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Reliability Panel AEMC

**FINAL REPORT**

2022 REVIEWABLE OPERATING  
INCIDENT GUIDELINE REVIEW

29 SEPTEMBER 2022

**GUIDELINES**

## 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.

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## SUMMARY

1 This report sets out the Panel’s final decisions on changes to the guidelines for identifying reviewable operating incidents (the guidelines). The Panel considers its final decisions will, or are likely to, better contribute to achieving the national electricity objective (NEO) by improving the efficiency of the guidelines.

2 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. The NER requires AEMO to review significant power system security incidents identified in accordance with the guidelines.<sup>1</sup> 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.

3 The Panel’s final decisions are on a set of changes requested by AEMO, and updates to reflect NER framework changes since the last review of the guidelines in 2012. AEMO proposed five changes to the guidelines that sought to ensure only necessary reports are produced, improve the efficiency of the guidelines and reduce costs imposed on participants.<sup>2</sup> The Panel also considered additional changes and updates 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.

4 The Panel has been guided by the NEO in undertaking this review.<sup>3</sup> The Panel’s approach has focused 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.

5 The Panel’s review of the guidelines was conducted in accordance with clause 8.8.1(a)(9) of the National Electricity Rules (NER) and the terms of reference provided by the Australian Energy Market Commission (AEMC or Commission).

### **The Panel’s final positions on AEMO’s proposed changes to the guidelines**

6 AEMO proposed a set of five changes to the guidelines. The Panel considered that AEMO’s proposed changes generally will increase the efficiency of the guidelines and ensure only necessary reviews are undertaken and participant costs are minimised. The Panel’s final decision is to amend the guidelines to implement the following of AEMO’s proposed changes:

- 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

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1 NER Clauses 4.8.15(a)(1).

2 In March 2022 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). AEMO’s request can be found on the project page at: <https://www.aemc.gov.au/market-reviews-advice/review-guidelines-identifying-reviewable-operating-incidents>

3 The Panel has also set out its approach to how it has assessed this review in Chapter 2.

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.

- 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.
- to exclude events where under-frequency load shedding (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.
- to amend guideline section 6(c) on distribution system incidents, and the definition of multiple contingency events, to update and clarify requirements:
  - clarify that 'distribution network incidents' involve an initiating event that occurs within the distribution system
  - amend the threshold for reporting on distribution network incidents under 6(c) from the capacity of the largest generating unit in a region with the largest credible contingency in a region
  - remove 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.
  - clarify the definition of multiple contingency events in guideline section 1 is not limited to events on the transmission system.

7 The Panel has elected not to implement AEMO's fifth proposal to limit reporting in respect of non-secure or non-satisfactory operation of the power system to only where critical transmission elements are impacted or affected at this time. The Panel recommends AEMO request another review of the guidelines in the next few years should the issues motivating AEMO's request become problematic.

**The Panel's final positions on updating the guidelines given the indistinct events rule and Queensland SRAS boundary changes**

8 The Panel identified the changes made in the indistinct events rule and SRAS boundary changes 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
- guideline references to central, south, and north Queensland regions following AEMO's determination to merge the central, south, and north SRAS subnetworks into a single Queensland wide SRAS subnetwork.

9 The Panel's final decision is to exclude non-credible events under the second limb of the new definition of contingency event in clause 4.2.3 of the NER as a new reviewable operating

incident report trigger at this time (i.e., non-credible contingency or multiple credible contingencies resulting from sudden or unplanned changes in energy flow). The Panel recommends that AEMO requests a subsequent review be conducted once the indistinct events rule has been fully implemented and appropriate operational experience has been gained.

- 10 The Panel has decided to retain a requirement for AEMO to report on major supply disruptions in north, central and south QLD. The Panel has updated the guidelines to define the boundaries of these three Queensland regions as an addendum to the guidelines for the purposes of identifying reviewable operating incidents. The Panel considers this approach provides a simple way to ensure major supply disruptions across the Queensland regions continue to be reviewed by AEMO.

**The Panel considers there is a need for additional reviews of the guidelines in future**

- 11 As the power system continues to evolve, the Panel has identified that there will be a need for future reviews of the guidelines. Power system security risks are changing as the power system transitions from a thermal synchronous system to a high VRE inverter-based system with greater demand-side participation. The guideline reviewable operating event triggers will likely need to evolve over time to reflect this evolving set of power system security risks.

- 12 In addition to the general need for ongoing guideline reviews, the Panel also considers AEMO should request a review of the guidelines to specifically consider implementing specific guideline trigger applying to the second of the new definition of contingency event being non-credible contingency or multiple credible contingencies resulting from sudden or unplanned changes in energy flow. The Panel recommends AEMO request this review once the indistinct events framework has been implemented and sufficient experience gained.

**The amended guidelines will be effective from 29 September 2022**

- 13 The amended guidelines for identifying reviewable operating incidents will be in effect from the publishing of this report on 29 September 2022. All reviewable operating incidents from this date will be identified according to these guidelines.

