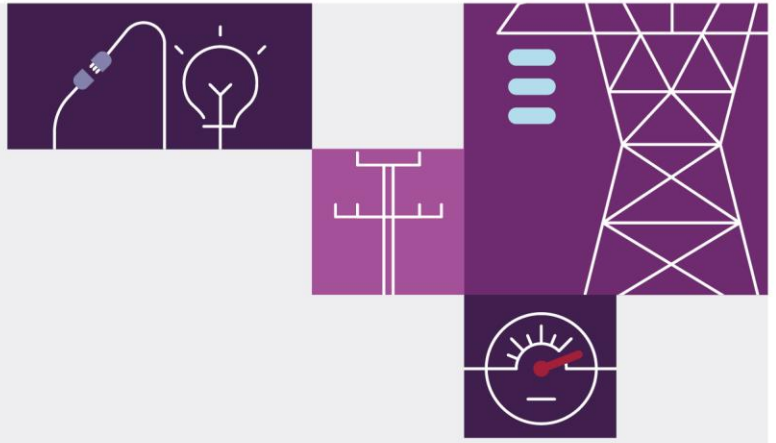


Trip of Tungkillo East 275 kV Busbar on 4 September 2023

January 2024

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.

Disclaimer

To inform its review and the findings expressed in this report, AEMO has been provided with data by registered participants as to the status or response of some facilities before, during and after the reviewable incident, and has also collated information from its own observations, records and systems. Any views expressed in this report are those of AEMO unless otherwise stated, and may be based on information given to AEMO by other persons. AEMO has made reasonable efforts to ensure the quality of the information in this report but cannot guarantee its accuracy or completeness. Any views expressed in this report may be based on information given to AEMO by other persons.

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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
FOS	Frequency Operating Standard
kV	Kilovolt/s
MN	Market Notice
NEM	National Electricity Market
NER	National Electricity Rules
PSSWG	Power System Security Working Group
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 ElectraNet² 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 4 September 2023 in South Australia. The incident involved the trip of the Tungkillo East 275 kilovolt (kV) busbar.
Incident classification	Other causes – Human error. Bypass of secondary isolation when fitting test wiring.
Generation impact	No generation was lost as a result of this incident.
Customer load impact	No load was lost as a result of this incident.
Pre-incident conditions	Prior to the event, ElectraNet contractors were undertaking protection testing works related to the future Tungkillo – Robertstown 275 kV No. 2 and Tungkillo – Para 275 kV No. 2 lines. Figure 1 illustrates the pre-incident network configuration.
Incident key events	<ol style="list-style-type: none"> At 1252 hrs on 4 September 2023, the Tungkillo 275 kV East busbar zone protection operated and circuit breaker (CB) 6546, CB 8066 and CB 6507 opened to de-energise the Tungkillo East 275 kV busbar. At 1340 hrs on 4 September 2023, Tungkillo 275 kV East busbar was returned to service.
Incident cause	<p>Post incident investigation by ElectraNet has concluded that:</p> <ul style="list-style-type: none"> During the time of the incident, ElectraNet contractors were testing newly installed line protection and accidentally bypassed an established isolation point, applying a test voltage to a previously isolated protection circuit. The applied test voltage initiated a trip to in-service bus zone protection which operated in line with its design and tripped CB 6546, CB 8066 and CB 6507, de-energising the Tungkillo East 275 kV busbar. <p>Figure 2 illustrates the post-incident network configuration.</p>
Power system response (facilities and services)	There was no other material impact on the broader power system, load, or generation.
Rectification	<p>On the day of the incident, ElectraNet contractors checked the test voltage connections after the busbar trip and then identified and rectified the connection error.</p> <p>The ElectraNet contractor has now modified their isolation procedure to include identification of circuits which must not be energised with isolating blocking pins. These pins prevent the fitting of test leads into terminals which must remain isolated.</p> <p>In addition, ElectraNet has updated its design standards to include additional isolation points for secondary circuits.</p>
Power system security	The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard ⁴ (FOS) was met for this incident.

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

² ElectraNet is a transmission network service provider (TNSP) for South Australia.

³ See NER 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.

⁴ Frequency Operating Standard; see <https://www.aemc.gov.au/sites/default/files/2020-01/Frequency%20operating%20standard%20-%20effective%201%20January%202020%20-%20TYPO%20corrected%2019DEC2019.PDF>.

