
Raglan 275 kV No. 2 busbar trip on 13 April 2021

July 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.

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 Powerlink² and from AEMO systems.

Table 1 Raglan 275 kilovolt (kV) No. 2 busbar trip incident

	Details
Reviewable operating incident type	Non-credible contingency event impacting a critical transmission element.
Incident details	This report relates to a reviewable operating incident ³ that occurred on 12 April 2020 in Queensland. The incident was a non-credible contingency event involving the trip of the Raglan No. 2 275 kV substation busbar.
Incident classification	Other causes – equipment mistakenly not returned to service after maintenance.
Generation impact	No generation was lost as a result of this incident.
Customer load impact	No load was lost as a result of this incident.
Pre-incident conditions	Prior to the event, Raglan 275/50 kV No. 2 transformer supplying Aurizon ⁴ was out of service for maintenance. See Figure 1 and Figure 2 for pre and post-incident single line diagrams.
The event	<ol style="list-style-type: none"> 1. On 13 April 2021, Powerlink staff completed maintenance activities on the instrument transformers associated with the Raglan 275/50 kV No. 2 transformer and took steps to return this equipment to service. 2. At 1758 hrs, Raglan 275 kV Circuit Breaker (CB) 5422 (see Figure 1) was closed to energise the Raglan 275/50 kV No. 2 transformer. 3. Raglan busbar X protection immediately operated, tripping the Raglan substation No. 2 275 kV busbar. 4. Powerlink identified and rectified the issue and the Raglan substation No. 2 275 kV busbar was returned to service at 1835 hrs on 13 April 2021.
Incident cause	At 1758 hrs on 13 April 2021, the Raglan substation No. 2 275 kV busbar tripped unexpectedly as a result of the operation of the Raglan busbar protection system.

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 Powerlink is the Transmission Network Service Provider (TNSP) for Queensland.

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 Aurizon is a freight rail operator in Queensland. Large portions of its rail network are electrified and supplied from Powerlink's network.

	Details
Power system response (facilities and services)	<p>Prior to the incident, maintenance activities were being carried out at Raglan 275 kV substation. This maintenance involved testing of instrument transformers associated with the Raglan 275/50 kV No. 2 transformer.</p> <p>To carry out this testing, the secondary circuits of the Current Transformers (CTs) associated with Raglan 275 kV CB 5422 had been isolated.</p> <p>On completion of the maintenance work, the secondary circuits were reinstated. However, due to human error, one CT circuit was missed. This resulted in no secondary current contribution to the Raglan busbar protection system from one phase of the CTs associated with the 275 kV CB 5422. As a result, when 275 kV CB 5422 was returned to service, the Raglan busbar X protection immediately operated due to false detection of a single-phase busbar fault and tripped the Raglan No. 2 275 kV busbar.</p>
Rectification	<p>The CT secondary issue was identified and rectified, and the Raglan 275 kV No. 2 busbar was returned to service at 1835 hrs on 13 April 2021.</p> <p>Powerlink's post-incident review has identified process improvements to control the risk of any future re-occurrence. These process improvements have been implemented.</p>
Power system security	<p>The power system remained in a secure operating state throughout this incident.</p>
Reclassification	<p>AEMO assessed whether to reclassify this incident as a credible contingency event⁵.</p> <p>The cause of this incident was identified and rectified by Powerlink prior to the Raglan 275 kV No. 2 busbar's return to service, therefore AEMO correctly identified that reclassification was not required.</p>
Market information	<p>AEMO issued the following market notice⁶, which was issued in accordance with NER requirements:</p> <ul style="list-style-type: none"> • AEMO issued Market Notice 84249 at 1902 hrs on 13 April 2021 – Advice of non-credible contingency event.
Conclusions	<p>AEMO has concluded that:</p> <ol style="list-style-type: none"> 1. The trip of the Raglan 275 kV No. 2 busbar was caused by human error during restoration of the associated busbar protection's secondary CT circuits. 2. Powerlink identified the incident cause and rectified it prior to returning the Raglan 275 kV No. 2 busbar to service. 3. AEMO correctly identified there was no requirement to reclassify this incident as a credible contingency. 4. The power system remained in a secure operating state throughout this incident. 5. Powerlink has identified process improvements to control the risk of any future re-occurrence. These process improvements have been implemented.
Recommendations	<p>AEMO plans to share details of this incident and its findings with the Power System Security Working Group (PSSWG) to enable TNSPs to consider the implications of this event in their maintenance activities.</p>

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).

⁶ Please see <https://aemo.com.au/en/market-notices>.

Figure 1 Pre-incident diagram

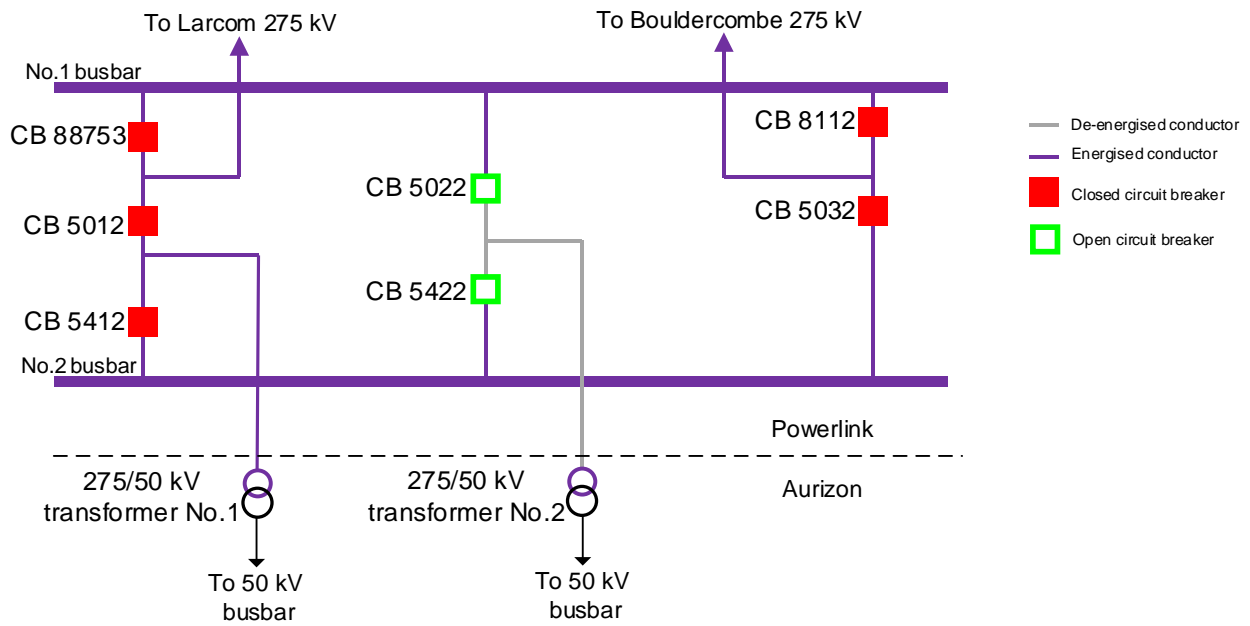


Figure 2 Post-incident diagram