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# 1 INTRODUCTION

The Panel has carried out this review of the Reviewable Operating Incident Guidelines (guidelines) to determine whether amendments or updates are required. The purpose of this report is to set out the Panel's final decision and amendments to the guidelines.

This chapter:

- introduces this review of the guidelines, including the process the Panel has followed and how stakeholders were involved
- introduces the reviewable operating incident framework
- introduces AEMO's proposed changes to the guidelines, and
- identifies additional review scope items.

## 1.1 The Panel considered it was timely to review the guidelines

In 2006, the Reliability Panel published guidelines for identifying reviewable operating incidents.<sup>4</sup> 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.<sup>5</sup> 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 energy sector.

This report sets out the Panel's final positions on the review scope described in section 1.3. The Panel considers its final positions will, 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 has been conducted following the NER process

The draft report commenced the review process under 8.8.1(a)(9) of the NER. The Panel conducted 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.<sup>6</sup>

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4 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.

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

6 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.

The draft report was followed by a single-stage consultation with submissions closing four weeks following publication and the Panel received two submissions from stakeholders. Publication of the final report completes the Panel's 2022 review of the guidelines for identifying reviewable operating incidents.

## 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.<sup>7</sup> 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 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 Panel's 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,

<sup>7</sup> Clauses 4.8.15(b) and 4.8.15(c) of the NER.

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

#### The 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.<sup>8</sup> The objective of requiring AEMO to conduct incident reviews is not explicit in the 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 guidelines 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.<sup>9</sup>

<sup>8</sup> NER Clause 4.8.15(a)(3).

<sup>9</sup> Clause 4.8.15(b) of the NER.

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.<sup>10</sup>

A Registered Participant must co-operate in any review conducted by AEMO including making available relevant records and information.<sup>11</sup>

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.

AEMO's reviewable operating incident reports are available on the AEMO website.<sup>12</sup>

## 1.3 What was 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 and final decisions on each of these changes.<sup>13</sup>

### 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 considered 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.

10 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](#).

11 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.

12 AEMO Reviewable operating incident reports, available [here](#).

13 A final version of the guidelines is available on the AEMC's website.

AEMO's proposed five changes to the guidelines that sought to ensure only necessary reports are produced, improve the efficiency of the guidelines, and reduce costs imposed on participants.<sup>14</sup> These proposed changes are to:

- exclude non-credible contingency events<sup>15</sup> 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.

### 1.3.2

#### Additional scope items

The Panel is not restricted in the scope of the issues it can consider when reviewing the guidelines. As discussed in the draft report, the Panel identified several additional issues that impact the guidelines for identifying reviewable operating incidents. The Panel 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 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.

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<sup>14</sup> AEMO's 25 March 2022 letter to the Panel is available on the AEMC's website

<sup>15</sup> 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.

## 2 PANEL'S ASSESSMENT FRAMEWORK

The Panel has applied a specific framework to its review of the guidelines. This chapter sets out the assessment principles and approach that were used to identify the Panel's final positions.

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

### 2.2 Assessment principles

The Panel has applied the following specific principles when considering the impact of changes 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** -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 are 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 provide 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 involved the following approach to specifically considering 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 and making final recommendations 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 relate to the staff required to investigate and report on incidents. 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.<sup>16</sup>

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**

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 nonreviewable events, therefore this is the incremental time rather than total time.
	Total estimated time:	38 hours

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

<sup>16</sup> Under NER clause 4.8.15(g), AEMO must allow 20 business days for registered participants to respond to such requests for information.

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. No stakeholders commented on this in submissions to the draft report.

## 3 FINAL POSITIONS ON AEMO'S PROPOSED CHANGES

This chapter sets out the Panel's final positions on AEMO's proposed changes to the guidelines.<sup>17</sup> AEMO proposed that the guidelines remove the requirement to review some types of incidents where there is no significant impact on the power system. 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 proposed the following five changes:

- exclude non-credible contingencies where successful auto-reclose occurred
- exclude events where a transmission line trips at one end only or a single circuit breaker trips
- remove reference to embedded generating units
- exclude events where UFLS schemes operated correctly and tripped only contracted load, and
- 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.

Each change is discussed in the following sections with AEMO's rationale for the departure from existing guideline arrangements. The Panel's considerations and draft position on each change are presented, as well as stakeholder feedback received in submissions to the draft report. The Panel's final position, rationale and any subsequent amendments to the guidelines for each of AEMO's proposed changes are then presented.

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

Section 1 of the existing guidelines define 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.<sup>18</sup>

AEMO 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. AEMO, therefore, proposed that the guidelines should 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 considered these events do not meet the intent of the NER in that the event is not of significance to the power system.

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<sup>17</sup> AEMO's request is published alongside this final report.

<sup>18</sup> 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.