Details	
Reclassification	AEMO assessed whether to reclassify this incident as a credible contingency event ⁵ . ElectraNet advised AEMO that the root cause of the non-credible contingency event was an inadvertent trip during site works. As the root cause had been identified, AEMO was satisfied another occurrence of this event was unlikely. Therefore, AEMO appropriately applied the reclassification criteria and determined the reclassification criteria were not met based on the information available to AEMO at the time.
Market information	For this incident, AEMO issued the following market notices (all market notices for this incident were issued in accordance with NER requirements): <ul style="list-style-type: none"> • AEMO issued Market Notice (MN) 109561 at 1315 hrs on 4 September 2023 to advise the market of the non-credible contingency event involving the trip of the Tungkillo East 275 kV busbar. The MN also advised the market that AEMO did not instruct load shedding nor was AEMO advised of any bulk load disconnections. The cause was not known at this stage. • AEMO issued MN 109563 at 1353 hrs on 4 September 2023 to advise the market that the Tungkillo East 275 kV busbar was returned to service. The MN also advised the market that the root cause of the non-credible contingency event had been identified and that it was unlikely to re-occur in the present conditions.
Conclusions	AEMO has concluded that: <ol style="list-style-type: none"> 1. At 1252 hrs on 4 September 2023, Tungkillo 275 kV East busbar tripped due to an ElectraNet contractor accidentally bypassing protection isolation during testing. This caused the in-service Tungkillo East busbar protection to operate. 2. The power system remained in a secure operating state and the FOS was met throughout this incident and the busbar was returned to service at 1340 hrs on 4 September 2023. 3. The cause of the incident was identified by ElectraNet and AEMO was satisfied that the event was unlikely to reoccur under the current circumstances.
Recommendations	AEMO and ElectraNet to share the findings of this incident and the updated isolation procedures with the Power System Security Working Group (PSSWG) by Q2 2024 so that TNSPs may consider any implications for their maintenance practices.

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

Figure 1 Pre-incident diagram – Tungkillo substation

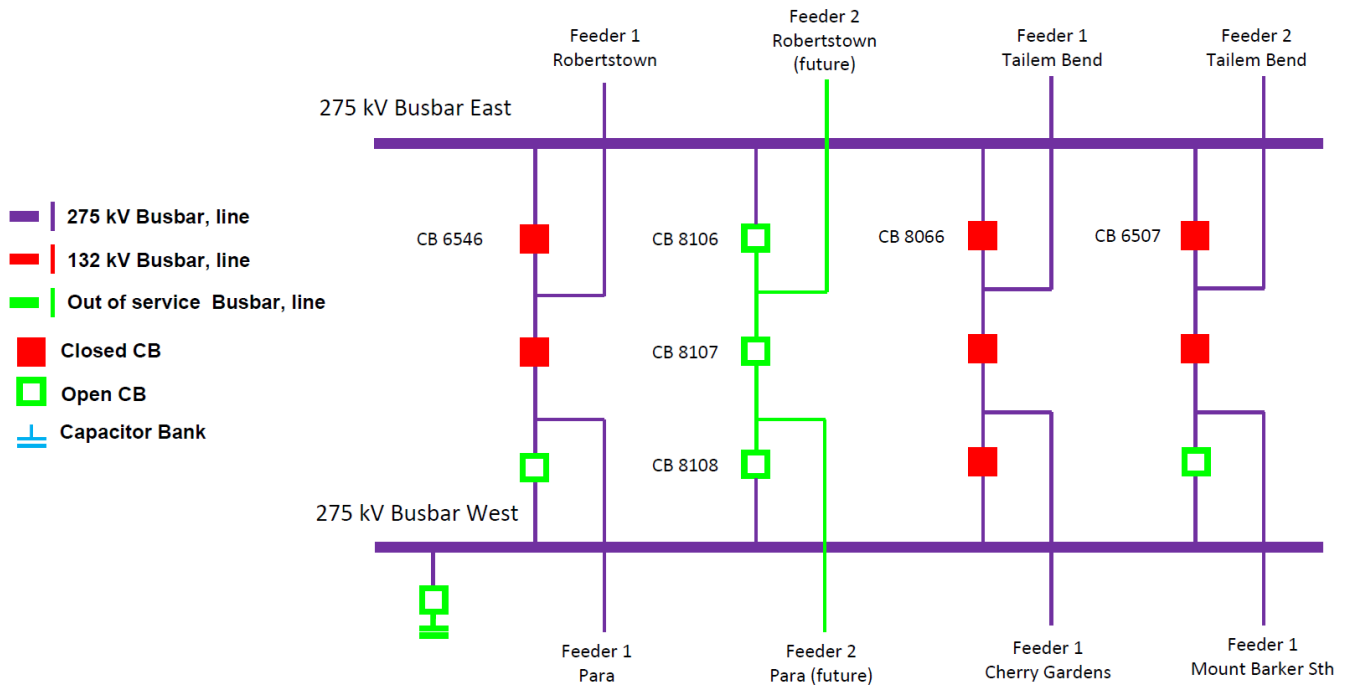


Figure 2 Post-incident diagram – Tungkillo substation

