

Trip of Collector Wind Farm 330 kV A Busbar on 26 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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Contact

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

The National Electricity Market (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
FOS	Frequency Operating Standard
HV	high voltage
kV	kilovolt/s
MW	megawatt/s
NEM	National Electricity Market
NER	National Electricity Rules
PSSWG	Power System Security Working Group
REF	Restricted Earth Fault
TNSP	Transmission Network Service Provider
WF	wind farm

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 – Trip of Collector Wind Farm (WF) 330 kV (kilovolt) A busbar

Details	
Reviewable operating incident type	Non-credible contingency event impacting critical transmission elements.
Incident details	This report relates to the reviewable operating incident ³ that occurred on 26 August 2022 in New South Wales. The incident involved the trip of the Collector WF 330 kV A busbar, the Collector WF 33 kV No. 2 busbar and their associated circuit breakers (CBs).
Incident classification	Other causes – human error.
Generation impact	There was a reduction of 4 megawatts (MW) output from the Collector WF immediately after the incident occurred.
Customer load impact	Nil.
Pre-incident conditions	Prior to the event, the Collector WF 330/33 kV No. 2 transformer was isolated and earthed for maintenance and high voltage testing. The transformer and its associated switching devices including isolator 5421 and CB 2422 were out of service as shown in Figure 1.
Incident key events	<p>On 26 August 2022:</p> <ol style="list-style-type: none"> At 0823 hrs, the Collector WF 330 kV A busbar (CB 5412A and CB 42B) and the 33 kV bus section CB (CB 2102) tripped. As a result, all the circuit breakers attached to the 33 kV No. 2 busbar including CB 52, CB 62, CB 72, CB 42 and CB 2722 were tripped as shown in Figure 2. AEMO and Transgrid observed a 4 MW reduction in the output from Collector WF post-incident. The output from Collector WF was approximately 10.69 MW pre-incident and immediately dropped to 6.68 MW post-incident. At 1214 hrs, the Collector WF 330 kV A busbar, the 330/33 kV No. 2 transformer and the Collector WF 33 kV No. 2 busbar were returned to service.
Incident cause	During high voltage (HV) switching to restore the Collector WF No. 2 transformer, following the completion of routine maintenance, Transgrid technicians were demagnetizing and restoring current transformer (CT) isolations. Due to a human error, current was inadvertently injected into the Collector WF No. 2 transformer Neutral/Restricted Earth Fault (REF) CTs. This caused the REF protection to operate and trip the Collector WF 330 kV A busbar, the 33 kV bus section CB (CB 2102) and the Collector WF 33 kV No. 2 busbar.
Power system response (facilities and services)	There were no other material impacts on the broader power system, load, or generation.
Rectification	<p>Following the incident on 26 August 2022, Transgrid has taken the following action:</p> <ul style="list-style-type: none"> Transgrid has updated its procedure for CT isolation/restoration. As part of this update, the sequence for the restoration and demagnetisation of CTs has been amended to reduce the likelihood of human error.

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 a Transmission Network Service Provider (TNSP) for New South Wales.

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	
Power system security	The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard (FOS) ⁴ was met for this incident
Reclassification	AEMO assessed whether to reclassify this incident as a credible contingency event ⁵ . Transgrid identified the cause of this incident prior to the equipment's return to service. AEMO was satisfied that the incident was unlikely to re-occur and correctly identified that reclassification was not required.
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 101367 at 1006 hrs on 26 August 2022 – Advice of non-credible contingency event. • AEMO issued Market Notice 101370 at 1303 hrs on 26 August 2022 – Update of non-credible contingency event, advising that the cause of this non-credible contingency event had been identified and AEMO was satisfied that another occurrence of this event was unlikely under the current circumstances.
Conclusions	AEMO has concluded that: <ol style="list-style-type: none"> 1. On 26 August 2022, due to a human error, Transgrid technicians inadvertently injected current into the Collector WF No. 2 transformer REF CTs. This caused the REF protection to operate and trip the Collector WF 330 kV A busbar, the 33 kV bus section CB (CB 2102) and the 33 kV No. 2 busbar. 2. There was a reduction of 4 MW output from the Collector WF post-incident. 3. Transgrid identified the cause of this incident and returned the Collector WF 330 kV A busbar, the 330/33 kV No. 2 transformer and the Collector WF 33 kV No. 2 busbar to service. As the root cause had been identified, AEMO correctly identified there was no requirement to reclassify this incident as a credible contingency. 4. Transgrid has updated its procedure for CT isolation/restoration, amending the sequence for the restoration and demagnetisation of CTs to reduce the likelihood of human error. 5. The power system remained in a secure operating state throughout this incident and the FOS was met for this incident.
Recommendations	AEMO recommends that Transgrid shares details of this incident and the changes made to the CT restoration and demagnetisation sequence with the Power System Security Working Group (PSSWG).