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 guidelines. The Panel understands regions in the NEM utilise auto-reclose systems on critical transmission lines that automatically attempt to re-energise a transmission line element following a fault. The current guidelines do 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 on the power system.<sup>19</sup> However, under the current guidelines, AEMO is required to produce incident reports on similar incidents on the system.

### 3.1.1

#### Panel's draft decision and stakeholder views

The Panel's draft position was to accept AEMO's proposal to remove non-credible contingency events from the scope of future reviewable operating incident reviews where successful auto-reclose occurred.

The Panel considered 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 leading to the identification of future actions to undertake to reduce the likelihood and/or impact of incident recurrence. In coming to its draft decision, the Panel interpreted 'no other power system security issues are identified as, at a minimum, the power system remaining in a secure operating state'.

The Panel also understood that reviewable operating incident reports on non-credible contingency events where successful auto-reclose has occurred 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, considered 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 learning in the long-term interests of consumers. In forming its draft position, the Panel also considered AEMO's advice and agreed that incidents where normal auto-reclose operation returns equipment to service within a few seconds are not significant events on the power system.

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<sup>19</sup> AEMO 2020, Reviewable operating incident report — Trip of the Calvale to Stanwell 8873 and 8874 275kV lines on 26 February 2020, report available [here](#).

Stakeholder feedback from the AER and CS Energy was supportive of the Panel's draft position on AEMO's first proposed change and considered it would improve the efficiency of the guidelines.<sup>20</sup>

### 3.1.2 Panel final decision and considerations

The Panel's final decision is to accept AEMO's proposal to exclude non-credible contingencies where successful auto-reclose occurred and no other power system security issues are identified. The Panel's final decision is therefore the same as its draft decision. This change has been reflected in amendments to section 1(a) of the guidelines.<sup>21</sup>

The Panel considers that this change will 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 Panel considers this change to the guidelines will ensure only necessary reviews are undertaken by AEMO, and will minimise the costs imposed on both AEMO and participants in producing these reports for otherwise insignificant events on the power system. The Panel has also taken into account both AEMO's advice and stakeholder feedback received through both submissions to the draft report from the AER and CS Energy, which supported AEMO's proposed change, in its final decision 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.

The amended guidelines will still ensure that non-credible contingency events where auto-reclose was unsuccessful or other security issues were identified are still appropriately reviewed by AEMO.

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

The Panel's final decision is 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.

## 3.2 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 guidelines define a reviewable operating incident to be an incident comprising a non-credible contingency event or multiple contingency events that impact

<sup>20</sup> Submissions to the draft report: AER, p.1 and CS Energy, p.2.

<sup>21</sup> A final version of the guidelines is available on the AEMC's website.

critical transmission elements or that impact the transmission system of multiple NEM regions.

AEMO's request identifies the trip of a transmission line at both ends is considered a credible contingency and not normally reviewable under the guidelines.<sup>22</sup> 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,<sup>23</sup> 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.

### 3.2.1

#### Panel's draft decision and stakeholder views

The Panel's draft position was to accept AEMO's proposed amendments to exclude events where a transmission line trips at one end only or a single circuit breaker trips.

The Panel considered 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 involving transmission line trips at one end only, or 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 did 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 noted 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 sections of the guidelines.

Stakeholder feedback from the AER and CS Energy was supportive of the Panel's draft position on AEMO's second proposed change, and considered it would improve the efficiency of the guidelines.<sup>24</sup>

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22 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.

23 AEMO 2013, Power system operating incident report — over voltage on Kangaroo Valley 330kV Busbar on 3 October 2013, report available [here](#)

24 Submissions to the draft report: AER, p.1 and CS Energy, p.2.

### 3.2.2 Panel final decision and considerations

The Panel's final decision is the same as its draft position on AEMO's second proposal to exclude events where a transmission line trips at one end only or a single circuit breaker trips. This change has been reflected in amendments to section 1(b) of the guidelines.<sup>25</sup>

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.

Excluding these types of events from the guidelines will ensure that AEMO does not undertake reviews on incidents that do not have a significant impact on the power system or cause other security issues. The Panel also considers that reporting on these incidents does not promote the objective of the guidelines and removing this reporting trigger would ensure unnecessary costs are not imposed on participants and AEMO.

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 FINAL 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's final decision is 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.

### 3.3 AEMO proposal 3 — Amendments to guidelines section 6(c)

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 considered 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

<sup>25</sup> A final version of the guidelines is available on the AEMC's website.

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.<sup>26</sup>

AEMO considers that other multiple generation contingencies can have a significant impact on the power system and potentially also the market. For this reason, AEMO proposed the guidelines remove the reference to 'embedded' generators in guidelines section 6(c) 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.

### 3.3.1 Panel's draft decision and stakeholder views

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

In the draft report, the Panel considered that section 1 of the guidelines applies to the loss of multiple large generators as these represent non-credible contingency events that impacts critical transmission elements. The Panel, therefore, did not 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 did not identify the same gap as AEMO in respect of non-credible large generation events, it considered the guidelines should be as clear and unambiguous as reasonably practicable allowing easy interpretation by all stakeholders. A lack of clarity may 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's draft report, therefore, signalled its intent to give additional consideration to whether clarification is required in Section 1 on such events.

