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| Contingency Event Reclassification Criteria – Targeted Consultation Update |
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Incorporating Indistinct Events into Contingency Event Management Framework

**December 2022**

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# Introduction

This document provides an update and an opportunity for feedback on AEMO’s targeted consultation to amend the National Electricity Market (NEM) reclassification criteria to incorporate indistinct events, following the AEMC’s determination in March 2022 of the *National Electricity Amendment (Enhancing operational resilience in relation to indistinct events) Rule 2022*.

The reclassification criteria under National Electricity Rules (**NER**) clause 4.2.3B are incorporated in AEMO’s Power System Security Guidelines (**SO\_OP\_3715**). These Guidelines are being updated to account for the NER amendments made by the AEMC rule, which requires that updated criteria are published by 9 March 2023.

This targeted consultation commenced in May 2022 and is being coordinated through the following industry working groups: Power System Security Working Group (**PSSWG**) and Control Room Operations Working Group (**CROWG**).

# Consultation Progress

Table 1 sets out details of the meetings, discussions and actions from the working groups and the NEM Operating Committee (**NEMOC**).

1. Meetings, discussion and actions

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| --- | --- | --- | --- |
| Date | Meeting | Discussion | Action/Feedback |
| 13 May 2022 | **PSSWG** | The meeting was primarily allocated to developing a comprehensive list of potential indistinct risks that would need to be managed through contingency management framework. | AEMO to review potential indistinct events for real-time ‘operational awareness’. If visible to control room staff, categorise potential actions for further discussion. |
| Generator reclassification during abnormal conditions - general view is that indistinct events will most likely affect the networks themselves. | Australian Energy Council representative to identify any generator risks that could be considered “indistinct” in nature in consultation with market participants.  |
| 3 Jun 2022 | NEMOC | NEMOC was updated on the progress of the contingency event reclassification criteria consultation to incorporate indistinct events. | None |
| 12 Aug 2022 | PSSWG | PSSWG agreed on the list of abnormal conditions (indistinct events) for inclusion into reclassification criteria based on availability of operational awareness (refer to Appendix A). The group commenced discussion of triggers and actions required to manage indistinct events in real time. It was noted that cloud cover events are emerging risk for the NEM and WEM and for this reason they will be included in review of the criteria. However, it was also noted that there is insufficient operational awareness (at present) to manage these events in real time.  | AEMO to continue to develop triggers and actions for inclusion into the criteria based on feedback received from the PSSWG.  |
| 16 Sep 2022 | NEMOC | NEMOC was updated on the progress of the reclassification criteria consultation to incorporate indistinct events. | None |
| 21 Oct 2022 | PSSWG (out of session meeting for reclassification criteria consultation) | AEMO presented analysis of indistinct events, triggers, and actions for inclusion into reclassification criteria. The group agreed that AEMO should engage with subject matter experts for weather related risks to understand if there are any recent developments to provide enhanced operational awarness for managing abnormal conditions in real time (e.g. detection of microbursts).  | AEMO to continue to engage with subject matter experts on weather related risks.  |
| 8 Nov 2022 | **CROWG** | AEMO provided an overview of indistinct events to be included in the reclassification criteria providing the summary of risks, triggers and actions.The group explored whether specific risk based triggers could be considered, but this requires enhancements to operational awareness and would be considered in future reviews.  | None.  |
| 17 Nov 2022 | **PSSWG** | Refinment of triggers and actions in Appendix A.AEMO advised that engagement with weather agencies and relevant subject matter experts is an ongoing process to improve situational awareness of weather related risks.  | Documentation of triggers and actions pending further consultation. |
| 9 Dec 2022 | **NEMOC** | NEMOC was updated on the progress of the contingency event reclassification criteria consultation to incorporate indistinct events. | None |

# Next steps for consultation

AEMO is updating SO\_OP\_3715 and other relevant procedures to incorporate management of indistinct events into existing contingency management framework. Updated procedures will be published by 9 March 2023 when the NER amendments take effect. Table 2 outlines the final key deliverables and timeline.

1. Deliverables and timeline

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| --- | --- |
| Deliverables  | Dates |
| PSSWG, market participants and other stakeholders are invited to provide feedback on the list of indistinct events outlined in Appendix A, including management actions for reclassified contingency events. | 31 January 2023 |
| After considering feedback, AEMO publishes amended SO\_OP\_3715. | 9 March 2023 |

# Feedback

A list of the indistinct events considered by AEMO and the working groups for inclusion in the reclassification criteria is provided in Appendix A of this document, including a description of the proposed management actions that may be expected following reclassification for those abnormal conditions.

If you wish to provide feedback in relation to the proposed amendments to the reclassification criteria, please contact ReclassificationCriteria@aemo.com.au by no later than 31 January 2023.

# Appendix A – Indistinct Events Risks, Triggers and Actions

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| --- | --- | --- | --- | --- |
| Event Category | Indistinct Event Description | Risks | Triggers / Assessment Process | Actions / Impacted Plant |
| Extreme Weather | Widespread bushfires. | * High intensity fires / smoke within or near the power line easements leading to: operation of protection systems and disconnection of multiple power lines; damage to plant (e.g. towers, poles, insulators, lines).
 | * Fire locations / extent of coverage / direction of movement.
* Proximity to assets.
* Fuel within or near easements.
 | Actions/measures to be taken include and are not limited to the following: * Constraining the dispatch of generation.
* Limiting inter-connector flows.
* Directing generation for the purpose of managing system strength / voltage / inertia requirements.
* Directing hydro generation to operate in synchronous condenser mode.
* Procuring additional FCAS.
* Reconfiguring the network.
* Recalling planned network outages.
* Recalling planned generation outages.
* Maximising reactive reserves.
* Invoke business continuity plans.
* Instruct NSP to manage power system security within a region / subregion (frequency, voltage etc).
* Implement temporary limits in SCADA.
* DPV curtailment.
* Load shedding.

