles and responsibilities

1.1.1 Employees shall review and follow these roles and responsibilities:

- *Follow applicable work practices in accordance with this procedure and facility/site requirements*
- *Wear appropriate PPE*
- *Ensure they take adequate warm-up breaks*
- *Notify their Supervisor if they become aware of factors or circumstances where they feel the measures taken to ensure their safety while exposed to cold stress are inadequate*
- *Follow working alone policy and communication checks when working in extreme cold conditions*

1.2 Managers and Supervisors Roles and Responsibilities

1.2.1 Managers and Supervisors shall review and follow these roles and responsibilities:

- *Support employees in resolving cold stress issues*
- *Manage employee and contractor cold stress compliance*

1.3 Corporate Safety

1.3.1 Corporate Safety shall review and follow these roles and responsibilities:

- *Provide support in the implementation and use of this SOP*
- *Monitor implementation and use of this SOP*
- *Provide support in developing recommendations to reduce the risk of cold stress*

1.4 Contractors

1.4.1 Contractors shall:

- *Meet or exceed the requirements of the SaskPower Contractor Health & Safety Management System, SaskPower Safety Management System and follow applicable work practices in accordance with this SOP and facility/site requirements*

2.0 Preventive Measures

2.1 Preventive Measures and Barrier Controls

2.1.1 SaskPower shall implement a combination of the following barrier controls to reduce the risk and exposure to employees/contractors and work to ensure that mechanisms are in place to identify, assess, control, and monitor the potential hazard and risk

- ***Engineering Controls*** *- often can eliminate the hazard and should be considered. Engineering controls for working in cold conditions such as equipment design (heating hand controls, designing machines and tools to be operated with gloves/mitts) and heating systems*
- ***Administrative Controls*** *- effective in reducing risks and exposures through training, work scheduling, rotating work schedules and pace of work, additional employees, increasing frequency and duration of warm up/rest breaks, getting workers acclimatized, move equipment to be worked on inside*
- ***PPE*** *- where engineering or administrative controls are not feasible or practicable, the use of PPE is necessary. Equipment will be selected in accordance with all other applicable codes*
- ***Clothing*** *- employees shall protect themselves from cold weather by wearing appropriate winter wear, clothing selections shall be made in accordance with all other SOPs*
- ***Emergency Supplies and Equipment*** *- if traveling in car, truck, all terrain vehicle or snowmobile ensure you carry an approved emergency kit, for extended trips, or work in remoter areas, additional cold weather equipment may be required*

NOTE: Layering of clothing is the most effective insulation in cold conditions

3.0 Hypothermia

NOTE: Hypothermia is a condition in which the body's core temperature drops below that required for normal metabolism and body functions. Hypothermia can be life threatening.

3.1 Signs and Symptoms of Hypothermia

3.1.1 Employees shall review and understand signs and symptoms of hypothermia:

- *Increasing slowness of physical and mental response*
- *Stumbling, cramps and shivering*
- *Slurring of speech*
- *Impaired vision*
- *Unreasonable behavior or irritability*
- *Increased pulse and respiration (as long as the body can still respond to shivering)*

3.2 Hypothermia Treatment

3.2.1 Employees shall review and understand the treatment of hypothermia:

- *Remove worker from the cold*
- *Remove any wet clothes and wrap worker in blanket(s) and apply external heat source like heater or body heat from others. Cover the head and neck*
- *Do not rewarm too quickly as this may cause heart problems*
- *Give warm liquids if the person is alert*

4.0 Frostbite

Note: Frostbite is the medical condition in which localized damage is caused to skin and other tissues due to freezing

4.1 Signs and Symptoms of Frostbite

4.1.1 Employees shall review and understand signs of frostbite:

- ***First Degree**, is called frostnip and is the earliest sign of frostbite and only affects the surface of the skin, which is frozen. At the onset, there is itching and pain, and then the skin develops white, red, and yellow patches and becomes numb, it can be easily treated with warm hand (no rubbing) or blowing warm breath on spot, and fingers by holding them under armpit, for toes remove footgear and apply heat gradually*
- ***Second Degree**, if freezing continues, the skin may freeze and harden, but the deep tissues are not affected and remain soft and normal. Second-degree injury usually blisters 1–2 days after becoming frozen. The blisters may become hard and blackened, but usually appear worse than they are. Most of the injuries heal in one month, but the area may become permanently insensitive to both heat and cold.*
- ***Third and Fourth Degree**, if the area freezes further, deep frostbite occurs. The muscles, tendons, blood vessels, and nerves all freeze. The skin is hard, feels waxy, and use of the area is lost temporarily, and in severe cases, permanently. The deep frostbite results in areas of purplish blisters which turn black and which are generally blood-filled. Nerve damage in the area can result in a loss of feeling. This extreme frostbite may result in fingers and toes being amputated*

4.2 Frostbite Treatment

4.2.1 Employees shall review the following to understand the treatment of frostbite:

- *Seek medical care promptly*
- *Rewarm the affected area gradually using warm water or body heat*
- *Do not break blisters. Protect them with dry dressings*
- *The decision to thaw is based on proximity to a stable, warm environment (truck or building), if rewarmed tissue ends up refreezing, more damage to tissue will be done, excessive movement of frostbitten tissue can cause ice crystals that have formed in the tissue to do further*

damage, splinting and/or wrapping frostbitten extremities are therefore recommended to prevent such movement, for this reason, rubbing, massaging, shaking, or otherwise applying physical force to frostbitten tissues in an attempt to rewarm them can be harmful

- *Do not use direct heat from heating pads, radiator, or fires*

Work Warm-Up Schedule for Outdoor Activities

Environment Canada reports wind chill factors and/or equivalent temperatures. If only this information is available, warm-up breaks should begin when wind chill reaches -32 C (1750 watts per square meter).

