



Adverse Weather Working Guideline

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The Policy Management System

To meet its business, regulatory and social responsibilities TCL maintains a policy management system.

This comprises operating principles, policies, standards, procedures and guidelines, together referred to as Policy Documentation, which are made available to Employees through the Policy Centre on the Todd intranet.

Alignment with the Group’s Operating Principles

This Standard aligns with the Operating Principle of: Creating Value

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1 Introduction

1.1 Description

This document describes the Todd Energy Ltd guidelines on the controls and precautions required to maintain a safe system of work during adverse weather.

1.2 Purpose

The primary objective in the preparation of these procedures has been the protection of personnel, assets, and reserves from any form of incident. Consideration is given throughout to existing company safe operating procedures e.g., Simultaneous Operations and various operating procedures / work instructions.

While the procedures attempt to cover all eventualities, it must be realised that the scope must remain within the guidelines for the Person In Charge (PICWS) of the worksite to appraise and take action on a situation as it develops.

1.3 Background

Many operational activities can be affected by adverse weather, and there have been incidents resulting in fatal injuries, within the industry, which can in part be attributed to adverse weather conditions.

1.4 Objective

To identify the hazards and determine the controls to be put into place during adverse weather conditions.

1.5 Scope

The Guidelines apply to all onshore plants, pipelines and facilities operated by Todd Energy. This procedure also gives guidance in respect of Todd contracted Mobile Accommodation Units (MAUs), and onshore drilling units. Contractors shall have their own policies for adverse weather working and these should be reviewed by Todd Energy prior to contract award with the most stringent policy being adopted for the contractor's activity.

1.6 Use of the Document

This document states the approach to be adopted at operating locations to ensure that a safe system of work is maintained during adverse weather.

Installation Specific Weather Limits should consider the location and type of worksite, the nature of jobs performed, and the time required to secure the worksite before the onset of adverse weather. In the absence of site-specific weather limits the guidance given in the Appendices of this document, should be used. Variations from the guidance require an Operating Variation Control Procedure to be raised and entered in Todd Asset Intellect.

To allow consistent application of adverse weather precautions, the weather limits should be in measurable quantities, e.g., Wind speed limit to restrict general external personnel movement.

In many cases the triggers are a two-level criterion, the first allowing the work to proceed, with increased awareness, controls, or additional precautions at the discretion of the supervisor and the second, where the particular activity will stop. For some locations the criteria given in the Appendices may be too high to allow work to continue safely and all locations must therefore critically examine the guidance to confirm their applicability before they are used.

1.7 Definitions and Abbreviations

Adverse Weather – environmental conditions which may affect people, equipment, or facilities to such an extent that precautionary measures must be taken to safeguard the facility or to maintain a safe system of work.

Adverse weather includes snow, ice, fog, hail, lightning, heavy rain, high winds. In certain circumstances low/no wind can also be adverse weather. Weather conditions can change quickly and the effects of short-term variations such as wind gusts must be considered.

2 Activities/Procedure

2.1 Meteorological Equipment Weather - Forecasting and Weather Reports

The ability to take action to minimise the hazards of adverse weather is dependent on the accuracy and timeliness of weather forecasts. It is therefore critical that due attention is given to these weather forecasts, and that adequate instrumentation is available at the operating location in order that decisions on precautions and controls can be based on accurate information.

The minimum level of equipment required on a normally manned installation is as follows:

- Sensors for wind speed and direction, air temperature and barometric pressure
- A processing/display unit and data recording device.
- For installations not normally manned and without the above-mentioned equipment, weather forecasts should be monitored via a reputable site such as MetService.

Appendix 1 (Table 1) gives an indication of the weather conditions which will be experienced at the triggers given in the Appendices.

2.2 Activity Planning and Execution

Weather conditions are most likely to affect external work, or work which involves the movement of personnel, equipment, or materials in external areas.

The control of work activities is the direct responsibility of supervision at all levels at the location. The effect of adverse weather must be considered in the planning and execution of the task. The weather forecast should be reviewed at the Daily Community Meeting or the equivalent (e.g., Daily Drilling call) so that any precautions which are required are discussed and necessary arrangements put in hand.

Actions to secure the workplace, equipment, etc shall commence in good time to achieve the required degree of security prior to the weather deteriorating to a point where this activity in itself becomes hazardous.

Note: Inspections during severe weather shall be avoided, thus relying solely on the pre-work being effective.

Where activities are scheduled, or have to be performed, which are particularly weather dependant, the pre- planning and the control of work must refer to the prevailing weather and the predicted weather development. Limiting weather parameters when work should be suspended or contingency plans actioned, shall be defined e.g., Project Safety Plans, Project bridging documents etc. On a work task level, such controls shall be referenced in the permit and associated Job Hazard Analysis (JHA).