Actions specific to solar storms include and are not limited to: * Recalling planned network outages (powerlines and transformers).
* Maximise reactive reserves across the power system.
* Requesting TNSPs to advise of revised transformer ratings, allowing the transformer to operate at cooler temperatures, to prepare for the onset of stray flux heating from the GIC.
* Requesting TNSPs to advise of their intent to take out of service transformer(s) due to the high impact of the GIC.
* In circumstances where a low intensity GMD is received but GIC is at alarm levels, as supplied by the TNSP, AEMO will take actions as if a severe Geomagnetic Disturbance (GMD) advice has been received. Table 6 in Power System Security Guidelines (SO\_OP\_3715) provides the summary of BOM notifications, timeframes and AEMO actions.

Impacted plant includes and is not limited to:* Transmission assets, the primary focus is on circuits / assets with voltages ≥ 220 kV but this does not exclude assessments being performed for circuits with voltages < 220 kV if there is a material impact on the power system security.
* Generating plant.
* Bidirectional units (i.e. batteries).
* DPV.
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| Dust storms / bushfire ash residue. | * Dust/ash within the powerline easements or build- up of dust/ash on insulators leading to flash over and operation of protection systems and disconnection of multiple power lines; dust/ash build up around generation centres leading to loss of multiple generation plants.
 | * Dust storm location / extent of coverage / direction of movement.
* Proximity to assets.
 |
| Extreme winds (e.g. cyclones / tornados). | * Extreme wind loading on the towers, poles and power lines leading to damage/collapse of electricity transmission/distribution infrastructure. Extreme wind causing damage to generation plant. For wind generation extreme winds are likely to cause wind turbine cut-out.
 | * Extreme wind locations / direction of movements.
* Wind speed.
* Proximity to assets.
 |
| Widespread floods. | * Flooding of solar plantations leading to loss of solar generation. Flooding of tower/pole footings leading to collapse of towers/poles.
 | * Flood locations / extent of coverage / direction of movements.
* Proximity to assets.
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| Landslides. | * Damage to transmission infrastructure following extended periods of heavy rain.
 | * The asset manager identifying a risk.
 |
| Cloud cover impacting solar generation. | * Sudden reduction/pickup in solar output, leading to supply/demand imbalance (challenges of managing power system frequency and voltage within operational limits).
 | PSSWG acknowledges that cloud cover events cannot be currently managed through real time operations. PSSWG to actively work towards mitigation strategies.Future reviews to consider the following:* Location of solar generation REZs / clusters / centres / zones.
* Cloud cover location / size / movements through radar observation or other forecasting methods / alerts that may be available in the future (e.g. monitoring of metro areas with large DPV, large solar generation zones).
* Proximity to assets.
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| Space Weather | Solar storm. | * Coronal mass ejection - Geomagnetic Induced Current (GIC). There are two risks that result from the introduction of GICs to the power system:
	+ Loss of reactive power support, due to harmonic current, combined with increased reactive power consumption by transformers, which could lead to voltage instability and power system collapse, and
	+ Damage to power system assets, typically associated with transformers.
 | * Severe Space Weather Service (SSWS) alerts/forecasts (watch messages) based on solar data only (providing lead times > 12 hours)
* Updated forecasts with increased probability that utilise additional solar wind data but with a decreased warning lead time of only 30-60 minutes.
* The process involves the observation of a coronal mass ejection associated with a solar flare anticipated to impact the Earth within 48 hours.
* Heightened awareness of the power system, by AEMO, Generators and NSPs, is recommended during this period of time.
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| Geological Activity | Earthquake (risk of aftershocks) and Tsunami. | * Shockwaves damaging energy infrastructure.
* Extreme waves causing catastrophic damage to energy infrastructure.
 | * Size of first impact.
* Areas / zones at risk from aftershocks.
* Time of impact.
* Duration etc.
* Speed and height of waves
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| Civil unrest / terror | Large scale protests / unrest / industry strike / act of war. | * Staff walking off jobs impacting operations of the market, power system.
* Damage to plant, humanitarian crisis impacting operations etc.
 | * Size / scale of unrest.
* High risk areas.
* Advice/alerts by Australian Cyber Security Centre.
* AEMO / Participants / Customers cyber security alerts.
* Scale of impact, companywide, industry wide, primary and backup systems.
* Criticality of systems.
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| Cyberattack: TNSP / DNSP / participant impact / customer impact (SCADA, market systems, smart meters etc).  | * Can manifest in different forms, have significant variety in form of penetration and impact, and can be difficult to control and eradicate.
* AEMO/NSP IT infrastructure / communications systems compromised leading to reduced or no visibility of:
	+ key power system parameters, causing plant to operate above safe levels
	+ supply demand balance, causing inability to monitor frequency exposing power system to greater risks during a contingency.
* Widespread loss of load due to smart meter attack.
* Widespread loss of generation.
* Resort to voice communications with market participants / customers.
 | * Advice/alerts by Australian Cyber Security Centre.
* AEMO / Participants / Customers cyber security alerts.
* Scale of impact, companywide, industry wide, primary and backup systems.
* Criticality of systems.
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