

Hazelwood – Cranbourne No. 4 500 kV line trip at the Hazelwood end only on 2 March 2022

June 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
CBM	Circuit Breaker Management
CBTS	Cranbourne Terminal Station
HWTS	Hazelwood Terminal Station
kV	Kilovolt/s
LYPS	Loy Yang Power Station
MW	Megawatt/s
NEM	National Electricity Market
NER	National Electricity Rules
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 AusNet Services (AusNet)² and from AEMO systems.

Table 1 Summary of event

Details	
Reviewable operating incident type	Non-credible contingency event impacting critical transmission element.
Incident details	This report relates to a reviewable operating incident ³ that occurred on 2 March 2022 in Victoria. The incident involved the trip of Hazelwood – Cranbourne (HWTS – CBTS) No. 4 500 kilovolts (kV) line at the Hazelwood end only.
Incident classification	Protection/control system maloperation – faulty contact inputs in a relay.
Generation impact	No generation was lost as a result of this event.
Customer load impact	No customer load was tripped or automatically shed in response to this incident.
Pre-incident conditions	Prior to the incident, the CBTS No. 4 Line/No. 3 Bus (CBTS4/B3) Circuit Breaker (CB) was open due to a prior outage (See Figure 1).
Incident key events	<ol style="list-style-type: none"> At 2343 hrs on 2 March 2022: <ul style="list-style-type: none"> A pole discrepancy alarm and trip were received for the CBTS No. 4 Line/Loy Yang Power Station No. 3 Line (CBTS4/LYPS3) 500 kV CB at HWTS, and The CBTS4/LYPS3 500 kV CB tripped, offloading the HWTS – CBTS No. 4 500 kV line (See Figure 2). At 2350 hrs on 2 March 2022: <ul style="list-style-type: none"> The CBTS4/LYPS3 500 kV CB at HWTS was manually closed and held to return the HWTS – CBTS No. 4 500 kV line back into service.
Incident cause	<p>Post incident investigation by AusNet has confirmed:</p> <ul style="list-style-type: none"> The Circuit Breaker Management (CBM) relay was deemed to be faulty following an initial assessment. Therefore, AusNet arranged for the CBM relay to be replaced, and disabled the relay's pole discrepancy function. The CB has its own pole discrepancy function built-in, therefore, no protection or functionality would have been compromised by this action. Several pole discrepancy alarms were observed by AusNet in the days following the event but prior to the intended replacement of the CBM relay. Further investigations revealed that the contact inputs on the relay that indicated the closed status of the CB were faulty. This was identified as the root cause for the incident.
Power system response (facilities and services)	There were no other material impacts on the broader power system, load, or generation.
Rectification	AusNet has replaced the input module of the relay after finding that the contact inputs for indicating the CB status were faulty. Ultimately the CBM relay did not need to be fully replaced after the input module of the relay was replaced.
Power system security	The power system remained in a secure operating state throughout this incident/ the Frequency Operating Standard ⁴ was met for this incident.

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

² AusNet Services (AusNet) is a Transmission Network Service Provider (TNSP) for Victoria.

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.

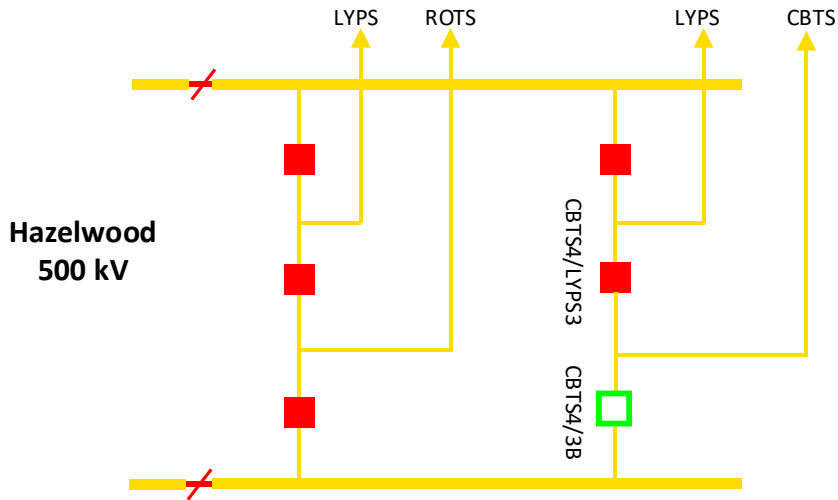
⁴ Frequency Operating Standard, effective 1 January 2020, at <https://www.aemc.gov.au/sites/default/files/2020-01/Frequency%20operating%20standard%20-%20effective%201%20January%202020%20-%20TYPO%20corrected%2019DEC2019.PDF>.