JHA and Toolbox talks should include prompts to ensure that weather limiting parameters are explained, that actions to be taken in the event of deteriorating weather forecast are specified, and that the person to authorise the cessation or continuation of work in marginal conditions is identified.

It must be considered that routine jobs may take longer due to the adverse weather, and lead to fatigue of personnel. The combined effect of wind and low temperatures may lead to the onset of hypothermia if adequate protection is not available. Further information in this subject area is detailed in -Appendix 2.

2.3 Contingency Planning

Where contingency plans are prepared to cover adverse weather, they should be critically examined to ensure that they can in fact be implemented.

For many activities the contingency plans are identified in- Guidance A (Table 3)

2.4 Movement of Personnel during Adverse Weather

An assessment of hazard to personnel during adverse weather should be carried out. In addition, supervisors responsible for the area should continue to monitor frequently external and other vulnerable areas throughout periods of adverse weather and put in place any necessary control measures to minimise risk to individuals.

In severe weather there will be occasions when all personnel will have to remain inside. Any operations which cannot safely be continued without personnel access to weather affected areas shall be suspended.

Weather Watch, carry out damage assessment, or undertake meteorological observations, should only be performed when it is safe to do so and should not be carried out by an unaccompanied individual.

When there is or has been severe weather events, the night shift Kapuni Control Room Operator should send out one of the three preformatted text messages (see below) to the relevant site staff and contractors advising them of the weather conditions and suggest they wait for daylight before travelling to site. These text messages should be sent out at around **05:45hrs**. These text messages will be sent out to predetermined recipients via the current Text Messaging system used for contacting the site neighbours.

Note: The Todd Energy Duty Coordinator will also receive the texts as a heads up.

2.5 Adverse Weather Warning Text Messages:

2.5.1 Rain Warning Message

This is an adverse weather warning from the Todd Energy Kapuni Control Room – You are advised that there has been extensive rain causing flooding/slips in some areas. If you must travel to site, you are advised to delay your trip until daylight if possible or otherwise take extreme caution on the roads.

2.5.2 Ice/Snow Warning Message

This is an adverse weather warning from the Todd Energy Kapuni Control Room – You are advised that there have been very low temperatures in the area with ice or snow in some areas. If you must travel to site, you are advised to delay your trip until daylight if possible or otherwise take extreme caution on the roads.

2.5.3 Wind Warning Message

This is an adverse weather warning from the Todd Energy Kapuni Control Room – You are advised that there have been very high winds in the area, beware of wind gusts, downed power lines, trees and debris over the roads, you are advised to delay your trip until daylight if possible or otherwise take extreme caution on the roads.

2.6 Winds

2.6.1 Mean Wind Speed

The average speed calculated from a 10-minute sample.

2.6.2 Gust Wind Speed

The highest gust speed over 3 seconds. On average the gust wind speed is approximately 1.3 x Mean Wind Speed.

If a particular activity has a quoted wind speed limit of say 45 knots, it needs to be made clear if this is a mean wind speed or a gust wind speed, because these variables result in different values.

2.6.3 Maximum Wind Gust Speed

The maximum Wind Speed as measured during the previous 20 minutes.

Appendix 1: General Guidance for Adverse Weather Precautions

Table 1 - Beaufort Scale: Specifications and Equivalent Speeds

Force	Descriptions	Specifications for use on Land	Equivalent Speed at 10m from Surface		
			Knots	Km per Hour	Metres per Second
			LIMITS	LIMITS	LIMITS
0	Calm	Calm: smoke rises vertically	<1	<1	0.0 - 0.2
1	Light air	Direction of wind shown by smoke drift, but not by wind vanes	1 - 3	1 – 6	0.3 – 1.5
2	Light breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind	4 – 6	7 – 12	1.6 – 3.3
3	Gentle breeze	Leaves and small twigs in constant motion; wind extends light flag	7 – 10	13 – 19	3.4 – 5.4
4	Moderate breeze	Raises dust and loose paper; small branches are moved	11 – 16	20 – 30	8.0 – 10.7
5	Fresh breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters	17 – 21	31 – 39	8.0 – 10.7
6	Strong breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty	22 – 27	40 – 50	10.8 – 13.8
7	Near gale	Whole trees in motion; inconvenience felt when walking against wind	28 – 33	51- 61	13.9 – 17.1
8	Gale	Breaks twigs off trees; generally, impedes progress	34 – 40	62 – 74	17.2 – 19.9
9	Strong gale	Slight structural damage occurs (chimney pots and slates removed)	41 – 47	75 – 87	20.0 - 24.4
10	Storm	Seldom experienced inland; trees uprooted considerable structural damage occurs	48 – 55	88 – 102	24.5 – 28.4
11	Violent storm	Very rarely experienced accompanied by widespread damage	56 – 63	103 - 117	28.5 – 32.6
12	Hurricane		≥ 64	≥118	≥ 32.7

