RELIABILITY PANEL AEMC

REVIEW

Reliability Panel AEMC

DRAFT REPORT

2022 REVIEWABLE OPERATING INCIDENT GUIDELINE REVIEW

30 JUNE 2022

INQUIRIES

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ABOUT THE RELIABILITY PANEL

The Panel is a specialist body established by the Australian Energy Market Commission (AEMC) in accordance with section 38 of the National Electricity Law and the National Electricity Rules. The Panel comprises industry and consumer representatives. It is responsible for monitoring, reviewing and reporting on reliability, security and safety on the national electricity system, and advising the AEMC in respect of such matters.

RELIABILITY PANEL MEMBERS

Charles Popple (Chairperson), AEMC Commissioner
Stephen Clark, Marinus Link Project Director, TasNetworks
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SUMMARY

1 On 25 March 2022, the Australian Energy Market Operator (AEMO) sent a letter to the Chair of the Reliability Panel (the Panel) proposing five changes to the guidelines for identifying reviewable operating incidents (the guidelines).

2 This draft report commences the review process under clause 8.8.1(a)(9) of the National Electricity Rules (NER). The Panel will be conducting the review in accordance with the terms of reference provided by the Australian Energy Market Commission (AEMC or Commission).

3 The Panel determined to commence a review of the guidelines as it considered AEMO's proposals were justified for further consideration and that other updates to the guidelines also appeared necessary given changes to the NER since the last review of the guidelines in 2012. It is timely to review these Guidelines given the significant transition underway.

4 The Panel has given initial consideration to AEMO's proposed changes as well as additional amendments to address interactions with the AEMC's *Enhancing operational resilience in relation to indistinct events* rule ('indistinct events rule') and recent changes to Queensland (QLD) System Restart Ancillary Services (SRAS) subnetwork boundaries.

5 This draft report considers these changes with the Panel's draft positions set out for stakeholder feedback. The Panel considers its draft positions would, or are likely to, better contribute to achieving the national electricity objective (NEO) and improve the efficiency of the guidelines.

6 The guidelines for identifying reviewable operating incidents inform improvements to the security of the power system

7 The NER require AEMO to review incidents identified in accordance with the guidelines.[1] Reviewable operating incidents are incidents that occur in the power system that have a significant effect on the operation of the power system in terms of system security. Reviewing these events provides the opportunity for AEMO to assess the response of facilities or services and analyse the effectiveness of actions taken to maintain power system security. This review process informs the development of the National Electricity Market's (NEM) security arrangements as well as a process of constant improvement for AEMO and market participants.

8 This paper sets out the Panel's draft positions on AEMO's proposed changes to the guidelines for stakeholder feedback

9 AEMO's letter to the Panel proposed five changes to the guidelines that seek to ensure only necessary reports are produced, improve the efficiency of the guidelines and reduce costs imposed on participants. These proposed changes are to:

- exclude non-credible contingency events where successful auto-reclose occurred and where no other power system security issues are identified

1 NER Clauses 4.8.15(a)(1).

- exclude events where a transmission line trips at one end only, or a single circuit breaker trips and where no other power system security issues are identified
- remove reference to embedded generating units, to clarify and provide discretion for AEMO to review events relating to the simultaneous (or near-simultaneous) trip of multiple generating units
- confirm that AEMO is not required to report on incidents involving the correct or normal operation of under-frequency control schemes where only contracted load blocks are tripped
- show that AEMO is only required to report on incidents involving non-secure or non-satisfactory operation of the power system where critical transmission elements are impacted or affected.

10 The Panel generally agrees with AEMO's proposed changes and considers that AEMO's proposed changes generally would increase the efficiency of the guidelines and ensure only necessary reviews are undertaken and participant costs are minimised. The Panel proposes to amend the Guidelines to reflect the first four of AEMO's changes.

11 However, the Panel is not minded to make the fifth proposal and is seeking further stakeholder feedback on the suggestion to limit AEMO's reporting in respect of non-secure or non-satisfactory operation of the power system to only where critical transmission elements are impacted or affected. This feedback on the materiality and potential impact of the change will inform the Panel's final decision as to whether or not this change is made.

12 This paper sets out the Panel's draft positions on amendments to the guidelines to address changes made by the indistinct events rule and recent changes to Queensland SRAS boundaries

13 The Panel identified the changes made by the indistinct events rule and operational changes made by AEMO since the last Panel review of the guidelines as requiring consideration in the scope of this review. Relevant changes include:

- amendments to the definition of 'contingency event' to include sudden and unplanned changes to the level of output, consumption or flow of plant on the power system; and
- AEMO's amalgamation of the central, south, and north Queensland SRAS subnetworks into a single Queensland wide SRAS subnetwork.

14 The Panel puts forward draft positions on amendments to manage interactions with the indistinct events rule and recent changes to the Queensland SRAS subnetworks to also improve the effectiveness of the guidelines.

15 The Panel has not yet made a decision on how interactions with the indistinct events rule will be managed in the guidelines, and is seeking stakeholder feedback through this draft report to help inform its decision.

16 Following the changes to the QLD SRAS subnetworks, the Panel proposes effectively maintaining the original north, central and south QLD sub-networks as an addendum to the guidelines to ensure major load interruptions in either part of the state are reviewed by AEMO.

17 The Panel's review will be guided by the national electricity objective

18 The Panel will be guided by the NEO in undertaking this review. The Panel has also set out its approach to how it will assess this review. The Panel's approach focuses on considering the trade-off between the costs and benefits of amending the guidelines. The Panel has also been informed by technical advice from AEMO, and feedback from stakeholders.

19 We are after stakeholder input

20 The Reliability Panel invites comments from interested parties on the Panel's draft positions and the proposed changes to the guidelines.

21 Stakeholders can provide feedback by providing a submission to the draft report by **Thursday 28 July 2022**.

22 The Panel may hold a public forum following the publishing of the draft report should stakeholders request it.

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APPENDICES

TABLES

1 INTRODUCTION

The Panel is carrying out this review of the reviewable operating incident guidelines to determine whether amendments or updates are required. The purpose of this report is to set out the Panel's proposed amendments to the guidelines and seek stakeholder submissions on these changes.

This chapter:

- introduces this review of the guidelines, including the process the Panel will follow and how stakeholders can get involved
- introduces the reviewable operating incident framework
- introduces AEMO's proposed changes to the guideline, and
- identifies additional review scope items

1.1 The Panel considers it is timely to review the guidelines

In 2006, the Reliability Panel published guidelines for identifying reviewable operating incidents.[2] The guidelines are used by AEMO in deciding which operating incidents in the power system to review and report on under the review of operating incident framework set out in Clause 4.8.15 of the NER.

There are no specific requirements under the NER for these guidelines to be reviewed, and this is the second review since their establishment. In March 2022, AEMO sent a letter to the Panel Chair proposing five changes to the guidelines.[3] The Panel determined to commence a review of the guidelines as it considered AEMO's proposals were justified for further consideration and that other updates to the guidelines also appeared necessary given changes to the NER since the last review of the guidelines in 2012. The Panel also considered it timely to review these guidelines given the significant transition underway in the sector.

This draft report sets out the Panel's draft positions on the review scope described in section 1.3 for stakeholder feedback. The Panel considers its draft positions would, or are likely to, better contribute to achieving the NEO and improve the efficiency of the guidelines. Additional information on the Panel's assessment framework is provided in Chapter 2.

1.1.1 The review is being conducted following the NER process

This draft report commences the review process under 8.8.1(a)(9) of the NER. The Panel will be conducting the review in accordance with the AEMC's provided terms of reference. The AEMC provided terms of reference for the Panel to undertake this review of the guidelines.[4]

2 The requirement for the Panel to establish the guidelines was introduced to the NER in 2006 as a part of the 'timely information to NEMMCO after operating incidents' Rule change. See AEMC, National Electricity Amendment (Timely information to NEMMCO after operating incidents), February 2006.