The Panel also identified an additional reason for removing the reference to 'embedded' in section 6(c). The Panel considered 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.

In submissions to the draft report, stakeholders supported the Panel's draft position to accept AEMO's third proposed change to the guidelines, with CS Energy, in particular, noting the growing importance of distribution-level assets.<sup>28</sup>

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<sup>26</sup> 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. 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.

<sup>28</sup> Submissions to the draft report: AER, p.1 and CS Energy, p.2-3.

### 3.3.2 Panel's final decision and considerations

Consistent with its draft decision, the Panel's final decision is to remove the reference to 'embedded' generating units from 6(c) of the guidelines and clarify guideline section 1 coverage of multiple generation events.

The Panel has also elected to make two additional amendments to guideline section 6(c) to clarify its intent and update the reporting threshold for the loss of multiple generators in response to distribution network incidents. The Panel has made these additional amendments following additional consultation with AEMO on the intent, and application of section 6(c) in the context of a changing power system. These changes are not inconsistent with any stakeholder views. They should be regarded as non-controversial and are updating the language in 6(c) consistent with its existing intent.

#### **Final decisions consistent with the Panel's draft decision**

The Panel considers removing reference to 'embedded' in section 6(c) of the guidelines will 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.

Consistent with its draft decision, the Panel considered the increasing significance of distribution network-related events to justify removing 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.

In the draft report, the Panel also considered that there may be a need for additional clarity for AEMO regarding the coverage of non-credible and multiple contingency events involving the loss of multiple generation units. The Panel has clarified that the guideline definition of multiple contingency events is not limited to transmission contingencies. This change will ensure there are no barriers or ambiguity regarding AEMO's ability to review generation-related events it considers to have a significant impact on the power system and warrants further investigation and reporting.

These amendments to section 1 and section 6(c) of the guidelines will ensure AEMO only undertakes necessary reporting while ensuring all generation events of significance on the distribution and transmission system are appropriately reported on by AEMO.

#### **Additional final decision amendments**

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

The Panel understands from AEMO that 'incidents on a distribution network' is unclear as to the origin of the initiating event. In particular, whether the initiating event occurs within the distribution network itself or involves the loss of distribution connected generation in response to an initiating event on the transmission network.

The Panel also understands that AEMO further considers the reporting threshold for an incident on a distribution network, being the capacity of the largest generating unit within any region, no longer appropriately reflects the size and nature of the risks AEMO is managing in the changing power system. AEMO considers a more appropriate reporting threshold to be the size of the largest credible contingency in a region.

Following consideration of AEMO's feedback on these points, the Panel's final decision is also to amend guidelines section 6(c) to:

- clarify that 'distribution network incidents' involve an initiating event that occurs within the distribution system, and
- amend the threshold for reporting on distribution network incidents under 6(c) from the capacity of the largest generating unit in a region with the largest credible contingency in a region.

The Panel considers limiting reporting under guidelines section 6(c) to incidents where the initiating event is within the distribution network to be consistent with the intent of the section which is to address events that occur on the distribution network itself, rather than sympathetic distribution network connected generation tripping in response to transmission faults and other transmission level events. This change is consistent with the first item in section 6(c) which is clearly limited to faults of extended duration within the distribution network.

The Panel also considers the reporting threshold for an incident on a distribution network, being the capacity of the largest generating unit within any region, no longer appropriately reflects the size of the risks AEMO is managing in the changing power system. In particular, as the capacity of the largest generating unit declines in some regions, the current guidelines may lead AEMO to report on inappropriately small distribution network events that are not significant from a power system security perspective.

By contrast, the largest credible contingency managed by AEMO in a region may be in relation to loss of generation due to a trip of a special protection scheme or transmission event affecting a large amount of smaller generation units, for example in a renewable energy zone. These types of risks have replaced the capacity of the largest generating unit in a number of NEM regions, in particular South Australia, as the largest credible contingency managed by AEMO. This change, therefore, updates section 6(c) to remain consistent with its original intent which is to align reporting obligations with the largest credible loss of generation in a region.

#### **BOX 5: RELIABILITY PANEL'S FINAL POSITION ON CHANGES TO GUIDELINES SECTION 6(C)**

The Panel's final decision is to amend section 6(c) of the guidelines to make the following changes:

- clarify that 'distribution network incidents' involve an initiating event that occurs within the distribution system, and
- amend the threshold for reporting on distribution network incidents under 6(c) from the capacity of the largest generating unit in a region with the largest credible contingency in a region.
- remove 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.
- clarify the definition of multiple contingency events is not limited to events on the transmission system.

The Panel considers these proposed changes would advance the objective of promoting the secure operation of the NEM as the system transitions.

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

Section 6(d) of the current guidelines cover 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.

