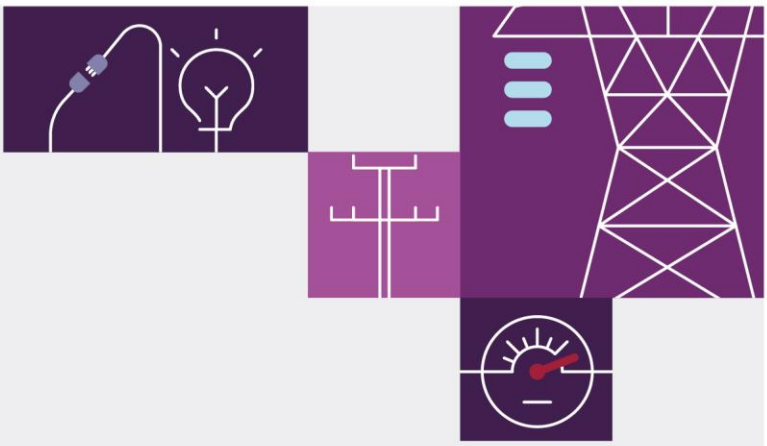
Armidale to Dumaresq 330 kV line trip at the Armidale end only on 29 August 2022

January 2023

Reviewable Operating Incident Report under the National Electricity Rules



Important notice

Purpose

AEMO has prepared this report in accordance with clause 4.8.15(c) of the National Electricity Rules, using information available as at the date of publication, unless otherwise specified.

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If you have any questions or comments in relation to this report, please contact AEMO at system.incident@aemo.com.au.

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Abbreviations

Abbreviation	Term
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
kV	Kilovolt
MW	Megawatts
NEM	National Electricity Market
NER	National Electricity Rules
TNSP	Transmission Network Service Provider

Incident review

This reviewable operating incident[1] report is prepared in accordance with clause 4.8.15(c) of the National Electricity Rules (NER). It has been prepared using information provided by Transgrid[2] and from AEMO systems.

Table 1 Summary of the event

	Details
Reviewable operating incident type	Non-credible contingency event impacting critical transmission elements[3].
Incident details	This report relates to a reviewable operating incident[4] that occurred on 29 August 2022 in New South Wales. The incident involved the trip of the Armidale to Dumaresq (8C) 330 kilovolts (kV) line at the Armidale end.
Incident classification	Protection and control system mal-operation – mal-operation of protection relay at Dumaresq 330 kV substation.
Generation impact	Nil
Customer load impact	Nil
Pre-incident conditions	Transgrid staff had recently completed protection work on the 8C 330 kV line's No.1 protection system at the Dumaresq 330 kV substation. This work had been completed with the 8C 330 kV line in service. As the protection work was completed, Transgrid staff were removing the protection system isolations from the 8C 330 kV line. Just prior to the event, power flow on the Queensland – New South Wales Interconnector (QNI) was approximately 900 megawatts (MW).
Incident key events	1. At 1259 hrs on 29 August 2022, the 8C 330 kV line tripped at the Armidale end only, offloading the line. 2. At 1303 hrs on 29 August 2022, the 8C 330 kV line was restored.
Incident cause	Post-incident investigation by Transgrid has concluded: • A Transgrid technician was on site at the Dumaresq 330 kV substation removing isolations from the 8C 330 kV line's No.1 protection system. This work was being completed with the 8C 330 kV line in service. • While the Transgrid technician was removing the protection system isolations from circuit breaker (CB) 5012 at Dumaresq 330 kV substation, the protection relay mal-operated and sent an intertrip signal, causing CB 8C2 at Armidale substation to trip and therefore offloading the 8C 330 kV line at Armidale end only (see Figure 1). The event occurred when the Transgrid technician restored the differential protection communication fibres on the protection relay. • As the protection isolations at the Dumaresq 330 kV substation had not yet been restored, the CBs at the Dumaresq end of the 8C 330 kV line did not trip. • The root cause of the incident has been identified as a protection and control system mal-operation.
Power system response (facilities and services)	There were no other material impacts on the broader power system, load, or generation.
Rectification	Following the opening of the 8C 330 kV line at the Armidale end, Transgrid has confirmed that: • Transgrid has updated isolation procedures to ensure that the protection system is isolated such that a relay mal-operation under similar conditions will not cause in service equipment to trip. • The protection relay appeared to mal-operate upon restoration of the communications circuit. To confirm this and identify whether further action is required, Transgrid has shared protection relays logs from this incident with the relay manufacturer for analysis.

[1] Reviewable operating incidents are defined by NER clause 4.8.15(a) and the Australian Energy Market Commission (AEMC) Reliability Panel Guidelines for Identifying Reviewable Operating Incidents.

[2] Transgrid is the Transmission Network Service Provider (TNSP) for New South Wales and Australian Capital Territory.

[3] This incident was reviewed under the AEMC Reliability Panel Guidelines for identifying reviewable operating incidents which applied from 1 April 2013 to September 2022. This version of the Guidelines can be found at https://www.aemc.gov.au/sites/default/files/2018-02/Final-revised-guidelines.pdf.

[4] See NER clause 4.8.15(a)(1)(i), as the event relates to a non-credible contingency event; and the AEMC Reliability Panel Guidelines for Identifying Reviewable Operating Incidents.

	Details
Power system security	The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard[5] was met for this incident.
Reclassification	AEMO assessed whether to reclassify this incident as a credible contingency event[5]. The cause of this incident was identified and rectified by Transgrid and AEMO was satisfied that another occurrence of this event was unlikely under the current circumstances. Therefore, AEMO correctly identified that reclassification was not required.
Market information	AEMO issued Market Notice 101401 at 1259 hrs on 29 August 2022 – the advice of non-credible contingency event (this market notice was issued in accordance with NER requirements).
Conclusions	AEMO has concluded that: 1. On 29 August 2022, during the restoration of protection isolations on the 8C 330 kV line, CB 5012 at the Dumaresq 330 kV substation the protection relay mal-operated and sent an intertrip signal to the Armidale 330 kV substation. This caused CB 8C2 to trip, offloading the 8C 330 kV line at Armidale end only. 2. The cause of this incident was identified and rectified by Transgrid and AEMO was satisfied that the event was unlikely to reoccur under the current circumstances. Therefore, AEMO correctly identified that reclassification was not required. 3. The power system remained in a secure operating state throughout this incident. 4. The root cause of the incident has been identified as a protection and control system mal-operation.
Recommendations	1. Transgrid to share findings of the relay manufacturer's investigation and any further recommended actions with AEMO and other TNSPs. 2. AEMO plans to share the findings from this event with the Power System Security Working Group by Q2 2023.

[5] AEMO is required to assess whether or not to reclassify a non-credible contingency event as a credible contingency event – NER clause 4.2.3A(c) – and to report how the reclassification criteria were applied – NER clause 4.8.15(ca).

Figure 1 Post-incident diagram