3 AEMO's 25 March 2022 letter to the Panel is available on the AEMC's website.

4 The AEMC's 30 March 2022 Terms of Reference for the review of the guidelines for identifying reviewable operating incidents are available on the AEMC's website.

Publication of this draft report commences the Panel's review of the guidelines for identifying reviewable operating incidents, which will be followed by a single-stage consultation with submissions closing four weeks following publication. The Panel may hold a public forum if requested as part of this review. Following consultation with stakeholders, the Panel will publish the final report and amended guidelines on Thursday 29 September 2022.

An indicative timetable for the remainder of the review is set out in Table 1 below.

Table 1.1: **Indicative review timetable**

MILESTONE	DATE
Draft report and guidelines published	Thursday 30 June 2022
Submissions to the draft report close	Thursday 28 July 2022
Final report and guidelines published	Thursday 29 September 2022

1.1.2 We are after your input to feed into the process

The Reliability Panel is seeking feedback and comments from interested parties on this draft and the proposed changes to the guidelines. Submissions are sought by **Thursday 28 July 2022.**

Electronic submissions must be lodged online through the AEMC's website www.aemc.gov.au using the link entitled "lodge a submission" and reference code "REL0085". Our treatment of the content of your submission, including agreed confidential information, is also explained on that page. The submission must be on letterhead (if submitted on behalf of an organisation), signed, and dated.

1.2 Background on the reviewable operating incident framework

Under the NER, AEMO is required to conduct a review of every 'reviewable operating incident' in the power system and publicly report on its findings.[5] Reviewable operating incidents are unusual or 'significant' power system events. These types of power system incidents involve significant deviations from normal operating conditions which impact the operation and security of the power system. Clause 4.8.15 of the NER sets out criteria for AEMO to determine which operating incidents of the power system must be reviewed, with the Panel's guidelines helping to clarify these criteria.

1.2.1 Reviewable operating incidents

AEMO's reporting on reviewable operating incidents allows it to assess the adequacy of the provision and response of facilities or services, and the appropriateness of actions taken to restore or maintain power system security. These reports provide highly valuable information to policy-makers, market bodies, market participants, jurisdictions and the Panel to

5 Clauses 4.8.15(b) and 4.8.15(c) of the NER.

understand system security risks in the NEM. Box 1 summarises what a reviewable operating incident is.

As a key indicator of power system security performance of the NEM over time, AEMO's reports form an essential part of the Annual Market Performance Review (AMPR) of the performance of the system.

BOX 1: NER DEFINITION OF A REVIEWABLE OPERATING INCIDENT

Clause 4.8.15(a) of the NER defines a Reviewable operating incident as:

(1) an incident comprising:

(i) a non-credible contingency event or multiple contingency events on the transmission system; or

(ii) a black system condition; or

(iii) an event where the frequency of the power system is outside limits specified in the power system security standards; or

(iv) an event where the power system is not in a secure operating state for more than 30 minutes; or

(v) an event where AEMO issues a clause 4.8.9 instruction for load-shedding,

being an incident identified, in accordance with guidelines determined by the Reliability Panel under rule 8.8, to be of significance to the operation of the power system or a significant deviation from normal operating conditions.

(2) an incident where AEMO has been responsible for the disconnection of facilities of a Registered Participant under the circumstances described in clause 5.9.5; or

(3) any other operating incident identified, in accordance with guidelines determined by the Reliability Panel under rule 8.8, to be of significance to the operation of the power system or a significant deviation from normal operating conditions;

but does not include an incident in respect of which AEMO is required to conduct a review under clause 3.14.3(c).

1.2.2 Purpose and Objective of the guidelines

The purpose of the guidelines is to promote the objective of these reviews by making sure incidents of significance to power system security are within the scope of what is considered 'reviewable' by AEMO. These guidelines also provide additional clarity and certainty on the review requirement, working to ensure AEMO does not undertake unnecessary reviews.

The NER requires AEMO to review incidents identified in accordance with the Panel's guidelines.[6] The objective of requiring AEMO to conduct incident reviews is not explicit in the

6 NER Clause 4.8.15(a)(3).

NER. However, it is implicit that the focus is system security, given that the operating incident review provisions are contained in chapter four of the NER, which focuses on power system security.

The Panel therefore considers the overarching objective of reviewing operating incidents is to promote the secure operation of the power system. It also provides additional guidance for AEMO on what kind of incidents AEMO should review to promote the secure operation of the power system while avoiding unnecessary costs.

While reviewing operating incidents can lead to power system improvements, they also impose costs on market participants. These costs result from the requirement for participants to take part in reviews and through AEMO's operational costs in conducting these reviews. As such, the guideline clarifies the scope of AEMO's reporting obligations to strike an appropriate balance between investigating incidents to ensure that the power system is operating securely and minimising overall costs.

1.2.3 AEMO operationalisation and reporting process

AEMO must conduct a review of every reviewable operating incident in order to assess the adequacy of the provision and response of facilities or services, and the appropriateness of actions taken to restore or maintain power system security.[7]

AEMO must prepare a report on the review of a reviewable operating incident, and where that report relates to an incident meeting the NER criteria set out above, AEMO must make the report available to registered participants and to the public.

With respect to a report that has been prepared by AEMO that relates to an operating incident involving a non-credible contingency event, the report must include details of how the re-classification criteria were assessed and applied in the context of that non-credible contingency event.[8]

A Registered Participant must co-operate in any review conducted by AEMO including making available relevant records and information.[9]

To help achieve this objective, AEMO's review of each incident considers:

- the nature of the incident;
- the adequacy of the provision and response of facilities or services;
- whether the actions taken to restore or maintain power system security were appropriate; and
- recommended actions to reduce the likelihood or impact of incident recurrence.

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7 Clause 4.8.15(b) of the NER.

8 Clause 4.8.15(ca) of the NER. Reclassification criteria describe the criteria AEMO uses to adjust the technical envelope for normally non-credible contingency events that are judged to have become credible given the presence of abnormal conditions. The reclassification is provided for in Clause 4.2.3A of the NER with the criteria set out in AEMO's power system operating procedures — OP-OP_3715 Power system security guidelines. More information available here.

9 Clauses 4.8.15(e) and 4.8.15(f) of the NER provides for AEMO to request a Registered Participant to provide such information relating to the performance of equipment of that Registered Participant during and after reviewable operating incidents, as AEMO reasonably requires for the purposes of analysing or reporting on the incident.

AEMO's reviewable operating incident reports are available on the AEMO website.[10]

1.3 What is the scope of this review?

The Panel has considered several amendments to the guidelines, with chapters 3 and 4 setting out the Panel's detailed considerations on each of these changes.[11]

1.3.1 AEMO's proposed changes

In March 2022, AEMO sent a letter to the Panel Chair proposing five changes to the guidelines. AEMO's proposed changes to the guidelines aim to allow both AEMO and Network Service Providers (NSP) to better focus resources on incidents that have a significant impact on the power system and warrant investigation. AEMO proposed that the guidelines remove the requirement to review particular types of incidents that AEMO considers have no significant impact on the security of the power system. AEMO considers these changes are in the long-term interests of consumers as they ensure effectively resourced analysis of significant incidents, allow investigative teams more time to identify and formulate recommendations with affected participant input, and will improve the overall timeliness of these reviews.

