AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Trip of Heywood – South East No. 1 Line M1 Transformer 275 kV Circuit Breaker on 2 June 2021

September 2021

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
DC	Direct Current
HYTS	Heywood Terminal Station
kV	Kilovolt
NEM	National Electricity Market
NER	National Electricity Rules
SESS	South East

Incident review

This reviewable operating incident[1] 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 elements.
Incident details	This report relates to a reviewable operating incident that occurred on 2 June 2020 in Victoria. The incident involved the opening of the 275 kilovolt (kV) Heywood – South East No. 1 line M1 transformer Circuit Breaker (CB) (HYTS-SESS M1 CB) offloading the Heywood M1 500/275 kV transformer.
Incident classification	Transmission equipment failure.
Generation impact	Nil
Customer load impact	Nil
Incident key events	At 1342 hours on 2 June 2021, the HYTS-SESS M1 CB opened at Heywood, offloading the Heywood M1 500/275 kV transformer. The CB tripping this way (at one end of the circuit only) is not as per design and is considered a non-credible event. At around 1349 hours on 2 June 2021, AusNet completed the preliminary investigation, and attempted to close the HYTS-SESS M1 CB which remained closed for 12 seconds before opening again on pole discrepancy trip. The pole discrepancy function in the CB Management (CBM) relay was disabled and the HYTS-SESS M1 CB was restored into service but kept open. At 1405 hrs, AEMO invoked the constraint set V-HYTX_M12 to limit inter-regional transfers. The M1 Transformer was returned to load at 1545 hours on 2 June 2021 by closing the HYTS-SESS M1 CB. At 1555 hrs, AEMO revoked the constraint set V-HYTX_M12.
Incident cause	AusNet's post-incident investigation confirmed a digital input of the CBM relay (GE C60) that monitors blue phase CB status had failed causing the Heywood – South East No. 1 line M1 transformer 275 kV circuit breaker to trip due to a pole discrepancy.

[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] AusNet Services is the relevant asset owner in relation to this event.

	Details
Power system response (facilities and services)	Post-incident investigation has confirmed: • At 1342 hours on 2 June 2021, the HYTS-SESS M1 CB opened at Heywood, offloading the Heywood M1 500/275 kV transformer. The CB was opened on a pole discrepancy trip from its CBM. • AusNet's initial site investigation identified that the digital input in the CBM relay (GE C60) that monitors blue phase CB status had failed causing the pole discrepancy trip. The pole discrepancy function in the CBM relay was disabled and the HYTS-SESS M1 CB was restored into service. AusNet has confirmed that there is a separate built-in CB discrepancy trip function in the CB mechanism that remained in service. The M1 Transformer was returned to load at 1545 hours on 2 June 2021. This CBM relay (GE C60) digital input failure is one of three similar failures at Heywood terminal station since 2 March 2020. The previous similar incidents are: 1. The trip of Heywood – Tarrone No. 1 line bus 500 kV CB (CB 210) on 2 March 2020. 2. Heywood – Mortlake tee Alcoa Portland (APD) 2 line 500 kV CB (CB 213) on 11 November 2020. The cause of the CBM relay digital input failure was found to be high voltage on the station's Direct Current (DC) system.
Rectification	The HYTS DC systems were adjusted on 8 June 2021 to maintain 250 volts (V) DC. The HYTS-SESS No. 1 Line/M1 Transformer 275 kV CBM relay was replaced on 12 June 2021.
Power system security	The power system remained in a secure operating state throughout this incident.
Reclassification	AEMO assessed whether to reclassify this incident as a credible contingency event[3]. AEMO was advised by AusNet that the cause of the incident had been identified and the failed equipment had been isolated prior to restoration of the CB. AusNet advised that a reoccurrence of the trip was not reasonably possible. As such, AEMO responded correctly and did not classify this non-credible contingency as a credible contingency event.
Market information	For this incident, AEMO issued the following market notices (all market notices for this incident were issued in accordance with NER requirements): • At 1410 hrs on 2 June 2021, AEMO issued Market Notice 86436 to advise of the non-credible contingency event. • At 1415 hrs on 2 June 2021, AEMO issued Market Notice 86437 to advise of an inter-regional transfer limit variation. • At 1556 hrs on 2 June 2021, AEMO issued Market Notice 86438 to advise on the cause of the non-credible contingency event.

[3] 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).