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 Pre-incident diagram – Collector WF 330 kV substation

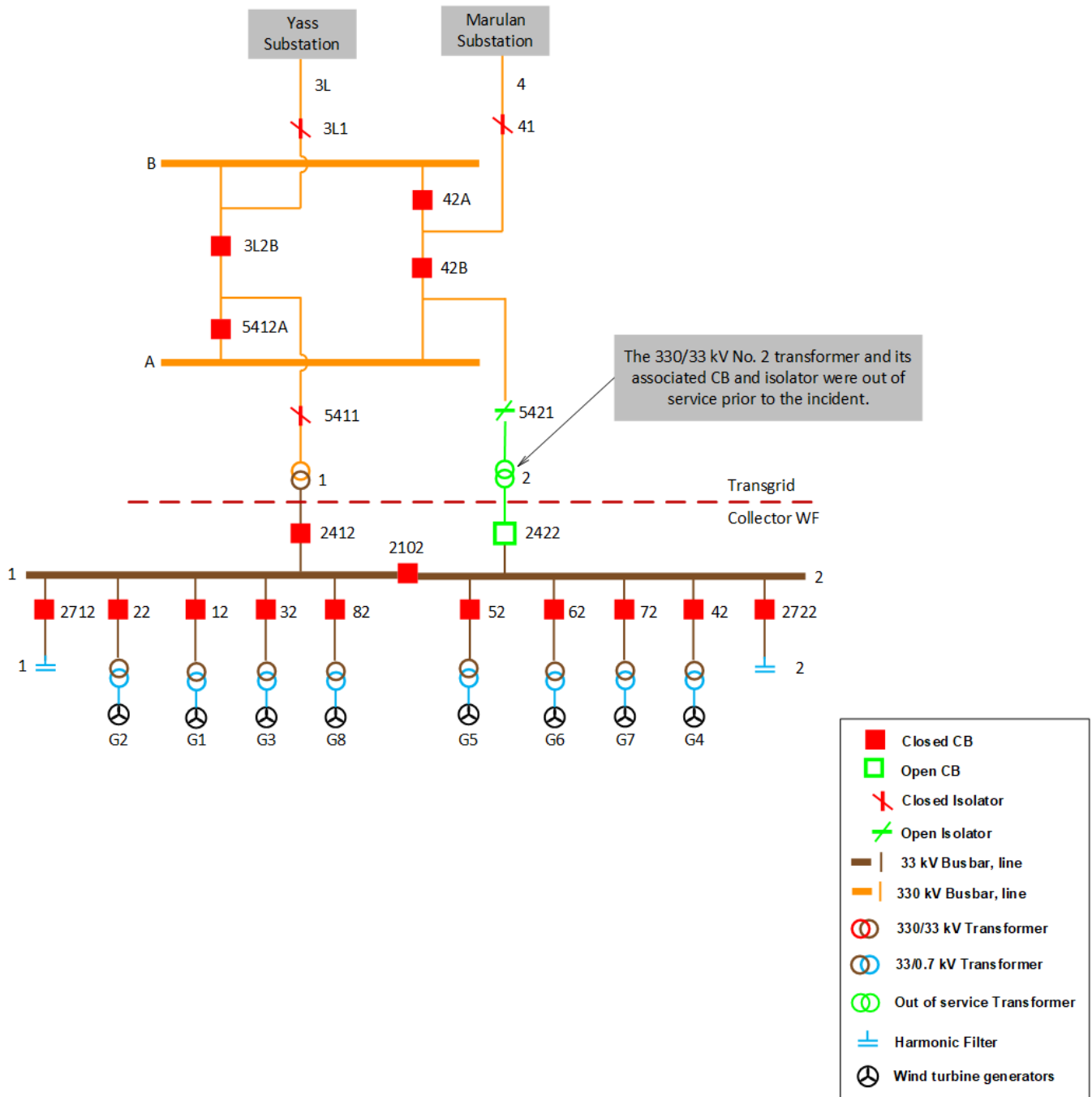


Figure 2 Post-incident diagram – Collector WF 330 kV substation