#### 3.4.1 **Panel's draft decision and stakeholder views**

The Panel's draft position was 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.

In the draft report, the Panel considered 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 noted 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.

In stakeholder submissions to the draft report both the AER and CS Energy supported the implementation of this change to the guidelines, considering that it would serve to improve their efficiency.<sup>29</sup>

### 3.4.2

#### **Panel's final decision and considerations**

The Panel has determined to maintain its draft position and amend the guidelines 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. This change is reflected through amendments to section 6(e)(i) and (ii) of the guidelines.<sup>30</sup>

The Panel does not consider events that result in the correct operation of under-frequency or over-frequency protection and control schemes including automatic under frequency load shedding constitute a significant incident on the power system. Rather, these events demonstrate the successful operation of systems specifically designed to ensure the continued secure operation of the power system.

As such, this amendment to the guidelines will minimise the costs imposed on both AEMO and participants by ensuring only necessary reporting is undertaken. The Panel considers this change to promote the long-term interests of consumers by ensuring the guidelines do not impose reporting obligations on AEMO for events that do not result in the power system deviating from normal operating conditions.

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, which may include events where contracted load blocks have been tripped, as a reviewable operating incident.

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<sup>29</sup> Submissions to the draft report: AER, p.1 and CS Energy, p.2-3.

<sup>30</sup> A final version of the guidelines is available on the AEMC's website.

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

The Panel's final decision is 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.

### 3.5 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.<sup>31</sup>

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, AEMO considers it possible for this requirement to be triggered in respect of an issue in the distribution system that presents no material risk to the transmission system. AEMO considers the guidelines should not require a review of these incidents as they do not represent significant power system security incidents.

AEMO further note their lack of visibility on whether distribution level network elements are operating outside applicable ratings makes it infeasible for AEMO to conduct reviewable incident reporting on such events.

#### 3.5.1 Panel draft decision and stakeholder views

In the draft report, the Panel appreciated that 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.<sup>32</sup> 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 appreciated 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

<sup>31</sup> A Secure operating state is defined under the rules with reference to specific provisions as set out under clause 4.2.4 of the NER. This includes references to the power system security principles as described in clause 4.2.6 of the NER.

<sup>32</sup> Clause 4.2.2(d) of the NER.

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 also appreciated AEMO's lack of visibility on whether distribution level network assets are operating outside their ratings.

The Panel however did not consider an interpretation in line with AEMO's concerns to be 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 however 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.<sup>33</sup>

The Panel, therefore, did not propose 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.

In submissions to the draft report, stakeholders raised a number of concerns with AEMO's fifth proposed change.

- CS Energy was not supportive of AEMO's fifth proposed change and noted that it may inadvertently create potential blind spots regarding the security of the evolving power system. Similarly, CS Energy considered as DER uptake increases, excluding distribution level assets may be detrimental to overall system security. CS Energy also noted the increasing utilisation and triggering of fast protection schemes during operating incidents including but not limited to Emergency Control Schemes, Remedial Action Schemes, System Protection Schemes, Special Protection Schemes, System Integrity Protection Schemes and Network Support Services Agreements should be reviewable by AEMO.<sup>34</sup>
- In their submission to the draft, the AER also raised concerns and considered the Panel should not amend the guidelines to reflect AEMO's proposal to limit reporting on insecure or unsatisfactory operation of the power system. The AER considered that AEMO's concerns that the current trigger could be interpreted too broadly and capture distribution system events have not been clearly demonstrated in practice. The AER considers these reports are a valuable resource for stakeholders to understand how events are managed.<sup>35</sup>

### 3.5.2

#### Panel's final decision and considerations

The Panel has decided not to implement 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.

<sup>33</sup> Clause 4.2.2(d) of the NER.

<sup>34</sup> CS Energy submission to the draft report, p.2-3.

<sup>35</sup> AER submission to the draft report, p.1-2.

The Panel appreciates AEMO's concern that existing arrangements may be interpreted as triggering a reviewable operating incident report should any single element of the power system deviate outside of its operating limits for more than 5 minutes given NER definition of satisfactory operating state captures all 'plant'. The Panel also understands the limits of AEMO's visibility over distribution network level assets.

However, the Panel does not identify a practical reporting issue with current arrangements which have been in place since 2013. Stakeholders raised concerns about AEMO's proposed change. Neither the AER, nor CS Energy, supported the change noting the rapidly evolving power system and the importance of these reports in helping stakeholders understand the management of power system security.

The Panel considers AEMO has the scope to manage the resource impact on any additional reporting arising under 6(a) given their flexibility to tailor the scope and depth of its reporting to the significance of any event for the power system.

While the issue AEMO raises are not currently evident, the Panel considers that they may become material in the coming years as the power system continues to evolve. As such, the Panel is recommending that the guidelines are reviewed in the next few years to evaluate if this provision in the guidelines remains fit for purpose or requires amending to address these reporting issues should they arise.

