	SEVERE WEATHER OLS-HSE-PRC-5033	Retention Code: CG01 - CA
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1.0 Purpose

This Severe Weather Procedure helps minimize risk of injury to people working outside of on, or in immediate proximity to at risk locations during severe weather.

This Procedure does not however address severe weather equipment operation and journey management.

This Procedure applies to all Oil Sands worksites owned or operated by ConocoPhillips Canada Resources Corp. (CPC).

2.0 Hazards to Mitigate

Hazards include, but are not limited to, the following:

- High winds (e.g. blowing debris).
- Thunderstorms (e.g. lightning strikes).
- Hail/ snow storms (e.g. extreme cold temperatures, icy conditions).
- Tornadoes (e.g. equipment damage, injury to personnel).
- Flooding (e.g. equipment damage, unsafe ground conditions).
- Forest fire and smoke.

3.0 Procedure-Specific Roles and Responsibilities

3.1. CPC Representative

Mitigate the effects of severe weather.

- Evaluate weather conditions that could negatively affect workers.
- Disseminate information to appropriate recipients.
- Establish and execute action plans to deal with severe weather.
- Issue severe weather watches and warnings (via the control room in operating facilities). In facilities with a control room, cellular phone/radio communication will be used.
- Withdrawing and reissuing permits, if work is stopped at site. See Pre-Job Hazard Assessment procedure.
- Initiate worksite evacuation, if necessary.
- Analyze results of executed action plans relating to incidents and emergencies.

4.0 Procedures

Severe weather is unpredictable—responses must be tailored accordingly.

4.1. Weather Information Resources

Resources to obtain information include:

- Environment Canada (e.g. weather reports and alerts).
- Local weather reports.
- Visual observations in the area.

Environment Canada issues alert bulletins for a variety of weather hazards (e.g. winter storms, freezing rain, severe thunderstorms, snowfall, tornado, etc.). See Environment Canada's Public Alert Criteria website.

4.2. Notification Flowchart

A site-specific flowchart must be developed to ensure effective and timely communication of severe weather information. It should include specific-site personnel and contact information.

4.3. Watch and Warning Response Stages

There is a two-stage general response for severe weather. Each stage triggers actions to mitigate possible effects.

4.3.1. Watch Stage (moderate risk)

Watch is the first stage of the response. Workers are alerted to the danger from severe weather, typically weather which will arrive within three to eight hours.

This stage requires workers to immediately take some preliminary initial defense actions to protect themselves and property.

Storm watch will be issued via radio in accordance with the site-specific procedure. In the case of operating facilities this should be done by the control room only (channel must be included in the site-specific flowchart).

4.3.2. Warning Stage (high risk)

Warning is the second stage. Workers are put on a more urgent alert with imminent risk of severe weather.

This stage also requires immediate escalation of defensive actions and may require worksite evacuation.

Storm warning will be issued via radio in accordance with the site-specific procedure. In the case of operating facilities this should be done by the control room only (channel must be included in the site-specific flowchart).

4.4. At Risk/Safe Locations

4.4.1. Thunderstorms

Examples of at risk locations:

- Isolated structures (e.g. communication towers, flag poles, light plants, substations, air monitoring stations).

- Metal structures/buildings (if not grounded).
- Pipelines.
- Cranes.
- Employees working outside of in immediate proximity to process structures.
- Tank farms.
- Surveying activities.
- Dewatering activities.
- Drilling/coring activities.

Examples of safe locations:

- Large metal frames and enclosed structures.
- Lightning protected buildings.
- Fully enclosed metal vehicles (windows closed).
- Pipe racks at grade.

Workers in grounded work areas are considered safe and can remain on the job.

4.4.2. Other Severe Weather

Examples of at risk locations:

- High wind exposure areas.
- Elevated work areas.
- Inside trenches or excavations (cold/flooding).

Examples of safe locations:

- Inside buildings or hoardings.
- Areas sheltered from the wind or precipitation.

Consider possible changes in PPE and/or clothing requirements. See Personal Protective Equipment specification.

4.5. Severe Weather Response

The following table provides a more detailed description of responses to various types of severe weather. Potential actions should be evaluated by the most senior site representative for applicability.

