

Trip of Waratah West B 330 kV Busbar on 25 May 2022

September 2022

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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Contact

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

The NEM operates on Australian Eastern Standard Time (AEST). All times in this report are in AEST.

Abbreviations

Abbreviation	Term
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
CB	Circuit breaker
kV	Kilovolt
MW	Megawatts
NEM	National Electricity Market
NER	National Electricity Rules
NSP	Network Service Provider
OLTC	On load tap changer
TNSP	Transmission Network Service Provider

Incident review

This reviewable operating incident¹ 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 Transgrid² and from AEMO systems.

Table 1 Summary of event

Details	
Reviewable operating incident type	Non-credible contingency event impacting critical transmission elements.
Incident details	This report relates to a reviewable operating incident ³ that occurred on 25 May 2022 in New South Wales. The incident involved the trip of the Waratah West B 330 kilovolt (kV) Busbar.
Incident classification	Other causes – incorrect isolation information in Transgrid database.
Generation impact	Nil.
Customer load impact	Nil.
Pre-incident conditions	Transgrid staff were carrying out maintenance activities on the Waratah West No. 3 330/132 kV transformer at the time of the busbar trip. In addition, the Waratah West No. 3 330/132 kV transformer 132 kV circuit breakers (CBs) were opened to undergo maintenance.
Incident key events	<ol style="list-style-type: none"> At 1250 hrs on 25 May 2022, the Waratah West B 330 kV busbar and its associated CBs (CB 9W2B and CB 962B) tripped (see Figure 1). At 1429 hrs on 25 May 2022, the Waratah West B 330 kV busbar was returned to service.
Incident cause	<p>Post incident investigation by Transgrid has confirmed:</p> <ul style="list-style-type: none"> On 25 May 2022, the isolations established to allow work on the Waratah West No. 3 330/132 kV transformer secondary systems were incorrect. The transformer's on load tap changer (OLTC) Buchholz trip links were isolated instead of its trip input links. Due to these incorrect isolations, planned work on the transformer's secondary systems caused the Waratah West No. 3 330/132 kV transformer No. 1 protection to operate unexpectedly. The transformer protection operated in line with its settings and opened CB 9W2B and CB 962B successfully, disconnecting the Waratah West B 330 kV busbar from the system. Transgrid has identified the root cause of this incident as incorrect information in the database used to identify the isolations required for secondary system work on the transformer. Transgrid has confirmed that its protection link database information has now been updated with the correct link numbers.
Power system response (facilities and services)	There were no other material impacts on the broader power system, load, or generation.

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 Participant is a transmission network service provider (TNSP) for Waratah Substation.

³ 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	
Rectification	<p>Following the trip of the Waratah West B 330 kV busbar, Transgrid staff identified the correct isolation link by cross checking the following sources of information:</p> <ul style="list-style-type: none"> • The onsite link schedule. • The links recorded in Transgrid's protection link database. • The available site drawings. <p>The isolations were corrected by Transgrid staff prior to the Waratah West B 330 kV busbar's return to service. Transgrid has confirmed the protection links database used during this incident has been updated with the correct link numbers to avoid the reoccurrence of any similar incidents.</p> <p>Transgrid has also checked a sample of the relays involved in this incident, cross checking site drawings and link details in its protection link database. This review has confirmed that this incident was an isolated event and unlikely to reoccur.</p>
Power system security	<p>The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard⁴ was met for this incident.</p>
Reclassification	<p>AEMO assessed whether to reclassify this incident as a credible contingency event⁵.</p> <p>The cause of this incident was identified and rectified by Transgrid and AEMO was satisfied that another occurrence of this event was unlikely prior to the equipment's return to service. Therefore, AEMO correctly identified reclassification was not required.</p>
Market information	<p>For this incident, AEMO issued the following market notice (this market notice was issued in accordance with NER requirements):</p> <ul style="list-style-type: none"> • AEMO issued Market Notice 96555 at 0143 hrs on 25 May 2022 (approximately 53 minutes after the incident) – Advice of non-credible contingency event. The cause of this non credible contingency event had been identified and AEMO was satisfied that another occurrence of this event was unlikely.
Conclusions	<p>AEMO has concluded that:</p> <ol style="list-style-type: none"> 1. On 25 May 2022, incorrect isolations on the Waratah West No. 3 330/132 kV transformer secondary system caused the transformer protection to operate during planned secondary system works. This protection operation tripped CB 9W2B and 962B disconnecting the Waratah West B 330 kV Busbar from the system. 2. Transgrid has identified the root cause of this incident as incorrect information in the database used to identify the isolations required for secondary system work on the transformer. Transgrid has confirmed the protection links database used during this incident has been updated with the correct link numbers to avoid the reoccurrence of any similar incidents. Furthermore, Transgrid has also checked a sample of the relays involved in this incident, cross checking site drawings and link details in their protection link database. This review has confirmed that this incident was an isolated event and unlikely to reoccur. 3. The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard was met for this incident.
Recommendations	<p>AEMO recommends that network service providers (NSPs) consider updating working practices to include a cross check of all available sources of isolation information (such as site drawings, databases, and as built diagrams) prior to establishing isolations and commencing work.</p>

⁴ Frequency Operating Standard, effective 1 January 2020, available at <https://www.aemc.gov.au/media/87484>.

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 Incident diagram

Waratah West Substation