AEMO's proposed five changes to the guidelines that seek to ensure only necessary reports are produced, improve the efficiency of the guidelines, and reduce costs imposed on participants.[12] These proposed changes are to:

- exclude non-credible contingency events [13] where successful auto-reclose occurred and where no other power system security issues are identified
- exclude events where a transmission line trips at one end only, or a single circuit breaker trips and where no other power system security issues are identified
- remove reference to embedded generating units, to clarify and provide discretion for AEMO to review events relating to the simultaneous (or near-simultaneous) trip of multiple generating units
- confirm that AEMO is not required to report on incidents involving the correct or normal operation of under-frequency control schemes where only contracted load blocks are tripped, and
- outline that AEMO is only required to report on incidents involving non-secure or non-satisfactory operation of the power system where critical transmission elements are impacted or affected.

AEMO's letter setting out its changes, including its rationale will be considered in detail in Chapter 3.

10 AEMO Reviewable operating incident reports, available here.

11 A changed marked version of the guidelines is available on the AEMC's website.

12 AEMO's 25 March 2022 letter to the Panel is available on the AEMC's website

13 Non-credible contingency events are contingency events other than credible contingency events. These are generally considered to be events that are rare in occurrence, such as the combination of a number of credible contingency events occurring at the same time.

1.3.2 Additional review scope items

The Panel is not restricted in the scope of the issues it can consider when reviewing the guidelines. As a part of the review, the Panel has identified several additional issues that impact the guidelines for identifying reviewable operating incidents. The Panel has therefore expanded the scope of the review to also consider:

- The interactions between the guidelines and the *Enhancing operational resilience in relation to indistinct events* rule, and
- 2020 changes to the Queensland SRAS sub-networks.

The Panel has elected to include these items in the scope of the review as it considers the guideline should be updated to reflect NER framework changes that have occurred since the last guideline review in 2012. The Panel is also interested in stakeholder views on whether other additional items should be included in the scope of this review.

2 PANEL'S ASSESSMENT FRAMEWORK

The Panel applies a specific framework when reviewing the guidelines. This chapter sets out the assessment principles and approach that were used to identify the Panel's draft positions, and are proposed for use in identifying the Panel's final positions on changes to the guidelines. Stakeholder feedback is sought on applying this approach to the Panel's final determination.

2.1 The national electricity objective

In determining and considering changes to the Guidelines, the Panel has considered whether any amendments to the guidelines would, or are likely to, contribute to the achievement of the NEO, which is set out in Box 1.

BOX 2: THE NATIONAL ELECTRICITY OBJECTIVE (NEO)

"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –

- price, quality, safety, reliability, and security of supply of electricity; and
- the reliability, safety, and security of the national electricity system."

Specifically, the Panel has considered how any proposed amendments would impact the efficient operation of electricity services. The Panel particularly identifies the price, safety and security of the supply of electricity as the particularly relevant factors of the NEO to be considered.

2.2 Assessment principles

The Panel has applied the following specific principles in considering the impact of proposed changes that are outlined in the following chapters on the long term interests of consumers of electricity, particularly in respect of the price and the safety and security of the supply of electricity.

- **Whether the guidelines act to promote the secure and resilient operation of the NEM power system** — As set out in Chapter 2, the Panel considers the overarching objective of reviewing operating incidents is to promote system security and resilience. The security and resilience of the power system is enhanced by understanding system security risks that may compromise the ongoing stable operation of the system consistent with power system security standards. The reviewable operating incident guidelines provides the opportunity for systematic evaluation of the adequacy of processes and systems in place to respond to non-credible operating events.
- **Whether the potential benefits of any amendments to the guidelines are likely to outweigh the costs** — The Panel considers that the long term interests of consumers are served by the efficient reporting of reviewable operating incidents. That

is, when the benefits (holistically considered) exceed the costs of reporting on these incidents. Efficient reporting is critical in balancing the impacts on prices with the benefits associated with the safe and secure supply of electricity across the national electricity system.

- **Whether the transparency of having publicly available AEMO reviewable incident reports are required given other NEM co-ordination and reporting processes** — Public reporting on reviewable operating incidents provides the opportunity to enhance market participant understanding of power system security. The transparency benefits of public reporting however, are limited by the applicability of the information and subject matter being reported. AEMO reporting on reviewable operating incidents that do not enhance market participant understanding, or are duplicating other reporting and communication between relevant parties under other NEM frameworks, may not provide a new benefit and therefore be in the long-term interests of consumers.

2.3 Approach to considering the efficiency of reviewable incident reporting

The Panel's assessment framework involves the following approach to specifically consider the costs and benefits of conducting reviewable incident reporting in its decision-making.

2.3.1 Potential benefits

AEMO's operating incident reports are the only comprehensive source of information that is publicly available on the cause and impacts of unusual operating incidents on the power system.

With respect to power system security, we consider the current key benefits of AEMO's operating incident reviews to be:

- AEMO obtains information from its reviews on incident causes and impacts that can be used for internal purposes — this includes consideration of whether to reclassify a non-credible contingency as credible.
- Information is shared with the market to inform decision-making relevant to the secure operation of plant and networks.
- Actions are recommended for market participants to undertake to reduce the likelihood and/or impact of incident recurrence — the implementation of these actions is monitored and publicly reported on by AEMO.
- Data is obtained and stored in a central repository to enable statistical analysis to identify any underlying trends in power system performance; and
- Assurance is provided to market participants that incidents are monitored and investigated.

There can be additional reliability and broader market benefits from AEMO's incident reporting, however, the Panel's key focus when considering amendments to the guidelines has been on power system security. This is consistent with the broader objective of incident reviews outlined in section 1.2.2 of this report.

The financial benefits of AEMO's reviewable incident reporting are difficult to estimate but relate to a reduction in unserved energy resulting from non-credible security-related events given enhancements to procedures, systems, and responses to such events implemented following a reviewable operating incident investigation and report. As the focus of the reviewable operating incident reporting framework is on effective learning following these events, the Panel has focused its consideration on the magnitude of benefits arising from effective learning by AEMO, NSPs, jurisdictions, other market bodies, and participants in estimating benefits.

2.3.2 Potential costs

The primary costs of incident reviews and reporting relates to the staff required to investigate and report on incidents. AEMO has advised the Panel that incident reviews currently involve an equivalent of around one and a half full-time employees throughout the year. There are also costs for other market participants in allocating time and resources to provide information to AEMO to assist in their incident investigations and to provide feedback on AEMO's draft reports.[14]

Table 2.1 provides an indication of the process involved in undertaking a standard incident review; outlining the steps involved and the time estimated for each step. The Panel notes that this table outlines the time for reporting on a typical or standard reviewable operating incident. AEMO's resourcing and reporting time frames can increase significantly depending on the complexity and magnitude of the reviewable incident, in both the time required to investigate the incident and seek information from participants.

Table 2.1: Staff requirements for a standard reviewable operating incident reporting

PARTY	TASK	TIME
AEMO	Identifying the incident as reviewable, requesting information, completing the incident review including follow up queries and report drafting.	30 hours (Engineer)
AEMO	Reviews and approvals	4 hours (Manager, General Managers, Comms).
Transmission Network Service Provider (TNSP)	Producing information for AEMO, reviewing AEMO report and responding to queries approximately.	Approximately 4 hrs additional effort (noting that TNSPs generally undertake internal investigations). Investigations into non-reviewable events, therefore

14 Under NER clause 4.8.15(g), AEMO must allow 20 business days for registered participants to respond to such requests for information.

PARTY	TASK	TIME
		this is the incremental time rather than total time.
	Total time estimated:	38 hours

Source: AEMO Feedback on power system incident reporting, 25 March 2022

An estimate of the savings achieved from AEMO's proposed changes is provided in Chapter 3.

