
Trip of the No. 2 275 kV busbar at Calvale on 24 September 2019

December 2019

Reviewable Operating Incident Report under the
National Electricity Rules

INCIDENT CLASSIFICATIONS

Classification	Detail
Time and date of incident	1450 hrs on 24 September 2019
Region of incident	Queensland
Affected regions	Queensland
Event type	Human error
Generation impact	No generation was disconnected as a result of this incident.
Customer load impact	No customer load was disconnected as a result of this incident.
Associated reports	Nil

ABBREVIATIONS

Abbreviation	Term
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
CB	Circuit Breaker
HV	High voltage
kV	Kilovolt
NEM	National Electricity Market
NER	National Electricity Rules
TNSP	Transmission Network Service Provider

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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Contents

1.	Overview	5
2.	The incident	5
2.1	Pre-incident conditions	5
2.2	The incident	5
2.3	Investigation	5
3.	Power system security	6
3.1	Reclassification	6
4.	Market information	6
5.	Conclusions	7

1. Overview

This report relates to a reviewable operating incident¹ that occurred on 24 September 2019 in Queensland. The incident involved the trip of the Calvale No. 2 275 kilovolt (kV) busbar (No. 2 busbar)

No generation or customer load was disconnected as a result of this incident.

As this was a reviewable operating incident, AEMO is required to assess the adequacy of the provision and response of facilities and services and the appropriateness of actions taken to restore or maintain power system security².

AEMO has concluded that:

1. The No. 2 busbar tripped due to insufficient isolation of secondary systems during planned work.
2. The insufficient isolation was the result of human error.
3. The power system remained in a secure operating state.

This report is prepared in accordance with clause 4.8.15(c) of the National Electricity Rules (NER). It is based on information provided by Powerlink³ and AEMO.

National Electricity Market (NEM) time (Australian Eastern Standard Time [AEST]) is used in this report.

2. The incident

2.1 Pre-incident conditions

At the time of this incident, although all major transmission elements such as busbars and transmission lines were in service, the following equipment at Calvale substation was out of service for planned work:

- Circuit breaker (CB) 88102 was open and isolated.
- CB 88102-1 was open with the No. 1 Reactor out of service.
- CB 88112 was open and isolated.

2.2 The incident

At 1450 hrs on 24 September 2019, the No. 2 busbar tripped during planned secondary systems work on CB 88102. There was no high voltage (HV) fault on the power system and the trip was not an expected outcome of the planned work.

The No. 2 busbar was returned to service at 1513 hrs on 24 September 2019.

2.3 Investigation

The following is based on information provided by Powerlink.

¹ 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.

² See NER clause 4.8.15(b).

³ Powerlink is a Transmission Network Service Provider (TNSP) in Queensland.

At 1450 hrs on 24 September, the No. 2 busbar tripped as a result of the operation of the No. 2 busbar 'X' protection system. This was not an expected outcome of the planned secondary systems work and there was no HV fault on the power system.

A review of the protection operation by Powerlink determined the No. 2 busbar 'X' protection operated during a period when the out of service and earthed CB 88102 was in the closed position as part of the planned work. The protection system operated when induced circulating current flowing through CB 88102 and the associated current transformers (CTs) reached sufficient magnitude to cause operation of the busbar protection system. The protection system operated correctly for the given inputs.

The review found that the CT inputs from CB 88102 into the busbar protection scheme had not been isolated as is normal practice for this type of work. The requirement to isolate the CTs was not identified, despite following the correct procedure. The requirement to isolate the CTs is dependent on the particular circuitry design and circumstances and due to human error, the requirement was missed in this instance. Powerlink have implemented refresher training and increased communication and awareness of this issue to reduce the likelihood of a recurrence.

Prior to restoring the No. 2 busbar to service at 1513 hrs on 24 September 2019, CB 88102 was opened to prevent a recurrence of the incident.

3. Power system security

AEMO is responsible for power system security in the NEM. This means AEMO is required to operate the power system in a secure operating state to the extent practicable, and take all reasonable actions to return the power system to a secure state following a contingency event in accordance with the NER⁴.

The power system was in a secure operating state prior to and during this incident and AEMO was not required to take any action in relation to power system security.

3.1 Reclassification

AEMO assessed whether to reclassify these incidents as a credible contingency event⁵.

Prior to restoring the No. 2 busbar to service, Powerlink had advised AEMO that the cause of the incident had been identified and precautions had been put in place to prevent a recurrence. Based on this advice, AEMO determined the incident was unlikely to reoccur and therefore correctly determined that reclassification as a credible contingency event was not required.

4. Market information

AEMO is required by the NER and operating procedures to inform the market about incidents as they progress. This section assesses how AEMO informed the market⁶ over the course of this incident.

⁴ Refer to AEMO's functions in section 49 of the National Electricity Law and the power system security principles in clause 4.2.6 of the NER.

⁵ AEMO is required to assess whether 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).

⁶ AEMO generally informs the market about operating incidents as the progress by issuing Market Notices – see <https://www.aemo.com.au/Market-Notices>

For this incident, AEMO informed the market on the following matters.

1. A non-credible contingency event – notify within two hours of the event⁷.
 - AEMO issued Market Notice 70203 at 1502 hrs on 24 September 2019, 12 minutes after the event, to advise of the non-credible contingency event.
2. Reclassification, details, and cancellation of a non-credible contingency – notify as soon as practical⁸.
 - AEMO issued Market Notice 70204 at 1520 hrs on 24 September 2019 to advise that the No. 2 busbar had been returned to service and that AEMO would not reclassify the loss of the No. 2 busbar as a credible contingency event.

5. Conclusions

AEMO has assessed this incident in accordance with clause 4.8.15(b) of the NER. In particular, AEMO has assessed the adequacy of the provision and response of facilities or services, and the appropriateness of actions taken to restore or maintain power system security.

AEMO has concluded that:

1. The No. 2 busbar tripped due to insufficient isolation of secondary systems during planned work.
2. The insufficient isolation was the result of human error.
3. The power system remained in a secure operating state.

⁷ AEMO is required to notify the market of a non-credible contingency event within two hours of the event – AEMO, Power System Security Guidelines, Section 7.3.

⁸ AEMO is required to notify the market of a reclassification – NER clause 4.2.3(g), details of the reclassification – 4.2.3(c), and when AEMO cancels the reclassification – 4.2.3(h).