

# Trip of Moorabool No. 2 500 kV busbar on 19 October 2023

March 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.

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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](mailto: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
CBF	circuit breaker fail
kV	kilovolt/s
MLTS	Moorabool Terminal Station
MOPS	Mortlake Power Station
NEM	National Electricity Market
NER	National Electricity Rules
TNSP	Transmission Network Service Provider

# Incident review

This reviewable operating incident<sup>1</sup> 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 AusNet<sup>2</sup> and from AEMO systems.

**Table 1 Summary of event**

Details	
<b>Reviewable operating incident type</b>	Non-credible contingency event impacting critical transmission elements.
<b>Incident details</b>	This report relates to a reviewable operating incident <sup>3</sup> that occurred on 19 October 2023 in Victoria. This incident involved the trip of the Moorabool Terminal Station (MLTS) No. 2 500 kilovolt (kV) busbar.
<b>Incident classification</b>	Other causes – Human error. Insufficient protection isolation due to: <ul style="list-style-type: none"> <li>• Outdated “As built” drawings stored in the site folder (inconsistent with AusNet procedures).</li> <li>• Failure of testing team to verify available site drawings against on site equipment.</li> </ul>
<b>Generation impact</b>	No generation was lost as a result of this incident.
<b>Customer load impact</b>	No customer load was tripped or automatically shed in response to these incidents.
<b>Previous incidents</b>	A non-credible contingency at MLTS previously occurred on 29 May 2023 <sup>4</sup> where the No. 1 220 kV busbar tripped due to a human error related to protection isolation. This busbar tripped during planned protection and control system upgrade work to the MLTS No. 1 220 kV capacitor bank. During this work, a short circuit of the two cores of a cable caused the circuit breaker fail (CBF) protection system of the MLTS No. 1 220 kV capacitor bank to operate and trip the MLTS No. 1 220 kV busbar.
<b>Pre-incident conditions</b>	Prior to the event, a secondary testing team was conducting routine protection maintenance testing on the MLTS – Mortlake Power Station (MOPS) line protection at MLTS.
<b>Incident key events</b>	On 19 October 2023, the following events occurred: <ul style="list-style-type: none"> <li>• At 1437 hrs the MLTS No. 2 500 kV busbar tripped (see Figure 1).</li> <li>• At 1447 hrs the MLTS No. 2 500 kV busbar was returned to service.</li> </ul>
<b>Incident cause</b>	Post-incident investigation by AusNet has confirmed that: <ul style="list-style-type: none"> <li>• At 1437 hrs on 19 October 2023, a secondary testing team was conducting routine protection maintenance of the MOPS 500 kV line at MLTS. During the relay testing, a CBF event initiated by MOPS line No. 2 busbar 500 kV CB caused the No. 2 500 kV busbar protection to operate and trip the MLTS No. 2 500 kV busbar.</li> <li>• It was identified that the CBF trip link of the panel under testing was not isolated and the station drawings did not reflect the actual wiring of the panel under test. Post-incident investigation confirmed that drawings used by the testing team to identify isolations for this work did not reflect the actual situation of the protection panel. The panel’s wiring had been modified in August 2023, but the station drawing folder had not been updated with the latest “as built” drawings. This was inconsistent with AusNet’s commissioning and construction requirements procedure which requires the latest “as built” drawings to be stored on site after any modifications are made.</li> <li>• In addition, AusNet’s procedures require testing teams to verify on site equipment against the available drawings before commencing the tests. AusNet’s investigation confirmed that the testing team had failed to correctly verify the site drawings prior to the works.</li> <li>• Finally, AusNet identified that the communication between the project team and the testing team before commencement of testing was not effective, as the recent onsite modifications to the panel were not discussed.</li> </ul>

<sup>1</sup> 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.

<sup>2</sup> AusNet is the Victoria Declared Shared Network Operator.

<sup>3</sup> 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.

<sup>4</sup> See [https://aemo.com.au/-/media/files/electricity/nem/market\\_notices\\_and\\_events/power\\_system\\_incident\\_reports/2023/trip-of-mlts-220kv-no-1-bus-trip-on-29-may-2023.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2023/trip-of-mlts-220kv-no-1-bus-trip-on-29-may-2023.pdf?la=en).

Details	
<b>Power system response (facilities and services)</b>	There was no other material impact on the broader power system, load or generation.
<b>Rectification</b>	<p>Immediately after this incident, the secondary testing team informed the AusNet Control room.</p> <p>After identifying the cause of the incident, at 1447 hrs on 19 October 2023, the MLTS No. 2 500 kV busbar was returned to service.</p> <p>Following the incident, AusNet replaced the drawings in the station folder with the latest “as built” drawings.</p> <p>A toolbox meeting was held to convey the learnings from the incident.</p> <p>In addition, AusNet conducted further awareness sessions in December 2023 for the Northwest testing team members to highlight the requirement to use the latest “as built” drawings when preparing protection isolation and the requirement to conduct final checks to confirm that on site isolations/equipment match the available drawings.</p> <p>AusNet has also confirmed that its procedures for drawing management during site works require that the latest “as built” drawings reflecting the status of the wiring on site are stored in the station folders and available to other work parties.</p>
<b>Power system security</b>	The power system remained in a secure operating state throughout this incident and the Frequency Operating Standard <sup>5</sup> was met.
<b>Reclassification</b>	<p>AEMO assessed whether to reclassify this incident as a credible contingency event<sup>6</sup>.</p> <p>The cause of this incident was identified and AEMO was satisfied that another occurrence of this event was unlikely under the current circumstances.</p> <p>Therefore, AEMO appropriately identified that reclassification was not required.</p>
<b>Market information</b>	For this incident, AEMO issued Market Notice (MN) 110331 at 1447 hrs on 19 October 2023 to advise the market of the non-credible contingency event involving the trip of the MLTS No. 2 500 kV busbar (market notice for this incident was issued in accordance with NER requirements).
<b>Conclusions</b>	<p>AEMO has concluded that:</p> <ol style="list-style-type: none"> <li>1. At 1437 hrs on 19 October 2023, site staff undertaking routine protection maintenance referred to out of date station drawings which led to the trip of MLTS No. 2 500 kV bus.</li> <li>2. The cause of this incident was identified by AusNet and AEMO was satisfied that the event was unlikely to reoccur under the current circumstances. Therefore, AEMO appropriately identified that reclassification was not required.</li> <li>3. The power system remained in a secure operating state and the Frequency Operating Standard was met throughout this incident.</li> </ol>
<b>Recommendations</b>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>

<sup>5</sup> Frequency Operating Standard, effective 9 October 2023, available at <https://www.aemc.gov.au/media/87484>.

<sup>6</sup> 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 Post-incident diagram