It is also likely that there may be savings for participants and policy-makers by making these changes. These savings would arise from the decreased amount of reporting participants are required to respond to and provide information as part of AEMO's investigation. Likewise, less reporting requires less work for policy-makers to remain abreast of security risks that may not be of significance to the system.

3 DRAFT POSITIONS ON AEMO'S PROPOSED CHANGES

This chapter sets out the Panel's draft positions on AEMO's proposed changes to the guidelines. AEMO's proposed amendments to the guidelines seek to allow it and NSPs to focus their resources on incidents that have significant impacts on the power system. AEMO proposes that the guidelines remove the requirement to review some types of incidents where there is no significant impact on the power system.

Each change is presented with AEMO's rationale for the departure from existing guideline arrangements. The Panel's considerations and draft position on each change are then presented. We are after stakeholder input and views on these draft conclusions.

3.1 AEMO's proposed changes and Panel considerations

This section presents details on AEMO's proposed changes to the guideline along with the Panel's key considerations on each informing its draft positions presented in chapter 2.

3.2 AEMO proposal 1 — Exclude non-credible contingencies where successful auto-reclose occurred

AEMO's request considers that not all non-credible contingency events impacting critical transmission elements represent significant deviations from normal operating conditions thereby warranting a reviewable incident investigation and report.

Section 1 of the existing guideline defines a reviewable operating incident to be an incident comprising a non-credible contingency event or multiple contingency events that impacts critical transmission elements or that impact the transmission system of multiple NEM regions.[15]

The removal of service of more than one transmission line is currently a non-credible contingency event that would trigger a reviewable incident report under the existing guideline. The Panel understands regions in the NEM utilise auto-reclose systems on critical transmission lines that automatically attempts to re-energise a transmission line element following a fault. The current guideline does not consider whether auto-reclose equipment successfully returns the relevant transmission lines to service when assessing the significance of a non-credible event.

AEMO considers non-credible contingencies that are resolved through normal auto-reclose operation that returns the equipment to service do not have a significant impact on the power system that warrants treatment as a reviewable operating incident. For example, on 26 February 2020 there was a simultaneous single-phase trip and reclose on two 275kV transmission lines in Queensland caused by lightning. Following the lightning strike, both lines were returned to service within six seconds and there was no significant ongoing impact

15 Critical transmission elements are those elements with a nominal voltage of 220 kilovolts or above, or transmission elements of a lower nominal voltage that are critical to the supply of electricity in or between regions.

on the power system.[16] However, under the current guidelines, AEMO is required to produce incident reports on similar incidents on the system.

AEMO proposal 1 — Exclude non-credible contingency events where successful auto-reclose occurred: AEMO propose the guidelines be amended to exclude non-credible contingency events where successful auto-reclose has occurred and where no other power system security issues are identified. AEMO considers these events do not meet the intent of the NER in that the event is not of significance to the power system.

3.2.1 Panel considerations and draft position

The Panel considers this change would maintain the existing benefits of the reviews while helping to remove benign incidents from AEMO's reporting obligations that do not pose a threat to the NEM's security. The amended guidelines would still ensure that non-credible contingency events where auto-reclose was unsuccessful or other security issues were identified are still appropriately reviewed by AEMO.

The Panel considers the long term interests of consumers are served by efficient reporting of reviewable operating incidents. That is when the benefits (holistically considered) exceed the costs of reporting.

Non-credible contingency events that are resolved through successful auto-reclose and where no other power system security issues are identified are unlikely to provide a benefit associated with information sharing and learning between market participants and identification of future actions for market participants to undertake to reduce the likelihood and/or impact of incident recurrence. The Panel interprets 'no other power system security issues are identified' as, at a minimum, the power system remaining in a secure operating state.

The Panel also understands the reviewable operating incident reports are duplicating other operational reporting and communication processes occurring between AEMO and TNSPs that consider such issues and the performance of such systems on an ongoing basis.

The Panel, therefore, considers a reviewable operating report in instances where the power system has operated as designed, through successful auto reclose, is unlikely to represent an efficient use of AEMO and TNSP staff resources or provide valuable learnings in the long term interests of consumers.

The Panel's draft position is therefore to accept AEMO's proposal to remove non-credible contingency events from the scope of future reviews where successful auto-reclose occurred. The Panel has considered AEMO's advice and agrees that incidents, where normal auto-reclose operation returns equipment to service within a few seconds, are not significant events on the power system.

16 AEMO 2020, Reviewable operating incident report — Trip of the Calvale to Stanwell 8873 and 8874 275kV lines on 26 February 2020, report available here.

BOX 3: RELIABILITY PANEL'S DRAFT POSITION — ACCEPT AEMO'S PROPOSAL TO EXCLUDE NON-CREDIBLE CONTINGENCY EVENTS WHERE SUCCESSFUL AUTO-RECLOSE OCCURRED

The Panel proposes to accept AEMO's proposal to amend the guidelines to exclude non-credible contingency events where successful auto-reclose occurred and the system remained in a secure operating state. The Panel considers these incidents are not significant events on the power system, and that this change would help streamline the efficiency of the guidelines to ensure AEMO only undertakes necessary reporting.

3.3 AEMO proposal 2 — Exclude events where a transmission line trips at one end only or a single circuit breaker trips

Section 1 of the existing guideline defines a reviewable operating incident to be an incident comprising a non-credible contingency event or multiple contingency events that impact critical transmission elements or that impact the transmission system of multiple NEM regions.

AEMO is not required to conduct a reviewable operating incident report for contingency events that AEMO considers 'credible' given they are reasonably possible given the surrounding circumstances and therefore accounted for within the technical envelope defined to keep the system in a secure state.[17] In contrast, a non-credible contingency event is any event AEMO considers is not reasonably possible and therefore not accounted for in the technical envelope.[18]

AEMO's request identifies the trip of a transmission line at both ends is considered as a credible contingency and not normally reviewable under the guidelines. However, the trip of a transmission line at one end only is considered by AEMO to be a non-credible contingency and therefore potentially reviewable as AEMO considers, as per clause 4.2.3(b) of the NER, these events to be not reasonably possible on the basis that a transmission line would normally be expected to trip at both ends. For the vast majority of this type of event however, the trip of the transmission line at one end only has no greater impact on the power system than the trip at both ends.

AEMO's request acknowledges that very occasionally there are events where the trip of a transmission line at one end only does have a significant impact on the power system. For example, on 3 October 2013 the trip of a 330kV line at one end resulted in voltage levels at the other end exceeding satisfactory levels,[19]AEMO considers circumstances, where there is a significant impact on the power system, would still trigger a reviewable operating incident reporting obligation through other parts of the guidelines.

17 Clause 4.2.3(b) of the NER

18 Clause 4.2.3(e) of the NER.

19 AEMO 2013, Power system operating incident report — over voltage on Kangaroo Valley 330Kv Busbar on 3 October 2013, report available here

AEMO proposal 2 — Exclude events where a transmission line trips at one end only or a single circuit breaker trips: AEMO proposes the guidelines be amended to exclude events where a transmission line trips at one end only or a single circuit breaker trips and where no other power system security issues are identified. AEMO considers these events do not meet the intent of the NER in that the event is not of significance to the power system.

3.3.1 Panel considerations and draft position

The Panel considers the overarching objective of reviewing operating incidents is to promote the secure operation of the power system by providing additional guidance for AEMO on what kind of incidents it should review, while avoiding unnecessary costs.

Events where a transmission line trips at one end only, or a single circuit breaker trips, are generally only considered non-credible due to their relative probability of occurrence rather than their significance and impact on power system operation. In this case, the Panel does not consider their treatment as reviewable operating incidents to provide a system security benefit that justifies the cost and resources required to investigate and publish a reviewable operating incident report.

