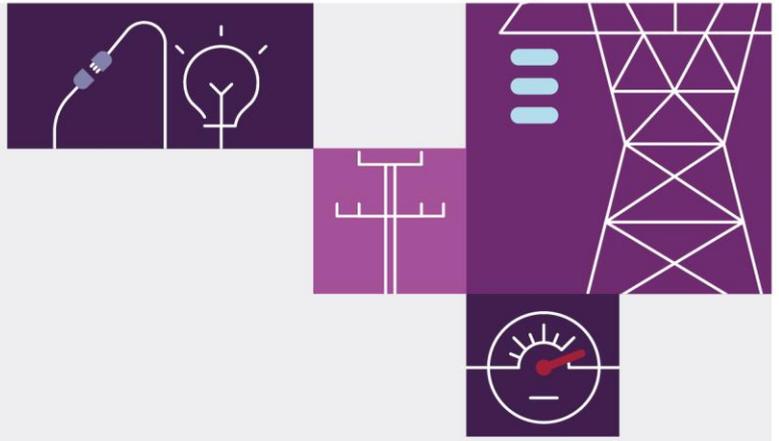


Trip of Para 275 kV West Left busbar on 14 November 2023

April 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.

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
CB	circuit breaker
CT	current transformer
HV	high voltage
IR	insulation resistance
kV	kilovolt/s
MN	market notice
MSP	maintenance service provider
MW	megawatt/s
NEM	National Electricity Market
NER	National Electricity Rules
TF1	No. 1 transformer
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 14 November 2023 in South Australia. The incident involved the trip of the Para 275 kilovolt (kV) West Left busbar.
Incident classification	Procedural error/lack of procedures – No suitable procedures for testing of in-service CT available for ElectraNet’s maintenance service provider (MSP) staff and MSP staff unfamiliar with/not trained in testing of in-service equipment.
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 this incident, the Para 275/66 kV No. 1 transformer (TF1) located at Para substation was out of service and was due to be re-energised on 14 November 2023 (see Figure 1). Before re-energising the out of service plant, ElectraNet’s MSP had planned to undertake a primary insulation resistance (IR) test of the plant, including the 275 kV current transformers (CT) associated with circuit breaker (CB) 6544. These CTs were still connected to in-service protection systems at the Para substation. ElectraNet’s MSP followed its standard process for IR testing and earthed the 275 kV CT secondary connections.
Incident key events	On 14 November 2023, the following events occurred: <ol style="list-style-type: none"> At 1045 hrs, the Para 275 kV West Left busbar set X and set Y protection systems operated and tripped CB 6541, CB 6515, CB 6519 and CB 8035, tripping the Para 275 kV West Left busbar (see Figure 2). At 1124 hrs, the Para 275 kV West Left busbar was returned to service.
Incident cause	Post-incident investigation by ElectraNet has confirmed that: <ul style="list-style-type: none"> At 1045 hrs on 14 November 2023, the Para 275 kV West Left busbar set X and set Y protection systems operated when additional earthing was connected to the CT secondaries associated with CB 6544. The earthing of these CT secondaries caused a circulating current in the affected CTs. This circulating current caused the Para 275 kV West Left busbar protection system to operate. Prior to the connection of additional earthing, the 275 kV CTs associated with CB 6544 were not isolated from in-service protection systems, including the Para 275 kV West Left busbar set X and set Y protection systems. A subsequent investigation undertaken by ElectraNet’s MSP has identified that the staff involved in this incident had limited experience in testing of in-service equipment. As such, they were not aware that fitting earth connections to the CT secondary wiring would create circulating current paths and would create a trip risk if no secondary isolations were in place. In addition, the ElectraNet’s MSP has identified that they had no suitable procedures or instructions in place for carrying out this type of work.
Power system response (facilities and services)	There was no other material impact on the broader power system, load or generation.
Rectification	ElectraNet has confirmed that the root cause of the incident was due to procedural error. A subsequent investigation by ElectraNet’s MSP has established a requirement for additional training and the need to review specific procedures and instructions in place for undertaking this type of work. Subsequently, ElectraNet’s MSP

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 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(1) event; and the AEMC Reliability Panel Guidelines for Identifying Reviewable Operating Incidents.

