	<b>SEVERE WEATHER</b> ALL-AOA-00-000-HST-0015	<b>Retention Code:</b> CG01 - CA
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## Document History

Date	Approved by	Change Summary
February 2020	David Reaich	Usability Mapped – Issued for Use

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## Severe Weather

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### Purpose

This Severe Weather Guideline provides defense recommendations to help minimize risk of injury to personnel during periods of actual or anticipated severe weather.

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## 1. Work Planning

### Defense Actions

During hazard assessment processes, consider defense actions for the following hazards as applicable:

- High winds
- Thunderstorms
- Hail/snowstorms
- Tornadoes
- Flooding
- Forest Fire and smoke.

### Weather Information

Weather Information and forecasts should be monitored from the following resources:

- Environment Canada (weather reports and alerts)
- Visual Observations in the area



**NOTE:** Environment Canada issues weather watches and warnings which can support work planning activities.

### At-Risk Locations

Examples of at-risk locations during thunderstorms or other severe weather are as follows:

- Tall structures (i.e. communication towers, flag poles, light plants)
- Ungrounded metal structures or buildings
- Pipelines and tank farms
- Cranes
- Areas in immediate proximity to process structures

### Safe Locations

Examples of safe locations to seek refuge during extreme weather include:

- Large metal frames and enclosed structures that are grounded.
- Lightning protected buildings
- Vehicles
- Pipe racks

## 2. Severe Weather

### Wind related Severe Weather

The following table outlines examples of wind related severe weather with associated response and recommended actions:

Weather	Local Communication	Actions
Sustained Wind >35 km/h (22 mph) Beaufort No. 5	Wind Warning for Crane Work	<ul style="list-style-type: none"> <li>Secure whip lines</li> <li>Lower cranes</li> </ul>
Wind forecast >56 km/h (35 mph) / Beaufort No. 7 in next 24 hours	High Wind Watch	<ul style="list-style-type: none"> <li>Monitor Wind</li> <li>Note areas of concern (loose items, equipment tie downs, housekeeping)</li> <li>Follow manufacture's requirements for equipment use.</li> </ul>
Sustained Wind >56 km/h (35 mph) / Beaufort No. 7 lasting for 1 hour or more	High Wind Warning	<ul style="list-style-type: none"> <li>Secure Loose items</li> <li>Tie down equipment</li> </ul>
Sustained Wind of 88.5 km/h (55mph) / Beaufort No. 9	Not safe to continue work	<ul style="list-style-type: none"> <li>At risk workers must seek shelter.</li> </ul>
Sever Storm forecast in 3-8 hours. E.g. Thunderstorm, heavy rain, hail, wind, tornadoes, winter storm	Storm Watch Issued	<ul style="list-style-type: none"> <li>Monitor weather</li> <li>Continue work</li> <li>Follow warm up schedule in low temperatures</li> </ul>
Severe Storm projected over site	Storm Warning Issued	<ul style="list-style-type: none"> <li>Secure/remove loose materials</li> <li>Secure whip lines or lower cranes</li> <li>Secure or close all open vessels, pipe, electrical boxes</li> <li>Secure scaffold Stabilize equipment under construction</li> </ul>
Tornado forecast	Tornado Watch	<ul style="list-style-type: none"> <li>Secure material and equipment</li> </ul>
Tornado Spotted	Tornado Warning	<ul style="list-style-type: none"> <li>Secure whip lines / lower cranes</li> <li>Relocate Workers to Safe Area</li> </ul>

**Cold Related Severe Weather**

During periods of cold weather review the Wind Chill Chart. Plan work according to chart and follow threshold for work/warm-up in Section 5.

**Flood Related Severe Weather**

The following table outlines examples of wind related severe weather with associated response and recommended actions:

Weather	Local Communication	Actions
Flood of waterways is possible	Flood Watch Issued	<ul style="list-style-type: none"> <li>• Stay clear of flood prone areas</li> <li>• Do not walk through moving water</li> <li>• Do not drive through flooded areas</li> <li>• Be aware of possible downed power lines</li> </ul>
Flooding of waterways and low-lying areas is occurring	Flood warning issued	<ul style="list-style-type: none"> <li>• Stay clear of flood prone areas</li> <li>• Do not walk through moving water</li> <li>• Do not drive through flooded areas</li> <li>• Be aware of possible downed power lines</li> </ul>

### 3. Lightning Protocol

#### Flash/Bang (F/B)

The F/B method is used which states that for every count of 5 seconds from the time of seeing the lightning strike to hearing the associated thunder, the lightning is one mile away.