The Panel notes AEMO's view that circumstances, where there is a significant impact on the operation of the power system associated with a transmission line tripping at one end only, would also trigger reviewable impact reporting other guideline sections.

The Panel does not consider requiring a reviewable operating incident report when a transmission line trips at one end only, or a single circuit breaker trip, and where no other power system security issues are identified, represents efficient reporting that is in the long-term interests of consumers. As noted in the previous section, the Panel interprets 'no other power system security issues are identified' as, at a minimum, the power system remaining in a secure operating state.

The Panel's draft position is to accept AEMO's proposed amendments to section 1 of the guidelines, to exclude events where a transmission line trips at one end only or a single circuit breaker trips. As this amendment only relates to events where a transmission line trips at one end only or a single circuit breaker trips, 1(a) of the guidelines would ensure major events impacting transmission elements are still reviewed by AEMO.

BOX 4: RELIABILITY PANEL'S DRAFT POSITION — ACCEPT AEMO'S PROPOSAL TO EXCLUDE EVENTS WHERE A TRANSMISSION LINE TRIPS AT ONE END ONLY OR A SINGLE CIRCUIT BREAKER TRIPS

The Panel proposes to accept AEMO's proposal to amend the guidelines to exclude events where a transmission line trips at one end only or a single circuit breaker trips and where the system remained in a secure operating state. The Panel considers these incidents are not significant events on the power system, and that this change would help streamline the efficiency of the guidelines to ensure AEMO only undertakes necessary reporting.

3.4 AEMO proposal 3 — Remove reference to embedded generating units

Section 6(c) of the current guideline makes incidents on the distribution network that impact critical transmission elements reviewable operating incidents. Section 6(c) further specifies the loss of multiple embedded generating units, of which the total capacity exceeds the capacity of the largest generating unit within any region including an affected generating unit, as a reviewable operating incident.

AEMO's request considers the current guidelines do not require AEMO to report on events resulting in the loss of multiple generating units unless the event results in frequency exceeding normal limits or under frequency load shedding, or comprises the trip of embedded generation totalling more than the largest single generating unit in any region.

AEMO considers that other multiple generation contingencies can have a significant impact on the power system and potentially also the market. For example, on 11 April 2020 the trip of a single 220kV transmission line connecting an auxiliary supply transformer at Yallourn Power Station to the Yallourn substation tripped resulting in the unexpected trip of three of the four generating units at Yallourn and four of the six collector groups at the Macarthur wind farm resulting in the loss of 1021 MW of generation.[20]The frequency remained within normal limits only because the Yallourn generating units did not all trip at the same time but rather a few minutes apart.

AEMO chose to review this incident using its discretionary powers under the guidelines noting that they consider the existing guideline does not cover the loss of multiple generating units unless they are embedded. AEMO, therefore, proposes to remove the reference to 'embedded' generation to cover all non-credible generator trips embedded or otherwise.

AEMO proposal 3 — Remove reference to embedded generating units: AEMO proposes the guidelines be amended to require AEMO to review incidents that result in the loss of multiple generating units which are assessed as having a significant impact on a transmission system. AEMO considers this type of event meets the intent of the NER as it can have a significant impact on the operation of the power system.

3.4.1 Panel considerations and draft position

The Panel considers that section 1 of the guideline should apply to the loss of multiple large generators as these represent non-credible contingency events that impact on critical transmission elements. The Panel, therefore, doesn't consider AEMO's proposal to remove 'embedded' from section 6(c) of the current guideline is required for the guideline to appropriately capture multiple generation events.

While the Panel does not identify the same gap as AEMO in respect of non-credible large generation events, it considers the guideline should be as clear and unambiguous as reasonably practicable allowing easy interpretation by all stakeholders. A lack of clarity may

20 AEMO 2021, Reviewable operating incident report — trip of Yallourn generating units 1, 3, 4 and four Macarthur Wind Farm collector groups on 11 April 2020, report available here.

compromise the guidelines' effectiveness in providing additional guidance for AEMO on what kind of incidents AEMO should review to promote the secure operation of the power system while avoiding unnecessary costs. The Panel is therefore giving additional consideration to whether clarification is required in Section 1 on such events.

The Panel has also identified an additional reason for removing the reference to 'embedded' in section 6(c). The Panel considers the increasing significance of distribution network-related events to warrant expanding the scope of section 6(c) to include events on the distribution network that affect all generating units whether they be embedded or transmission connected. Such a change would remove any barrier to AEMO including the loss of transmission connected generation when considering whether a reporting obligation exists in respect of a distribution system event.

The Panel therefore considers removing reference to 'embedded' in section 6(c) of the guidelines would advance the objective of promoting the secure operation of the power system particularly given its ongoing transition and increasing significance of distribution systems in the overall security of the NEM.

The Panel's draft position is to accept AEMO's proposal to remove the reference to 'embedded' generating units from 6(c) of the guidelines. The Panel considers this amendment would remove any barriers to AEMO considering the impact of distribution system related events on transmission connected generation.

> BOX 5: RELIABILITY PANEL'S DRAFT POSITION — ACCEPT AEMO'S PROPOSAL TO REMOVE REFERENCE TO EMBEDDED GENERATING UNITS
>
> The Panel supports removing reference to 'embedded' generation in section 6(c) of the guidelines, to include events on the distribution network that affect all generating units whether they are embedded or connected to the transmission network. The Panel considers this proposed change to the guidelines would advance the objective of promoting the secure operation of the NEM as the system transitions.

3.5 AEMO proposal 4 — Exclude events where UFLS schemes operated correctly and tripped only contracted load

Section 6(d) of the current guideline covers incidents that result in the operation of under-frequency or over-frequency protection and control schemes including automatic under-frequency load shedding; and automatic tripping of a generating unit due to over-frequency.

AEMO's request identifies that there are a number of control schemes that are types of automatic under and over frequency tripping schemes, such as the adaptive under frequency load shed (AUFLS) scheme in Tasmania, that are designed to trip blocks of contracted load in response to frequency events resulting from either credible or non-credible contingencies.

AEMO considers the guidelines should clarify whether reporting on the correct or normal operation of these types of control schemes in response to a frequency event is required. AEMO considers that if this type of protection/control scheme operates as designed and trips only contracted load blocks there is no significant impact on the power system.

AEMO proposal 4 — Exclude events where UFLS schemes operated correctly and tripped only contracted load: AEMO proposes the guidelines be amended to confirm that AEMO is not required to report on incidents involving the correct or normal operation of under frequency control schemes where only contracted load blocks are tripped.

3.5.1 Panel considerations and draft position

The Panel considers section 6(d) of the Guideline speaks to the emergency under and over frequency systems that are implemented under Schedule S5.1.10.2 and clause 4.3.5 of the NER. That is, the obligation for NSPs and market customers to ensure sufficient facilities to disconnect involuntary loads over 10 MW to maintain power system frequency within extreme frequency excursion tolerance limits. The Panel particularly notes these obligations involve involuntary emergency load shedding. AEMO's proposal specifically speaks to whether the shedding of the contracted load is covered as a reviewable operating incident.

The overarching objective of the guidelines is to provide guidance on security-related power system events that represent a significant departure from normal operating conditions. The guidelines make the operation of under frequency or over-frequency protection and control schemes including automatic under frequency load shedding a reviewable operating incident as the operation of such involuntary control schemes indicates a power system that has significantly departed from normal operating conditions.

The operation of contracted load for frequency control purposes may not, in and of itself, indicate a power system that has significantly departed from normal operating conditions to warrant a reviewable operating incident. The Panel notes that section 3 of the guidelines would still require AEMO to treat any instance where the frequency is outside the operational frequency tolerance band as a reviewable operating incident.