Details	
	has completed the review, updated its relevant procedures, and arranged secondary isolation familiarisation training for its staff and ensured its staff attend these training sessions every two years.
Power system security	The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard ⁴ was met for this incident.
Reclassification	<p>AEMO assessed whether to reclassify this incident as a credible contingency event⁵.</p> <p>Prior to the Para 275 kV West Left busbar’s return to service, ElectraNet advised AEMO that this event was caused by human error associated with the ongoing outage on the Para TF1, and that the event was unlikely to re-occur in the present circumstances. AEMO was able to obtain the appropriate level of assurance to determine that recurrence of this incident was not reasonably possible.</p> <p>AEMO appropriately applied the reclassification criteria and determined the reclassification criteria were not met based on the information available to AEMO at the time.</p>
Market information	<p>For this incident, AEMO issued the following market notices (MNs) (all market notices for this incident were issued in accordance with NER requirements):</p> <ul style="list-style-type: none"> • AEMO issued MN 111252 at 1109 hrs on 14 November 2023 to advise the market of the non-credible contingency event involving the trip of Para 275 kV West Left busbar. • AEMO issued MN 111253 at 1137 hrs on 14 November 2023 to advise the market that the cause of this non-credible contingency event had been identified, that AEMO was satisfied that recurrence of this event was considered unlikely under the present circumstances, and that the Para 275 kV West Left busbar had been returned to service.
Recommendations	<ol style="list-style-type: none"> 1. ElectraNet to ensure all working parties follow standard operating procedure to correctly perform the standard tests on high voltage (HV) transmission elements. 2. By Q3 2024, AEMO will discuss the findings of this incident with the Power System Security Working Group (PSSWG) and seek confirmation that all Network Service Providers consider busbar risk of trip assessment and have procedures in place to ensure only suitably trained staff with the required competence are assigned to in-service protection works.

⁴ Frequency Operating Standard, effective 1 January 2020, available at <https://www.aemc.gov.au/market-reviews-advice/review-frequency-operating-standard-2022>.

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 Incident diagram – Para substation equipment status immediately prior to the incident

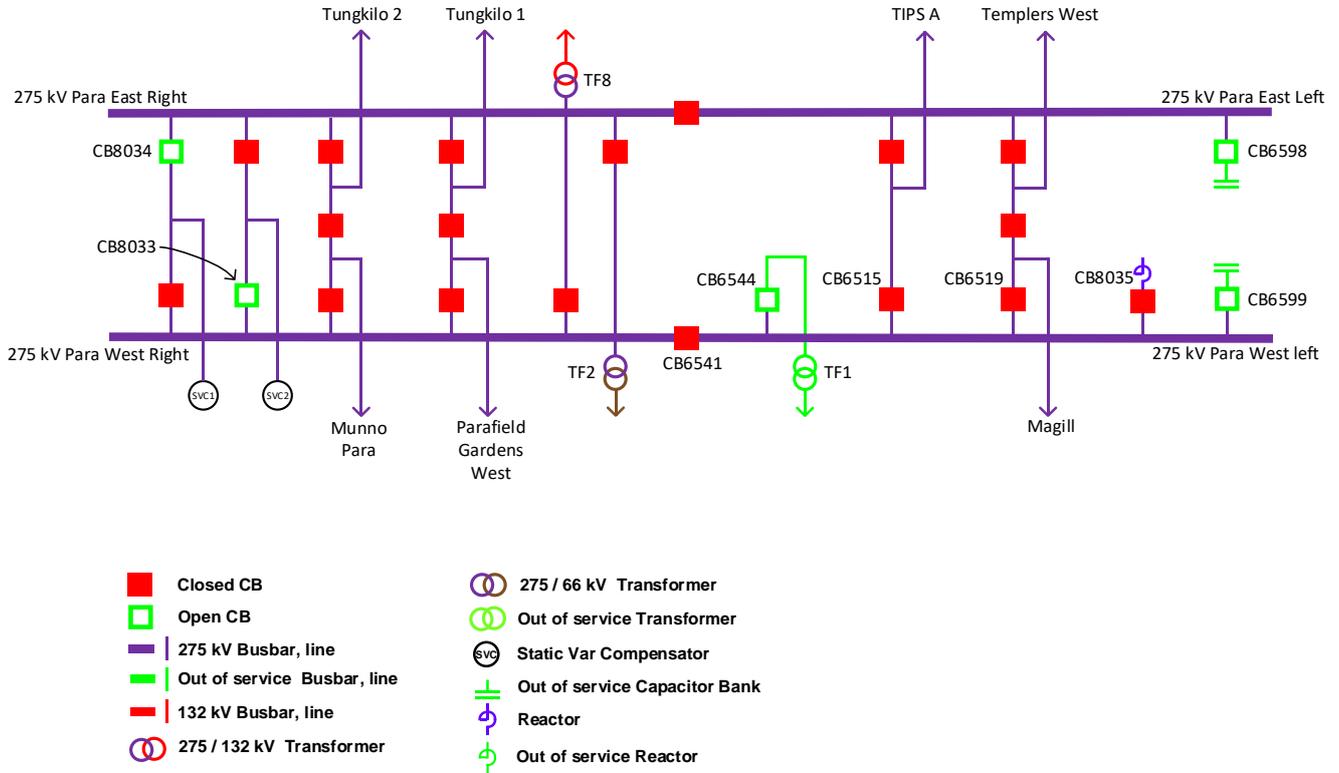


Figure 2 Incident diagram – Para substation equipment status immediately following the incident