NOTE: This information applies to any 4 hour period. Warm-up breaks are assumed to provide 10 minutes in a warm environment. These guidelines apply to workers wearing dry clothing.

<table>
<tr><th colspan="3">Sunny Sky</th><th colspan="3">Sunny Sky</th><th colspan="3">Sunny Sky</th></tr>
<tr><th>Wind</th><th colspan="2">16 km/h (10mph)</th><th>Wind</th><th colspan="2">24 km/h (15mph)</th><th>Wind</th><th colspan="2">32 km/h (20mph)</th></tr>
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Wind Chill below zero</th><th>Max. work Period</th><th>Number of breaks</th><th>C
Wind Chill below</th><th>Max. work Period</th><th>Number of breaks</th><th>C
Wind Chill below</th><th>Max. work Period</th><th>Number of breaks</th></tr>
<tr><td>37 to 39</td><td>75 Minutes</td><td>2</td><td>39 to 42</td><td>55 Minutes</td><td>3</td><td>41 to 43</td><td>40 Minutes</td><td>4</td></tr>
<tr><td>41 to 43</td><td>55 Minutes</td><td>3</td><td>43 to 45</td><td>40 Minutes</td><td>4</td><td>45 to 47</td><td>30 Minutes</td><td>5</td></tr>
<tr><td>44 to 47</td><td>40 Minutes</td><td>4</td><td>47 to 49</td><td>30 Minutes</td><td>5</td><td rowspan="3">49 and below</td><td colspan="2" rowspan="3">Non-emergency work shall stop</td></tr>
<tr><td>48 to 50</td><td>30 Minutes</td><td>5</td><td rowspan="2">51 and below</td><td colspan="2" rowspan="2">Non-emergency work shall stop</td></tr>
<tr><td>51 and below</td><td colspan="2">Non-emergency work should stop</td></tr>
</table>

This reference found at: "Domino.doc-Document Profile" for Document Management Criteria

DANGER: All non-emergency work should **STOP** when the wind chill reaches -51C.

Windchill – Air temperature is not the only measure of how cold it is. Wind velocity combines with air temperature to create a windchill that magnifies the cooling effect on exposed human skin. For example, a calm-air temperature of -20° Celsius poses little danger, but the same temperature in a 50-kilometre per hour wind will chill as quickly as a calm air temperature of -30° Celsius. Wind, therefore, adds to the effect of low temperature and causes the body to cool more rapidly or hastens the freezing of tissue. Figure 1 shows the relationship between air temperature and wind chill. These equivalent chill temperatures are applicable if your clothes and skin are dry. When you are wet, cold injury can result at much warmer temperatures.

FIGURE 1

Wind Chill Calculation Chart

		Air Temperature (°C)											
		5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
Wind Speed (kph)	5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
	10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
	15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
	20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
	25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-68
	30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-70
	35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-72
	40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-72
	45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-74
	50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-75
	55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-76
	60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-77
	65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
	70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80

Frostbite Guide

Low risk of frostbite for most people
Increasing risk of frostbite for most people in 10 to 30 minutes of exposure
High risk for most people in 5 to 10 minutes of exposure
High risk for most people in 2 to 5 minutes of exposure
High risk for most people in 2 minutes of exposure or less

10.0 Acronyms, Definitions and Symbols

Acronyms and Abbreviations

N/A

Definitions

Approved Emergency Kit - Approved emergency kits are stocked in SaskPower Central Stores

Acclimatized - The process in which an individual adjusts to a gradual change in environment.

Symbols

N/A

11.0 Components

The following is a list of components for this SOP which can be accessed through the SOP System:

Component Name	Component Type	Component Description	Location of Component
Procedure for Working in Cold Conditions Flowchart	Flowchart	High Level Flowchart for the procedure	SOP Online: Working in Cold Conditions

12.0 Owner

Owner
Operations and Maintenance Director - Kevin Schwing

13.0 References

References	Location of Resource
- SaskPower Safety Rulebook	Safety Net
- Environment Canada	www.ec.gc.ca
- Cold Environments - Working in the Cold	www.ccohs.ca/oshanswers/phys_agents/cold_working.html
- Wikipedia	en.wikipedia.org
- Extreme Hot or Cold Temperature Conditions	http://www.ccohs.ca/oshanswers/phys_agents/hot_cold.html
- Northwest Territories Transportation	http://www.dot.gov.nt.ca/_live/pages/wpPages/home.aspx