The Panel's draft position is to accept AEMO's proposal to remove any requirement to report on incidents involving the correct or normal operation of under frequency control schemes where only contracted load blocks are tripped.

BOX 6: RELIABILITY PANEL'S DRAFT POSITION — ACCEPT AEMO'S PROPOSAL TO EXCLUDE EVENTS WHERE UFLS SCHEMES OPERATED CORRECTLY AND TRIPPED ONLY CONTRACTED LOAD

The Panel proposes to accept AEMO's proposal to exclude events where UFLS schemes operated correctly and only tripped contracted load. The Panel considers that the correct operation of such schemes does not itself indicate a power system that is operating outside of normal operating conditions, and would therefore serve to ensure only necessary reports are produced by AEMO.

3.6 AEMO proposal 5 — Limiting the requirement to review events where the power system is insecure for greater than 30 minutes, or not satisfactory for more than 5 minutes, to incidents that impact or affect critical transmission elements

AEMO is currently required to report on incidents where the power system is not in a secure operating state for more than 30 minutes, or not in a satisfactory operating state for more than 5 minutes.[21]

AEMO's request identifies these requirements are not limited by reference to their potential impact on the operation of critical transmission elements. Because the definition of a satisfactory operating state extends to operating conditions of all plant forming part of the power system, it is possible for this requirement to be triggered in respect of an issue in the distribution system that presents no material risk for the transmission system. AEMO considers the Guidelines should not require a review of these incidents.

AEMO proposal 5 — Limiting the requirement to review events where the power system is insecure for greater than 30 minutes, or not satisfactory for more than 5 minutes, to incidents that impact or affect critical transmission elements: AEMO proposes the guidelines be amended to outline that AEMO is only required to report on incidents involving the non-secure or non-satisfactory operation of the power system where critical transmission elements are impacted or affected.

3.6.1 Panel considerations and draft position

The Panel appreciates the NER definition of a satisfactory operating state extends to maintaining the operating conditions of all 'plant' forming part of the power system within their relevant operating limits.[22] Under Chapter 10 of the NER, 'plant' includes, in relation to a connection point, all equipment involved in generating, utilising, or transmitting electrical energy.

The Panel appreciates that these NER definitions and section 6(a) of the guidelines could be interpreted as giving rise to a very broad potential scope of reporting. Specifically, the Panel understands that AEMO is concerned that existing arrangements may be interpreted as triggering a reviewable operating incident report should any single element of the power system (including low voltage feeders and residential end use equipment) be outside its operating limits for more than 5 minutes.

The Panel is not aware of a practical reporting issue that has arisen from the theoretical potential reporting scope identified above. The Panel notes that current guidelines arrangements have been in place since at least 2013 without a reporting burden emerging to justify AEMO's concerns. The Panel further notes that AEMO may never become aware of plant ratings being exceeded in the distribution network.[23] For these reasons, the Panel is still

21 A Secure operating state is defined under the rules with reference to specific provisions as set out under clause 4.2.4 of the rules. This includes references to the power system security principles as described in clause 4.2.6 of the rules.

22 Clause 4.2.2(d) of the NER.

23 Clause 4.2.2(d) of the NER.

giving consideration to whether a material issue exists in respect of Section 6(c) that would justify an amendment to the guidelines.

The Panel however does not consider an interpretation in line with AEMO's concerns is consistent with the objective of the guideline to provide guidance on the significance to the operation of the *power system* or a significant deviation from "normal operating conditions". The Panel is therefore not minded to make AEMO's suggested change to limit the requirement to review events where the power system is insecure for greater than 30 minutes, or not satisfactory for more than 5 minutes, to incidents that impact or affect critical transmission elements. However, we are interested in stakeholder views on this matter, and in particular the materiality of this issue, and whether stakeholders consider these proposed amendments should be made to the guidelines.

BOX 7: RELIABILITY PANEL'S DRAFT POSITION — NO SPECIFIC RECOMMENDATION, SEEKING STAKEHOLDER FEEDBACK TO INFORM THE PANEL'S CONSIDERATIONS

The Panel is minded to not make a specific recommendation on AEMO's proposal to limit the requirement to review events where the power system is insecure for greater than 30 minutes, or not satisfactory for more than 5 minutes, to incidents that impact or affect critical transmission elements. The Panel seeks stakeholder feedback to further inform consideration on this issue.

3.7 Consideration of costs and benefits of AEMO's proposed changes

As previously discussed in section 1.2, reviewable operating incident reports can provide important information to the market regarding system security issues and improve the way in which processes and systems respond to these incidents. However, these reports are also burdensome on both AEMO and market participants who are required to provide information on incidents that may or may not warrant further investigation. Striking the right balance between the costs associated with reporting and the benefits to power system security is essential to the efficiency and effectiveness of this framework.

The Panel considers that AEMO's proposed changes exclude events that do not have significant impacts on the security of the power system, and would work to ensure only necessary reports are produced each year. We also do not consider that this would be a loss of valuable information to the market. These changes would also have the benefit of ensuring AEMO and participant resources are focused on incidents that are of significance and require the in-depth analysis offered in reviewable operating incident reports.

For example, excluding events where a transmission line trips at one end only or a single circuit breaker trips would significantly reduce the administrative and resourcing burden on AEMO of reporting on events that do not have a significant impact on the security of the power system. Excluding these events from the scope of this framework would reduce reviews of insignificant incidents on the power system, with AEMO having resourced six

reports on such events in the last 12 months (see appendix A). The amendments proposed by AEMO would save over 200 hours of resourcing and associated costs required to produce these reports (see table 2.1).

The Panel considers that the proposed amendments to the guidelines would ensure incidents on the power system that require further reporting by AEMO are still captured. As such, the Panel considers these changes would help to ensure only necessary reporting is undertaken by AEMO, and improve the efficiency and effectiveness of the guidelines and associated reports.

4 DRAFT POSITIONS ON QLD SRAS REGION UPDATE AND INDISTINCT EVENTS RULE CHANGE

As a part of the review, the Panel has identified several additional issues that impact the guidelines for identifying reviewable operating incidents. The Panel has therefore expanded the scope of the review to also consider:

- the interactions between the guidelines and the *Enhancing operational resilience in relation to indistinct events* rule (ERC0304), and
- the 2020 changes to the Queensland SRAS sub-networks.

This chapter presents the Panel's considerations and draft decisions on these issues for stakeholder feedback.

4.1 Interactions with the enhancing operational resilience in relation to indistinct events rule change

Section 1 of the guidelines define a reviewable operating incident as an incident comprising a non-credible contingency event or multiple contingency events that impacts critical transmission elements or that impact the transmission system of multiple National Electricity Market regions. The guidelines further require the definition of a non-credible contingency set out in clause 4.2.3 of the NER to be applied.

The *Enhancing operational resilience in relation to indistinct events* rule made changes to both the definition of contingency event and the scope of the reviewable operating incident framework itself. The Panel has expanded the scope of the review to consider whether changes to the guidelines are required to address these changes.

4.1.1 Relevant changes made in the enhancing operational resilience in relation to indistinct events rule change

On 9 March 2022, the Commission made a final rule regarding the *Enhancing operational resilience in relation to indistinct events* (Indistinct events) rule change.[24] The Indistinct events rule amended the definitions for a *contingency event* and a *reviewable operating incident*, in NER clauses 4.2.3 and 4.8.15 respectively, which will come into effect on **9 March 2023.** These changes are described in Table 4.1.