**BOX 7: RELIABILITY PANEL'S FINAL POSITION — 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 AT THIS POINT IN TIME.**

The Panel has decided not 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. While there is not a clear issue currently, the panel recommends AEMO request another review of the guidelines in the next few years should these problems begin to materialise.

### 3.6 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 the first four of 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.

As discussed in the draft report, 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. The draft report highlighted that 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 of the draft report). The amendments proposed by AEMO would save over 200 hours of resourcing and associated costs required to produce these reports (see table 2.1 and the draft report for more information).

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

## 4 FINAL POSITIONS ON QLD SRAS REGION UPDATE AND THE INDISTINCT EVENTS RULE CHANGE

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

- the *Enhancing operational resilience in relation to indistinct events* rule (Indistinct events rule),<sup>36</sup>
- changes to the Queensland SRAS sub-networks that merged the north, central, and south sub-networks into a single Queensland-wide sub-network.

This chapter presents the Panel’s considerations and final decisions on these issues.

### 4.1 Managing interactions with the Indistinct events rule

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 Indistinct events rule made changes to both the definition of contingency event and the scope of the reviewable operating incident framework itself. The Panel, therefore, 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 Indistinct events rule require amendments to the guidelines

On 9 March 2022, the Commission made a final rule on the enhancing operational resilience in relation to indistinct events (Indistinct events) rule change. 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
<b>Contingency event</b>	"A <i>contingency event</i> means an event affecting the power system	"A <i>contingency event</i> means an event on the power system which

<sup>36</sup> Further information on the *Enhancing operational resilience in relation to indistinct events* rule (ERC0304) can be found at: <https://www.aemc.gov.au/rule-changes/enhancing-operational-resilience-relation-indistinct-events#:~:text=The%20COAG%20Energy%20Council%20submitted,%20or%20condition%20dependent>.

DEFINITION	CURRENT DEFINITION ACCORDING TO THE NER	AMENDED DEFINITION IN THE NER FOLLOWING THE INDISTINCT EVENTS RULE CHANGE
	<p>which AEMO expects would be likely to involve the <u>failure</u> or <u>removal from operational service</u> of one or more <u>generating units</u> and/or <u>transmission elements</u>."</p>	<p>AEMO expects would be likely to involve:</p> <ol style="list-style-type: none"> <li>1. The failure or removal from operational service of plant; or</li> <li>2. A sudden and unplanned change to the level of output, consumption, or power flow of <i>plant</i>." </li> </ol>
<p><b>Reviewable operating incident guideline</b></p>	<p>"(a) For the purposes of this clause 4.8.15:</p> <p><b>Reviewable operating incident</b> means:</p> <ol style="list-style-type: none"> <li>1. an Incident comprising:                     <ol style="list-style-type: none"> <li>(i) A non-credible contingency event or multiple contingency events on the <u>transmission system</u>;"</li> </ol> </li> </ol>	<p>"(a) For the purposes of this clause 4.8.15:</p> <p><b>Reviewable operating incident</b> means:</p> <ol style="list-style-type: none"> <li>1. an incident comprising:                     <ol style="list-style-type: none"> <li>(i) A non-credible contingency event or multiple contingency events on the <u>power system</u>;"</li> </ol> </li> </ol>

**4.1.2 Panel draft decision and stakeholder views**

The Panel’s draft decision noted that the scope of the events potentially captured by the reviewable operating incident guidelines has expanded as a result of these amendments to the NER . Reviewable incidents may no longer be limited to non-credible or multiple instances of the failure or removal from service of plant, and from 9 March 2023, may 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 may also trigger a reporting requirement.

Following these amendments, the Panel has considered whether it should provide additional guidance, and reviewable operating report triggers, for AEMO to cover this broader range of incidents. 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.

As such, the Panel was not 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 was 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.

In their submission to the draft determination, the AER considered a new trigger requiring AEMO to report on non-credible sudden or unexpected changes in power flow should be included in the guidelines as a new reviewable operating incident would be useful even if these types of events would likely be covered by existing triggers.<sup>37</sup>

However, the AER understood a trigger at this point may not be feasible as a definition for a non-credible sudden or unexpected change in power flow has not been developed. The AER understands AEMO is working towards a definition and encouraged the Panel to reconsider this question when an appropriate definition has been developed.<sup>38</sup>

In their submission to the draft report, CS Energy did not provide feedback on interactions between the indistinct events rule and the guidelines.

#### 4.1.3

#### Panel's final decision and considerations

To address changes made in the enhancing operational resilience in relation to indistinct events (the indistinct events) rule, the Panel has decided to limit reporting under guideline section 1 to contingency events involving plant failure or removal from service. This will exclude the second limb of the new definition of contingency event in clause 4.2.3 of the NER, to apply from 9 March 2023, as a reviewable operating incident report trigger. (i.e., non-credible contingency or multiple credible contingencies resulting from sudden or unplanned changes in energy flow).