Details	
Reclassification	<p>AEMO assessed whether to reclassify this incident as a credible contingency event⁵.</p> <p>The cause of this non-credible contingency was not known to AEMO at the time of the event. As such, AEMO considered the HWTS – CBTS No. 4 500 kV line trip at HWTS end was reasonably possible to reoccur and correctly reclassified the event as a credible contingency.</p> <p>On 7 March 2022, AusNet advised AEMO that the faulty input module of the CBM relay had been replaced and confirmed that the event was no longer reasonably possible. AEMO then correctly cancelled the reclassification of this event as a credible contingency.</p>
Market information	<p>For this incident, AEMO issued the following market notices (all market notices for this incident were issued in accordance with NER requirements):</p> <ul style="list-style-type: none"> • AEMO issued Market Notice 95021 at 0006 hrs on 2 March 2022 – Advice of non-credible contingency event and reclassification of event as a credible contingency. • AEMO issued Market Notice 95024 at 0123 hrs on 3 March 2022 – Update to advice of reclassification of non-credible contingency event as credible. • AEMO issued Market Notice 95117 at 1452 hrs on 7 March 2022 – Cancellation of reclassification of a non-credible contingency event as a credible contingency event.
Conclusions	<p>AEMO has concluded that:</p> <ol style="list-style-type: none"> 1. A pole discrepancy alarm and trip were received for the LPYS/CBTS4 500 kV CB causing the HWTS – CBTS No. 4 500 kV line to trip at HWTS end. 2. AEMO correctly identified the need to reclassify this incident as a credible contingency until the cause of the incident had been identified and isolated. 3. The power system remained in a secure operating state throughout this incident. 4. The cause of the trip of Hazelwood – Cranbourne No. 4 500 kV line at Hazelwood end only was identified as the faulty contact inputs on the relay that indicated the closed status of the CB. 5. Following the event, AusNet replaced the input module of the relay after finding that the contact inputs for indicating the CB status were faulty.
Recommendations	Nil

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).

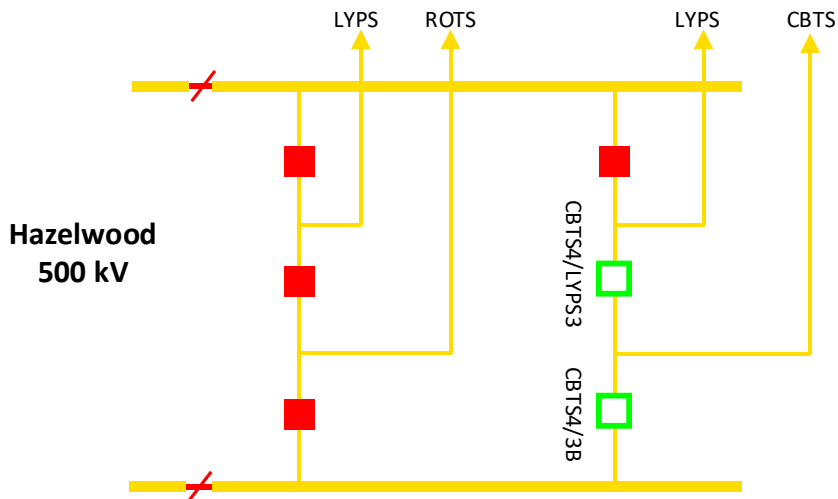


Figure 1 Incident diagram – system prior to the trip of LYPS3/CBTS4 500 kV CB



- Closed CB
- Open CB
- | 500 kV Busbar, line
- | Out of service Busbar, line

Figure 2 Incident diagram - system following the trip of LYPS3/CBTS4 500 kV CB



- Closed CB
- Open CB
- | 500 kV Busbar, line
- | Out of service Busbar, line