Table 4.1: **Outline of amendments to the definitions of a contingency event and reviewable operating incident following the Indistinct events rule change**

DEFINITION	CURRENT DEFINITION ACCORDING TO THE NER	AMENDED DEFINITION IN THE NER FOLLOWING THE INDISTINCT EVENTS RULE CHANGE
Contingency	"A ***contingency event*** means an	"A ***contingency event*** means an

24 Enhancing operational resilience in relation to indistinct events rule change, AEMC, March 2022, available here

DEFINITION	CURRENT DEFINITION ACCORDING TO THE NER	AMENDED DEFINITION IN THE NER FOLLOWING THE INDISTINCT EVENTS RULE CHANGE
event	event affecting the power system which AEMO expects would be likely to involve the failure or removal from operational service of one or more generating units and/or transmission elements."	event on the power system which AEMO expects would be likely to involve: 1. The failure or removal from operational service of plant; or 2. A sudden and unplanned change to the level of output, consumption, or power flow of *plant*."
Reviewable operating incident guideline	"(a) For the purposes of this clause 4.8.15: **Reviewable operating incident** means: 1. an Incident comprising: (i) A non-credible contingency event or multiple contingency events on the *transmission system*;"	"(a) For the purposes of this clause 4.8.15: **Reviewable operating incident** means: 1. an incident comprising: (i) A non-credible contingency event or multiple contingency events on the *power system*;"

4.1.2 Panel considerations and draft position

As a result of these amendments to the NER, the scope of the events that are captured by the reviewable operating incident guidelines has expanded. Reviewable incidents would no longer be limited to non-credible or multiple instances of the failure or removal from service of plant.

Reviewable incidents would now also include non-credible or multiple credible contingency events resulting from sudden or unexpected changes in the power flow of power system equipment. To the extent they meet the criteria, a non-credible contingency event or multiple credible contingency events on the distribution system would now also trigger a report.

Following these amendments, the Panel considers it necessary to provide additional guidance for AEMO when identifying incidents it should report on. AEMO has also indicated a preference to remove ambiguity and provide additional clarity in the guidelines. However, the Panel appreciates the complexity associated with providing guidance in the guidelines on events involving unexpected changes in power flow that are sufficiently significant from a power system security perspective to warrant treatment as a reviewable operating incident by AEMO.

The Panel is still considering its approach to addressing this issue and intends to undertake additional consultation with AEMO prior to making a specific recommendation.

As such, the Panel is not yet minded to make a specific draft decision on the guidelines changes necessary to address changes to the definition of a contingency event made in the Indistinct events rule. Stakeholder feedback is sought on whether contingency events involving the non-credible sudden or unexpected changes in power flow should be included as a new reviewable operating incident that would require further investigation and reporting by AEMO.

The Panel notes that the impact of sudden and unplanned change to the level of output, consumption, or power flow would still trigger a reviewable operating incident investigation and report should its impact be sufficiently material to also trigger other provisions in the guidelines. In particular:

- Section 3 of the guidelines covering events where the system frequency is outside the frequency operating standard
- Section 4 of the guidelines covering events where the power system is not in a secure state for more than 30 minutes
- Section 6(a) of the guidelines covering events where the power system is not in a satisfactory operating state for more than 5 minutes, and
- Section 6(d) of the guidelines covering events involving the operation of under frequency or over frequency protection and control schemes.

The Panel is interested in stakeholder views on whether the power system security impact of a sudden and unplanned change to the level of output, consumption, or power flow is sufficiently captured under the sections listed above or whether a standalone trigger is required.

Additional considerations of the Enhancing operational resilience in relation to indistinct events rule change

The Panel notes that in the final determination of the Indistinct events rule, stakeholders raised the potential need for the reviewable operating incident framework to consider the impact of actions AEMO may take ahead of time to manage Indistinct events on the power system. The Panel considers that should such actions be significant, they would already be effectively captured through the list of reviewable incidents on the power system according to the current guidelines. As such, the Panel does not consider there is currently any need to amend the guidelines to incorporate potentially duplicative criteria to capture these incidents. However, we are interested in stakeholder views on this.

BOX 8: RELIABILITY PANEL'S DRAFT POSITION — THE PANEL HAS NOT COME TO A DRAFT POSITION AND IS SEEKING STAKEHOLDER FEEDBACK ON THIS ISSUE

The Panel is not minded to make a specific recommendation on guideline changes necessary

to address changes to the definition of contingency event made in the Enhancing operational resilience in relation to indistinct events rule. The Panel is seeking stakeholder feedback on whether non-credible sudden or unexpected changes in power flow should be included in the guidelines as a new reviewable operating incident that requires AEMO reporting.

4.2 Changes to the Queensland SRAS subnetworks

Section 2 of the guidelines outlines that a reportable incident associated with a major supply disruption involves the loss of greater than 60% of the load in North, Central, and South Queensland regions. The existing guidelines do not define the boundaries or provide further details on the Northern, Central, or South Queensland regions.

The Panel understands this reference to Northern, Central, and South Queensland refer to SRAS subnetworks which were defined by AEMO for the purposes of system restoration following a black system event or major supply disruption at the time of the last review of the guidelines in 2013. These Queensland SRAS sub-networks no longer exist having since been amalgamated, initially into North and South Queensland subnetworks,[25] and then on 16 October 2020, AEMO published a final determination to combine the two remaining SRAS sub-networks, being north Queensland and south Queensland, into a single Queensland subnetwork.[26].

Section 2 of the guideline is therefore out of date and requires updating.

4.3 Panel considerations and draft position

The Panel has considered updating section 2 of the guidelines to:

- align with currently defined SRAS sub-network boundaries by only referring to a single Queensland region, or
- retain the reference to North, Central, and South Queensland regions but define the boundaries of those regions, either consistent with the SRAS sub-network boundaries the applied prior to 2014 or on some other basis.

The Panel's draft position is to retain the guidelines references to North, Central, and South Queensland regions but define the boundaries of those regions. A single Queensland region would require the loss of greater than 60% of load in the entire Queensland region to qualify as a major supply disruption triggering a reviewable operating incident report. This is despite the relatively dense population centres in both the south and north of Queensland, where such a significant loss of load would be a major event on the power system.

The Panel considers that the loss of greater than 60% of load in either north, central, or south Queensland is an event of significance and should be reported on by AEMO. Queensland's network, which is longer and 'stringier' than the networks in other regions, and

25 This occurred in a 2014 AEMO review of the SRAS networks. Further information can be found here.

26 AEMO 2020, System restart ancillary services guideline 2020 – final report and determination, available here

prone to electrical separation at various points. The significant population centres along the Queensland coast further justify retention of a multi-region approach.

The Panel considers the guidelines should be updated to define the boundaries of the three sub-regions as an addendum to the guidelines for the purposes of identifying reviewable incidents.[27] The Panel's draft approach is to define the boundaries consistent with the SRAS subnetworks that applied at the time of the Panel's last review of the guideline.

The previous amalgamation of subnetworks such as New South Wales and North New South Wales, have not required similar adjustments to the guidelines. This is due to the significant population centres that exist in both north and south Queensland when compared to New South Wales. The Panel considers this approach provides a simple way to ensure major supply disruptions in the Queensland region are reviewed.

BOX 9: RELIABILITY PANEL'S DRAFT POSITION — RETAIN GUIDELINE REFERENCES TO NORTH, CENTRAL AND SOUTH QUEENSLAND REGIONS BUT DEFINE THE BOUNDARIES OF THOSE REGIONS FOR THE PURPOSES OF IDENTIFYING REVIEWABLE OPERATING INCIDENTS

The Panel proposes to update the guidelines to define the boundaries of the three Queensland sub-regions as an addendum to the guidelines for the purposes of identifying reviewable incidents. The Panel considers this approach provides a simple way to ensure major supply disruptions across the Queensland regions are reviewed by AEMO.