Under this approach, AEMO will still retain its ability to review these events at its own discretion, ensuring that incidents resulting from this limb are still reviewable should AEMO consider any such events to be sufficiently significant to be necessary to report on.

The impact on the power system from significant sudden or unplanned changes in energy flow is also likely to trigger reporting under other criteria in the guidelines. The Panel noted that the impact of a significant sudden and unplanned change to the level of output, consumption, or power flow would still trigger a reviewable operating incident investigation under the following:

- 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.

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<sup>37</sup> AER submission to the draft report, p.1-2.

<sup>38</sup> AER submission to the draft report, p.1-2

The Panel considers it likely that future amendments to the guidelines will be necessary to reflect both distribution level non-credible or multiple credible contingency events in addition to non-credible contingency events involving a sudden and unplanned change to the level of output, consumption, or power flow of *plant*. The Panel however considers it premature to implement specific additional reporting obligations prior to the indistinct events framework having been implemented and sufficient experience gained in its operation.

The Panel understands AEMO is currently updating the reclassification criteria according to the changes made through the Indistinct events rule, which will be completed in March 2023. This makes it difficult to determine what events resulting from this limb should be reviewable under the guidelines prior to AEMO updating the reclassification criteria and contingency event framework. The Panel also notes that the AEMC will be conducting a review of the contingency event framework within five years of the implementation of the final indistinct events rule.

The Panel, therefore, recommends that AEMO request a subsequent review be conducted once the Indistinct events rule has been fully implemented and the AEMC has conducted its review of this framework. This would also provide time for AEMO to gain appropriate operating experience with the new framework and definition, such that they are able to recommend effective changes.

**BOX 8: RELIABILITY PANEL'S FINAL POSITION — THE PANEL HAS DECIDED TO LIMIT REPORTING UNDER GUIDELINE SECTION 1 TO CONTINGENCY EVENTS INVOLVING PLANT FAILURE OR REMOVAL FROM SERVICE.**

The Panel has decided to exclude the second limb of the new definition of contingency event in clause 4.2.3 of the NER as a reviewable operating incident report trigger. (i.e., non-credible contingency or multiple credible contingencies resulting from sudden or unplanned changes in energy flow). The Panel is also recommending that AEMO consider requesting a subsequent review be conducted once the Indistinct events rule has been fully implemented and appropriate operational experience has been gained.

## 4.2 Defining north, central, and south Queensland region boundaries.

Section 2 of the guidelines specifies 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 north, central, or south Queensland regions.

The Panel understands this reference to these Queensland 'regions' refer to SRAS sub-networks 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,<sup>39</sup> 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.<sup>40</sup>

Section 2 of the guideline is therefore out of date and requires updating. The Panel 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 that applied prior to 2014 or on some other basis.

#### 4.2.1

##### Panel's draft decision and stakeholder views

The Panel's draft position was 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 the 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.

In making its draft decision, the Panel considered 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 prone to electrical separation at various points, and the significant population centres along the Queensland coast further justify retention of a multi-region approach.

The Panel's draft decision was that 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.<sup>41</sup> The Panel's draft approach was to define the boundaries consistent with the SRAS subnetworks that applied at the time of the Panel's last review of the guidelines.<sup>42</sup>

In their submissions, the AER and CS Energy did not raise any issue with the Panel's draft position on managing recent changes to QLD SRAS subnetwork.<sup>43</sup>

39 This occurred in a 2014 AEMO review of the SRAS networks. Further information can be found [here](#).

40 AEMO 2020, System restart ancillary services guideline 2020 – final report and determination, available [here](#)

41 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.

42 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.