Severe Weather Response

Weather	General Response	Specific Actions	Evacuation	Resume Work
High winds forecasted to rise above 56 km/h (35 mph)/Beaufort No. 7 in the next 24 hours. See Appendix C – Beaufort Scale	High wind watch issued for area surrounding site.	<ul style="list-style-type: none"> • Monitor wind speeds. • Note areas of concern: loose items; crane work; equipment that must be tied down; housekeeping, etc. • Suspend crane activity. • Review manufacturer’s recommendations for continued operation of equipment. 	N/A	N/A
Sustained wind speeds of 56 km/h (35 mph) or higher lasting for 1 hour or longer.	High wind warning issued for area surrounding site.	<ul style="list-style-type: none"> • Secure loose items. • Tie down equipment. • Perform housekeeping. See Appendix D for guidelines. 	N/A	When winds have weakened and are under 56 km/h (35 mph).
Sustained wind speeds of 88.5 km/h (55 mph)/Beaufort No. 9 or higher detected.	High wind exceeds threshold for safe work.	<ul style="list-style-type: none"> • At risk workers must seek shelter. Local work supervisor may elect to suspend work activities at lower wind speeds. See Appendix D for guidelines. 	Evacuate workers.	When winds have weakened and are under 56 km/h (35 mph).
Lightning is detected (using F/B technique) within 30 s or 10 km (6 mi.) of site.	Lightning watch issued.	<ul style="list-style-type: none"> • Continue routine work if site can be secured and workers can safely exit before the weather front arrives. • Begin to secure items at jobs that require extra time or are at heights (tie-ins, crane lifts, confined space work, work at height, etc.). • Suspend crane/hoisting, elevated work activities. 	N/A	N/A

Weather	General Response	Specific Actions	Evacuation	Resume Work
Lightning is detected (using F/B technique) within 15 s or 5 km (3 mi.) of site.	Lightning warning issued.	<ul style="list-style-type: none"> • Perform only essential/non-deferrable outdoor work needed to maintain safe operations. • Ensure worksite is safe. • Seek shelter in a grounded area (e.g. safe shelter areas [including E-houses], EHT shelters, pipe racks at grade, I/O buildings, FIC buildings, enclosed vehicle, substantial tent, office trailer). <ul style="list-style-type: none"> ♦ Headache shacks and hording built out of scaffolding are not grounded. ♦ Workers in a grounded area will remain on the job. ♦ Workers are not permitted in smoking areas. • Suspend all crane lift operations and confined space entries. 	N/A	Once the flash-bang differential is greater than 30 seconds. If work is called off or normal work hours, end during lightning warning, encourage workers to stay in shelter until weather conditions permit safely leaving. All workers will return to work when the all clear is announced.
Severe storm is expected within the next 3 to 8 hours. <ul style="list-style-type: none"> • Thunderstorms. • Heavy rain. • Hail. • High winds. • Tornados. • Winter storms with ice, snow or extremely low temperatures. 	Severe storm watch issued.	<ul style="list-style-type: none"> • Send out weather status update. • Monitor weather. • Continue routine work activities as long as jobs can be secured and workers can safely exit the job site prior to the arrival of the storm. • Ensure that in the event of extremely low temperatures or high winds that a work/warm-up schedule is followed. See Appendix E for guidelines. 	N/A	N/A

Weather	General Response	Specific Actions	Evacuation	Resume Work
Severe storm projected to pass over site.		<ul style="list-style-type: none"> • Define responsibilities and determine priorities. • Complete as many low cost/low risk steps as possible. • Communicate plans to management. • Secure/remove the following: trash containers, port-a-cans, loose materials, water coolers and stands, project signs, banners, material in outlying areas or storage yards, etc. • Develop methods to secure tall structures. • Secure whip lines or lower cranes. • Determine methods to secure or dismantle erected scaffolds. • Dismantle or secure spark containment/wind break enclosures. • Secure or close all open vessels, pipe, electrical boxes and equipment, etc. • Secure tie downs of all buildings and portable facilities. • Stabilize high structures or those under construction. • Review plans and consult with vendors to delay deliveries. • Develop work list with priorities for after the storm. Prepare schedule to release non-critical workers. • Prepare method to provide information to workers regarding return-to-work schedule. 	Should be evaluated.	