27 The AEMC's 30 March 2022 Terms of Reference for the review of the guidelines for identifying reviewable operating incidents are available on the AEMC's website.

ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMPR	Annual Market Performance Review
AUFLS	Adaptive Under Frequency Load Scheme
Commission	See AEMC
kV	Kilovolt
MCE	Ministerial Council on Energy
MW	Megawatt
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National electricity objective
NER	National Electricity Rules
NSP	Network Service Provider
SRAS	System Restart Ancillary Services
UFLS	Under Frequency Load Shedding
TNSP	Transmission Network Service Provider

A EVENTS THAT WOULD NOT HAVE BEEN REPORTED ON WITH AEMO'S THE PROPOSED CHANGES OVER THE LAST 12 MONTHS

The following table outlines the reviewable operating incident reports that would not have been produced had AEMO's proposed changes been retroactively in place in the last 12 months of reporting. In particular, the Panel notes that events where a transmission line trips at one end only or a single circuit breaker trips being has been a key contributor to reports over the last year.

Table A.1: **Reviewable operating incidents that would not have been reported on in the last 12 months under AEMO's proposed changes**

DATE	INCIDENT	FAULT TYPE	REVIEWABLE OPERATING INCIDENT	NO. OF EVENTS	TRANSMISSION ELEMENT(S) AFFECTED	POWER SYSTEM SECURITY	LOAD INTERRUPTED	GENERATION INTERRUPTED
27/10/2021	Dederang - Wodonga 330 kV trip at Wodonga end only	Trip of the Wodonga to Dederang 330 kV line at the Wodonga 330 kV substation end only.	Non-credible contingency event impacting critical transmission elements.	1	Wodonga (WOTS) to Dederang (DDTS) 330 kV line	The power system remained in a secure operating state throughout this incident.	Nil	Nil
13/07/2021	Muswellbrook - Tamworth 88 line opened at Tamworth end only	The opening of Muswellbrook – Tamworth 88 330 kV line at the Tamworth end only.	Non-credible contingency event impacting critical transmission elements.	1	Muswellbrook – Tamworth 88 330 kV (MUS – TAM) line	The power system remained in a secure operating state throughout this incident.	Nil	Nil
5/07/2021	Armidale — Sapphire WF 8E line opened at Armidale end only	The opening of Armidale – Sapphire 8E 330 kV line at Armidale end only.	Non-credible contingency event impacting critical transmission elements.	1	Armidale – Sapphire 8E 330 kV line	The power system remained in a secure operating state throughout this incident.	Nil	Nil

DATE	INCIDENT	FAULT TYPE	REVIEWABLE OPERATING INCIDENT	NO. OF EVENTS	TRANSMISSION ELEMENT(S) AFFECTED	POWER SYSTEM SECURITY	LOAD INTERRUPTED	GENERATION INTERRUPTED
2/06/2021	Heywood - southeast line trip at 1 end only	The opening of the 275 kV Heywood – South East No. 1 line M1 transformer Circuit Breaker offloading the Heywood M1 500/275 kV transformer.	Non-credible contingency event impacting critical transmission elements.	1	275 kV Heywood – South East No. 1 line M1 transformer Circuit Breaker (HYTS-SESS M1 CB), Heywood M1 500/275 kV transformer	The power system remained in a secure operating state throughout this incident.	Nil	Nil
21/12/2021	Alcoa Portland No.2 - Heywood 500 Kv trip at Portland end only	500kv line trip at the Portland end only	Non-credible contingency event impacting critical transmission elements.	1	CB 5100 tripped at APD 500kV substation, disconnecting the HYTS – APD 500kV No.2 line at the APD end only	The power system remained in a secure operating state throughout this incident.	Nil	Nil
2/03/2022	Hazelwood-Cranbourne trip at one end only	Trip of Hazelwood – Cranbourne No. 4 500 kV line at the Hazelwood end only.	Non-credible contingency event impacting critical transmission elements.	1	Hazelwood – Cranbourne (HWTS – CBTS) No. 4 500 kV line	The power system remained in a secure operating state throughout this incident.	Nil	Nil

Source: Information sourced from AEMO's Reviewable Operating Incident reports 2021-2022, available here.

B GLOSSARY

This glossary outlines explanations of select terms to provide background and context to this draft report. Where terms are defined under the rules, please refer to Chapter 10 of the rules for the precise wording of the rule definitions.

Table B.1: Glossary of terms

Black system event	Black system is defined under the rules as the absence of voltage on all or a significant part of the transmission system or within a region during a major supply disruption affecting a significant number of customers.
Clause 4.8.9 instruction	Under the rules AEMO has powers to issue directions and instructions to registered participants. A 'clause 4.8.9 instruction' refers to an instruction by AEMO, or a person authorised by AEMO, to a registered participant under clause 4.8.9(a1)(2) of the rules to take any action in accordance with the provisions under the rules or the National Electricity Law.
Contingency event	A contingency event is currently defined under the rules as an event affecting the power system which AEMO expects would be likely to involve the failure or removal from operational service of on or more generating units and/or transmission elements (see clause 4.2.3(a) of the rules). From 9 March 2023, this definition will be expanded to include a sudden and unplanned change to the level of output, consumption, or power flow of power system equipment. The definition will also expand to cover all plant forming part of the power system, in addition to generating units and transmission elements.
Credible contingency event	A credible contingency event is defined under the rules as a contingency event that AEMO considers to be reasonably possible in the surrounding circumstances (see clause 4.2.3(b) of the rules).
Frequency operating bands	There are four frequency operating bands as defined under the frequency operating standards. The concepts and the actual values, of the bands are outlined in the standards. The concepts are briefly summarised below in the below terms.
Normal operating frequency band	Subject to impacts of events on the power system, generally the frequency should not exceed the normal operating frequency band for more than five minutes on any occasion.

Normal operating frequency excursion band	This is the band that the frequency of the power system should not exceed (except as a result of a contingency event or a load event).
Operational frequency tolerance band	This is the band that should not be exceeded following a network event. The time frame to recover the system varies for the type of event.
Extreme frequency excursion tolerance limit	This is the band that should not be exceeded for more than two minutes as a result of any multiple contingency events.
Frequency operating standards	The frequency operating standards set out the standards of the frequency of the power system in operation. The standards are determined by the Reliability Panel in accordance with provisions under the rules. Separate standards apply for the 'mainland NEM' and for Tasmania.
Load shedding	Load shedding is defined under the rules as reducing or disconnecting load from the power system.
Major supply disruption	Major supply disruption is defined under the rules as the unplanned absence of voltage on a part of the transmission system affecting one or more power stations.
Non-credible contingency	A non-credible contingency event is defined under the rules as a contingency event other than a credible contingency event (see clause 4.2.3(e) of the rules).
Power system security and reliability standards	These are the standards (other than the system restart standard) governing power system security and reliability of the power system. These standards are approved by the Reliability Panel on the advice of AEMO.
Satisfactory operating state	Satisfactory operating state is defined under the rules with reference to the criteria set out under clause 4.2.2. Summarily the NEM is considered to be in a satisfactory operating state when the frequency and voltage are within operating standards, transmission lines and other plant are within operating limits and the power system is safely configured.
Secure operating state	The power system is considered to be in a secure operating state if the power system is in a satisfactory operating state and, in AEMO's reasonable opinion, the power system will return to a satisfactory operating state following the occurrence of any credible contingency event (see clause 4.2.4).
Under-frequency load shedding	When the frequency of the power system falls, it is possible that load may need to be shed in order to restore the frequency to require levels.

Source: Terms and definitions sourced from Chapter 10 of the NER