Appendix 2: Cold Stress

Thermal protection to ensure comfort and well-being in the cold is determined by personal and environmental factors. Personal factors include bodily activity (metabolic rate), clothing insulation, and duration of exposure. Environmental factors are ambient air temperature, wind velocity, radiant temperature of surroundings and the presence of rain or snow.

Equivalent chilling temperature (degrees centigrade):

Table 2 - Cold Stress

Wind Speed	Actual Thermometer Reading					
	Knots	m/s-1	+10	+5	-1	-7
4.3	2.2	+9	+3	-3	-9	-15
8.7	4.5	+5	-2	-9	-16	-23
13.0	6.7	+2	-6	-13	-21	-28
17.3	8.9	0	-8	-16	-23	-32
21.8	11.2	- 1	-9	-18	-26	-34
26.0	3.4	- 2	-11	-19	-28	-36
30.3	15.6	- 3	-12	-20	-29	-37
34.8	17.9	- 3	-12	-21	-30	-38

Cooling power of wind on exposed flesh expressed as equivalent chilling temperature under low wind speed (1.8m/s) conditions (adapted from ACGIH, 1989).

From the above it can be seen that the following combinations of ambient air temperature and wind: +5 degrees and 35 knots, * -1 degree and 15 knots, -7 degrees and 5 knots have an equivalent chilling temperature of approx. -12 degrees centigrade under low wind speeds.

The type of activity will also determine the hypothermic effect e.g., heavy physical work will generate greater body heat than a task such as calibrating instruments where fine motor skills are required and therefore fingers will also be exposed to the elements.

Normal action taken to prevent cold stress is to provide insulation by layers of clothing to prevent the cooling effect of the wind directly on the skin. The combined effect of moisture and cold is even more severe in that any water vapour, either rain or perspiration, eventually condenses out and eliminates the insulation effect of any trapped air. Breathable fabrics overcome this problem by allowing the passage of water vapour whilst retaining an effective wind break.

Appendix 3: Guidance A – General Activities

Table 3 - General Activities Guidance

TRIGGER	PRECAUTION
Wind	
25 Knots Mean Wind Speed at Working Area	<ul style="list-style-type: none"> • Consider secure loose items and use nets on skips, etc to prevent wind dislodging contents where safe to do so. • Cease rope access work to prevent pendulum effects upon rope access technicians. • Make worksites safe and cease scaffolding activities. • Cease handling sail-like objects e.g., tarpaulins/scaffold boards, due to difficulty in handling such material. • Minimise access via ladders or work at heights due to difficulty of climbing in exposed locations. • Advise greater caution in Toolbox Talks, including the effects of windage on foul weather clothing. • Secure container doors to prevent uncontrolled movement.
40 Knots Mean Wind Speed at Working Area	<ul style="list-style-type: none"> • No access to scaffold structures in exposed locations due to the increased risk of collapse. • Suspend Wireline/Well Entry activities/coiled tubing. • Consider emergency response scenarios for the effects of wind on emergency equipment e.g., effect on water spray patterns.
50 Knots Mean Wind Speed at Working Level	<ul style="list-style-type: none"> • Advise personnel to avoid wind affected areas to prevent injury to personnel.
Precipitation	
Heavy Rain	<ul style="list-style-type: none"> • Minimise vehicle movements to essential use only due to increased risk of incidents. • Consider impact on Emergency response scenarios for the effects of higher river levels / localized flooding and faster river flowrates. Consider postponing WOW activities until after heavy rain event has passed through and any downstream impact has subsided.
Snow Forecast	<ul style="list-style-type: none"> • Avoid unnecessary journeys that could lead to being snowbound.
Snow/Ice Accumulation	<ul style="list-style-type: none"> • Minimise vehicle movements to essential use only due to increased risk of incidents. • Person in charge of facility to make decision to close offices for non-essential personnel in severe snow conditions. • Clear walkway areas of accumulations to minimise injury to personnel. Where not possible, cordon-off the area. Minimise work at heights.
Poor Visibility	<ul style="list-style-type: none"> • Review all operations where visual contact is essential for safe operation. • Cease lifting operations if dogmen are unable to clearly see crane hook, due to increased risk of injury to personnel
Temperature	
Wind Chill Conditions	<ul style="list-style-type: none"> • Minimise individual's exposure and provide additional clothing if necessary. Personnel should recognise tasks may take longer to achieve due to fatigue.
<-1°C	<ul style="list-style-type: none"> • Monitor availability of services/utilities/firewater. Check winterisation e.g., lagging, inhibition, and trace heating. • Consider draining lines likely to be affected by freezing to minimise damage.