The following example provides F/B related to Distance:

F/B	Distance
10	3.2 km (2 mi)
20	6.4 km (4 mi)
30	9.6 km (6 mi)

#### Activation of the Lightning Protocol

The lightning protocol will be activated for a F/B less than 30.

The local work supervisor may permit low risk work (non-crane or at height activities) at F/B >15.

#### Communication of Lightning Protocol

When activated, communication of lightning protocol to affected workers will be completed by local communication methods (e.g. radio, phone intercom).

#### Suspension of Work Activities

When the lightning protocol is activated, the following work activities must be suspended:

- Crane work and hoisting
- Elevated Work activities
- Confined Space Entries
- Work on or near water
- Work occurring outside of grounded building and vehicles

#### Work activities permitted














When the lightning protocol is in effect, the following work activities are permitted:

- Walking at ground level under a pipe rack.
- Moving to and from buildings and vehicles
- Work in grounded locations

#### Return to Work Criteria "All-Clear"

When the All-Clear is given, FLHAs, PJHAs, and/or local permits must be reviewed before returning to work.

## 4. Beaufort Scale

Beaufort Number	Wind Speed	Seaman Term		Effects on Land
0	<1.6 km/h (1 mph)	Calm		Calm, smoke rises vertically.
1	1.5-4.8 km/h (1-3 mph)	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	6.4-11.2 km/h (4-7 mph)	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	12.8-19.3 km/h (8-12 mph)	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	20.9-28.9 km/h (13-18 mph)	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	30.5-38.6 km/h (19-24 mph)	Fresh Breeze		Small trees begin to sway.
6	40.2-49.8 km/h (25-31 mph)	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	21.5-61.2 km/h (32-38 mph)	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	62.7-74.0 (39-46 mph)	Fresh Gale		Twigs and small branches broken off trees.
9	75.6-86.9 (47-54 mph)	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	88.5-101.3 km/h (55-63 mph)	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	103.0-115.9 km/h (64-72 mph)	Storm		Very rarely experienced on land usually with widespread damage.
12	≥117.4 km/h (73 mph)	Hurricane Force		Violence and destruction.



## 5. Wind Charts

WIND CHILL CHART										
		Ambient Temperature (°C)								
		4	-1	-7	-12	-18	-23	-29	-34	-40
Wind km/h	Velocity mph	Equivalent Chill Temperature (°C)								
<b>Calm</b>										
0	0	4	-1	-7	-12	-18	-23	-29	-34	-40
8	5	3	-3	-9	-14	-21	-26	-32	-38	-44
16	10	-2	-9	-16	-23	-30	-35	-43	-50	-57
24	15	-6	-13	-20	-28	-36	-43	-50	-58	-65
32	20	-8	-16	-23	-32	-39	-47	-55	-63	-71
40	25	-9	-18	-26	-34	-42	-51	-59	-67	-76
48	30	-16	-19	-22	-36	-44	-53	-62	-70	-78
56	35	-11	-20	-29	-37	-46	-55	-63	-72	-81
64	40	-12	-21	-29	-38	-47	-56	-65	-73	-82

Adapted from: Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio

**Little danger** in less than one hour exposure of dry skin

**DANGER** – Exposed flesh freezes within one minute

**GREAT DANGER** – Flesh may freeze within 30 seconds

**Maximum danger** of false sense of security

THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT *											
Air Temperature Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
° C (approx)	° F (approx)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease			Non-emergency work should cease				
-43° to below	-45° & below	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	

Source: Adapted from Threshold Limit Values (TLV) and Biological Exposure Indices (BEI) booklet; published by ACGIH, Cincinnati, Ohio, 2008.