Weather	General Response	Specific Actions	Evacuation	Resume Work
Tornado may strike in the next several hours.	Tornado watch issued for area surrounding site.	<ul style="list-style-type: none"> Secure all loose material and equipment. Secure whip lines or lower all cranes. Shut down all non-critical equipment. 	Consider whether evacuation of workers is required.	
Tornado spotted or Doppler radar indicates a circulation which could spawn a tornado.	Tornado warning issued for area surrounding site.	<ul style="list-style-type: none"> Secure whip lines or lower all cranes. 	Evacuate workers. (They may have already been released during tornado watch.)	
Flood of local waterways is possible.	Flood watch issued for area surrounding site.	<ul style="list-style-type: none"> Stay clear of flood areas if at all possible. Do not walk through moving water. Do not drive through flooded areas. Be aware of flooded areas that may be electrically charged from downed/damaged power lines. 	N/A	
Flooding of small streams, streets and low-lying areas occurring or is expected soon.	Flood warning issued for area surrounding site.	<ul style="list-style-type: none"> Stay clear of flood areas if at all possible. Do not walk through moving water. Do not drive through flooded areas. Be aware of flooded areas that may be electrically charged from downed/damaged power lines. 	Should be evaluated.	

Weather	General Response	Specific Actions	Evacuation	Resume Work
Forest fire in the area. Site may be affect by smoke and ash.	Forest fire watch issued for area surrounding site.	<ul style="list-style-type: none"> • Send out fire hazard season status • Continue routine work activities • Develop schedule to monitor wildfire status map • Refer to Emergency Response Plan for predetermined shut-in timeframes (Danger Approaching/Imminent Danger) • Use Wildfire Notification/Evacuation Distances calculator to determine distance of a fire to the facility for shut down/evacuation purposes. 		
Forest fire in the immediate vicinity of the site.	Forest fire warning issued for area surrounding site.	<ul style="list-style-type: none"> • Issue wildfire warning to all personnel • Begin facility controlled/soft shut-in procedures when fire has reached the notification distance as determined by the wildfire distances calculator • Shelter in place only if current fire conditions impact egress route • Conduct air monitoring for Occupational Health & Safety Ambient Air Quality guidelines (smoke particulates matter) 		

4.5.1. Lightning Protocol

- Based on the F/B technique, findings will be communicated to the ERT.
 - Any site personnel can inform/notify the ERT of lightning in the area.
- All notifications with respect to **executing** a lightning stand down on the CPF will come from the ERT. Wellpads or remote areas can call a localized stand down which will come from the shift supervisor or designate for the specific area. Notifications will be via phone intercom and Surmont All Call radio channel.
 - If a stand down hasn't been called by the ERT, work groups utilizing the F/B technique can review their work plans, seek shelter and notify the ERT.
- All workers will remain at their safe locations until it is announced that it is safe to return to normal work activities.
- ConocoPhillips personnel will monitor conditions. Once the F/B is greater than 15 seconds, work can resume outside of grounded areas with the exception of crane/hoisting and elevated work activities. Once the F/B is greater than 30 seconds, all activities can resume.
- The "all-clear" will be communicated by the ERT for the CPF, and the Shift Supervisor or delegate for Wellpads and remote areas via phone intercom and Surmont All Call radio channel.
- In the event that a crew or worker feels they are working in an unsafe environment, they should report to their foreman/supervisor and an assessment of the situation will be done.
- Permit to work must be re-issued if work is not resumed within 1 hour of the stand down.

NOTE: It is acceptable to move short distances from vehicles to grounded buildings.

4.6. Return to Work

The CPC Site Manager and, if applicable, the Contractor Site Manager will coordinate to determine acceptable return-to-work and damage assessment processes. When deemed safe to do so, workers can return to work. To do so:

- Assess damage.
- Establish responsibilities to address any damage/unsafe conditions.
- Determine timing to resume work if immediate return to work is not possible.

See guidance above for scenario-specific return to work guidance.

4.7. Critical Work

The Site Manager has the authority to authorize critical work during times of high risk severe weather due to emergency situations and/or the necessity to secure the plant or associated components for safety reasons.

5.0 References

- Advances in Lightning Detection from the Canadian Forest Service
- Canadian National Lightning Detection Network (CNLDN)
- Environment Canada
- National Lightning Safety Institute (NLSI/NOAA, lightningsafety.com)
- North American National Lightning Detection Network (NANLDN)

- Cold Weather Exposure procedure ALL-HSE-PRC-145.
- Personal Protective Equipment specification ALL-HSE-SPC-643.
- Pre-Job Hazard Assessment procedure ALL-HSE-PRC-387.
- Wildfire Shut-In and Evacuation Calculator.

6.0 Document Retention

Retain records in accordance with the ConocoPhillips Document Retention Schedule.

Record	Owner	Classification	Retention
Hazard Assessments	BUs and Functional Departments as applicable	HE11	Event

Note: Contractors must retain procedure-specific records.

Appendix A – Definitions






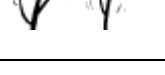







Contractor	A person or company that signs an agreement to provide services to CPC but is not in an employee relationship.
Environment Canada Weather	Website providing official weather warning, current conditions, forecasts and weather models for public and marine areas in Canada.
Flash/Bang (F/B) technique	For every count of five seconds from the time of seeing the lightning strike to hearing the associated thunder, the lightning is one mile away. Example: F/B of 10 = 2 miles, F/B of 20 – 4 miles, etc.
Flood warning	Second stage of the response to a flood forecast. Flooding of small streams, streets and low-lying areas is occurring or is expected soon.
Flood watch	First stage of the response to a flood forecast. Flooding of local waterways is possible.
Heavy snowfall warning	Second stage of the response to a heavy snowfall forecast. Snowfall as follows is expected: <ul style="list-style-type: none"> • At least 10 cm (4 in.) in a 12-hour period, OR • 15 cm (6 in.) in a 24-hour period.
Heavy snowfall watch	Second stage of the response to a heavy snowfall forecast. Snowfall is not expected to be significant, but may affect road conditions and visibility.
High risk	Thunderstorms are forecasted to be numerous or widespread in coverage (60-100% chance). Atmospheric conditions support continuous and intense cloud-to-ground lightning strikes.
High wind warning	Second stage of the response to a high wind forecast. Sustained winds with the following characteristics are blowing: <ul style="list-style-type: none"> • 56 km/hr (35 mph) or higher lasting for one hour or longer OR • 93 km/hr (58 mph) or higher for any duration of time.
High wind watch	First stage of the response to a high wind forecast. Wind speeds meeting the criteria of high wind warning are expected within the next 24 hours.
Lightning warning	Second stage of the response to report of lightning in vicinity of site. Lightning is within 11 km (7 mi.) of the site.
Lightning watch	First stage of the response to report of lighting in general vicinity of site. Lightning is within 24 km (15 mi.) of the site.
Lightning (Low Risk)	Isolated or widely scattered thunderstorms (20% chance). Atmospheric conditions do not support cloud-to-ground lightning strikes.

Moderate risk	Thunderstorms are forecast to be scattered in coverage (30-50% chance). Atmospheric conditions support frequent cloud-to-ground lightning strikes.
Severe weather warning	Second stage of the response to a forecast of severe weather. Severe weather with one of the following characteristics is expected imminently : <ul style="list-style-type: none"> • Hail at least 2 cm (0.75 in.) in diameter or larger. • Wind gusts to 93 km/hr (58 mph) or greater. • Tornado.
Severe weather watch	First stage of the response to a forecast of severe weather. Severe weather with one of the following characteristics is expected within the next three to eight hours : <ul style="list-style-type: none"> • Hail at least 2 cm (0.75 in.) in diameter. • Wind gusts to 93 km/hr (58 mph) or higher. • Tornado.
Tornado warning	Second stage of the response to a report that a tornado has been spotted or that Doppler radar indicates a thunderstorm circulation which can spawn a tornado.
Tornado watch	First stage of the response to a forecast that a tornado may arrive in the next several hours.
Warning	Second stage of the response to severe weather conditions. Severe weather is imminent or in progress.
Watch	First state of the response to a severe weather forecast. Severe weather will arrive within the next three to eight hours.
Weather advisories	Bulletins issued when severe weather is expected, not to the extent of requiring a “warning,” but for situations in which weather could still cause significant inconvenience.
Winter storm warning	Second stage of the response to a forecast that any two separate types of winter storms (heavy snowfall conditions and wind chill conditions, etc.) are expected in the next 12 to 24 hours.
Winter storm watch	First stage of the response to forecast that any two separate types of winter storms (heavy snowfall conditions and wind chill conditions, etc.) are expected within the next 36 hours. A watch for a single winter storm event is not needed, for example, for only a wind chill or only a heavy snowfall. However, if a forecaster believes that there will be significant winter storm of any kind, as winter storm watch may be implemented.

Appendix B – Revision Record

Section	March 16, 2016	Previous Information	Change Impact
4.5.1	Added Lightning Protocol		Low – protocol was already being used

Appendix C – 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.

Appendix D – 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)								
Calm										
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 ↓							
-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 ↓			

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