<i>Electrical Storms</i>	
Lightning and/or Thunder	<ul style="list-style-type: none">• Restrict access to external areas due to potential for injury to personnel.• Suspend Wireline/Well Entry activity/coiled tubing.• Restrict planned operational venting.• Suspend crane operations, retract and rack boom.• Consider access to columns

Appendix 4: Guidance B – Crane Operations

Table 4 - Crane Operations Guidance

TRIGGER	PRECAUTION
Wind	
20 Knots Mean Wind Speed at Working Area	<ul style="list-style-type: none"> • Ensure tag lines are attached due to “sail effect”. • Increase frequency of inspection rope lay/sheaving of cranes.
30 Knots Mean Wind Speed at Working Level	<ul style="list-style-type: none"> • 30 Knot is based on a Todd limit however this may be lower based on crane limit. • Suspend mobile crane operations. If there is any concern about the conditions on the day. • Final decision will be made by the Crane Operator, Rigger, and Permit issuer consulting together.
35 Knots Mean Wind Speed at Working Level	<ul style="list-style-type: none"> • Stop all crane operations, retract, and rack boom.
Precipitation	
Rain	<ul style="list-style-type: none"> • Consider surface load bearing (onshore mobile cranes) in preplanning of crane usage.
Snow/Ice Accumulation	<ul style="list-style-type: none"> • Keep roadways clear of accumulations to avoid slip hazards (land-based cranes). • Accumulations on crane boom may cause increased crane loading. If safe to do so, remove. If not cease crane operations.
Poor Visibility	<ul style="list-style-type: none"> • Unless being directed by radio to perform an on-installation lift, the crane operator should be able to see dogman, deck crew, hook, or load clearly. Otherwise cease operation.
Electrical Storms	
Lightning and/or Thunder	<ul style="list-style-type: none"> • Suspend crane operations, retract, and rack boom.

Appendix 5: Guidance C — Work Over Water (WOW)

Table 5 - Work over Water Activities Guidance

TRIGGER	PRECAUTION
Wind	
25 Knots Mean Wind Speed at Working Area	<ul style="list-style-type: none"> • Cease rope access work to prevent pendulum effects upon rope access technicians. • Cease handling sail-like objects e.g., tarpaulins/scaffold boards, due to difficulty in handling such material. • Minimise access via ladders or work at heights due to difficulty of climbing in exposed locations. • Advise greater caution in Toolbox Talks, including the effects of windage on foul weather clothing. • Consider emergency response scenarios for the effects of wind on water surface / water way drift rate
40 Knots Mean Wind Speed at Working Level	<ul style="list-style-type: none"> • No Work over Water or related Work at Height activities are permitted in exposed locations due to the increased risk of injury. Secure any loose equipment / materials to prevent injury from flying debris.
Precipitation	
Poor Visibility	<ul style="list-style-type: none"> • Review all activities where visual contact is essential for safety.
Heavy Rain	<ul style="list-style-type: none"> • Minimise vehicle movements to essential use only due to increased risk of incidents. • Consider impact on Emergency response scenarios for the effects of higher river levels / localized flooding and faster river flowrates. Consider postponing WOW activities until after heavy rain event has passed through and any downstream impact has subsided.
Snow/Ice Accumulation	<ul style="list-style-type: none"> • Clear walkway areas of accumulations to minimise injury to personnel. Where not possible, cordon-off the area. • Cease any Work at Height activities associated with WOW
Temperature	
Wind Chill Conditions	<ul style="list-style-type: none"> • Minimise individual's exposure and provide additional clothing if necessary. Personnel should recognise tasks may take longer to achieve due to fatigue.
<5C Ambient Temperature	<ul style="list-style-type: none"> • No Work over Water activities are permitted below this temperature in exposed locations due to the increased risk of injury. • Consider freezing impact on rigging and other safety equipment likely to be affected by low temperatures to minimise damage.
Electrical Storms	
Lightning and/or Thunder	<ul style="list-style-type: none"> • Cease Work over Water activities whilst an Electrical lightning storm event is active to minimise risk of injury and damage.



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