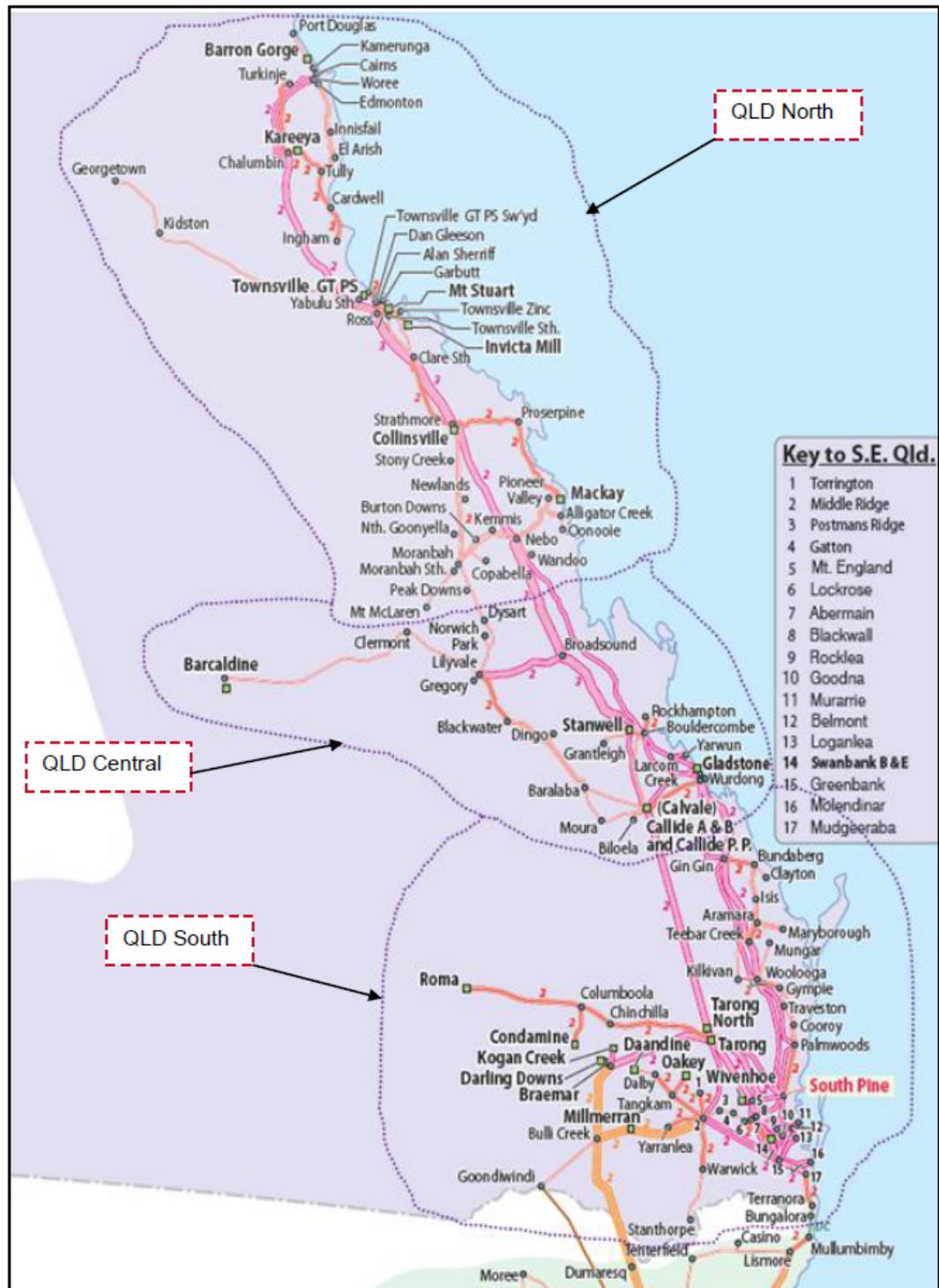
43 Submissions to the directions paper: AER, p.1-2 and CS Energy, p.1-3.

#### 4.2.2 Panel final decision and considerations

Following stakeholder feedback, the Panel has determined to maintain its draft position set out in the draft report. This is to retain references to north, central, and south Queensland for the purposes of major supply disruption reporting and define region boundaries consistent with the three Queensland subnetworks that existed in 2013. These region boundaries will be set out as an appendix in the guidelines. The map of the 2012-13 Queensland SRAS subnetwork boundaries that appears in appendix A of the guidelines can be found in figure 4.1 below.

The Panel considers this change will ensure that the loss of 60% of north, central or south Queensland load would continue to constitute a reviewable operating incident according to the guidelines. Reporting obligations consistent with the SRAS regions that existed in 2013 will reflect the characteristics of the Queensland network, the system security risks associated with potential separation at vulnerable points, and the community interest given the significant population centres along the Queensland coast. The Panel considers these factors to justify the retention of a multi-region approach in Queensland to ensure that major disruption impacting consumers is investigated and reported on by AEMO.

Figure 4.1: 2012-2013 Queensland SRAS electrical subnetworks



Source: AEMO

Map of the 2012-13 Queensland SRAS subnetwork boundaries, as it appears in appendix A of

the draft guidelines

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

The Panel has updated 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.

## 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 rule
NSP	Network Service Provider
SRAS	System Restart Ancillary Services
UFLS	Under Frequency Load Shedding
TNSP	Transmission Network Service Provider

## A SUMMARY OF OTHER ISSUES RAISED IN SUBMISSIONS

This appendix sets out the issues raised in the consultation on the draft report and the Panel's response to each issue. If an issue raised in a submission has been discussed in the main body of this document, it has not been included in this table.

**Table A.1: Summary of other issues raised in submissions**

STAKEHOLDER	ISSUE	RELIABILITY PANEL RESPONSE
CS Energy	There is a lack of a more holistic consideration of power system security frameworks, and the Reliability Panel needs to clarify what is meant by consistency with power system security standards as part of this consultation.	The Panel has been informed of these issues and they will be considered as part of the Panel's future work program, through workstreams such as the Annual performance Review (AMPR).
CS Energy	Recommendations made through reviewable operating incident reports should be tracked to detail progress status, any delay and associated reasons and updates on completion timeframes.	

Source: