POWER SYSTEM INCIDENT REPORT: TRIP OF TORRENS ISLAND B1 AND B2 GENERATING UNITS – 21/01/2010

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FINAL

Table of Contents

1. Introduction

Between 18:10-18:12 hrs on 21 January 2010, Torrens Island B Power Station generating units B1 (TORRB1) and B2 (TORRB2) tripped resulting in a loss of 264 MW of generation in South Australia. Generating Unit B3 (TORRB3) was out of service at the time and Unit B4 (TORRB4) continued generation uninterrupted.

This report has been prepared under clause 4.8.15 of the Rules 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 security.

Information for this report has been supplied to AEMO by AGL SA Generation Pty Ltd. Data from AEMO's Energy Management and Market Systems has also been used in analysing the event.

All references to time in this report refer to Market time (Australian Eastern Standard Time).

2. Summary of Events

Between 18:10-18:12 hrs on 21 January 2010, Torrens Island B Power Station generating units B1 (TORRB1) and B2 (TORRB2) tripped resulting in a loss of 264 MW of generation in South Australia. At 18:03 hrs TORRB1 was generating 116 MW and TORRB2 was at 122 MW. Between 18:04-18:05 hrs, TORRB2 generation ramped down rapidly from 122 MW to 39 MW and then tripped at 18:10 hrs. Meanwhile TORRB1 generation ramped up from 116 MW to 142 MW at 18:09 hrs and then ramped down rapidly reaching 45 MW at 18:10 hrs before tripping at 18:11 hrs.

Torrens Island Power Station is cooled using sea water supplied via cooling water pumps located within B station. To protect the cooling water system from debris ingress, protective screens are fitted at the cooling water inlet. These screens are regularly back-washed using high pressure water to maintain effectiveness.

On 21st January, 2010 while cooling water screen washing operations were being carried out, a flexible rubber bellows unit on the screen washing pump outlet failed flooding the cooling water valve pit with sea water. This resulted in loss of cooling water for generating units B1 and B2. As a result the generating unit B2 (TORRB2) tripped at 18:10 hrs. This was followed by generating unit B1 (TORRB1) tripping at 18:11 hrs.

AGL's subsequent analysis of the cooling water system failure showed that the design of the screen washing system could be simplified while improving reliability.

Figures 1-2 below show the network topology at Torrens B Power Station before and after the trip:

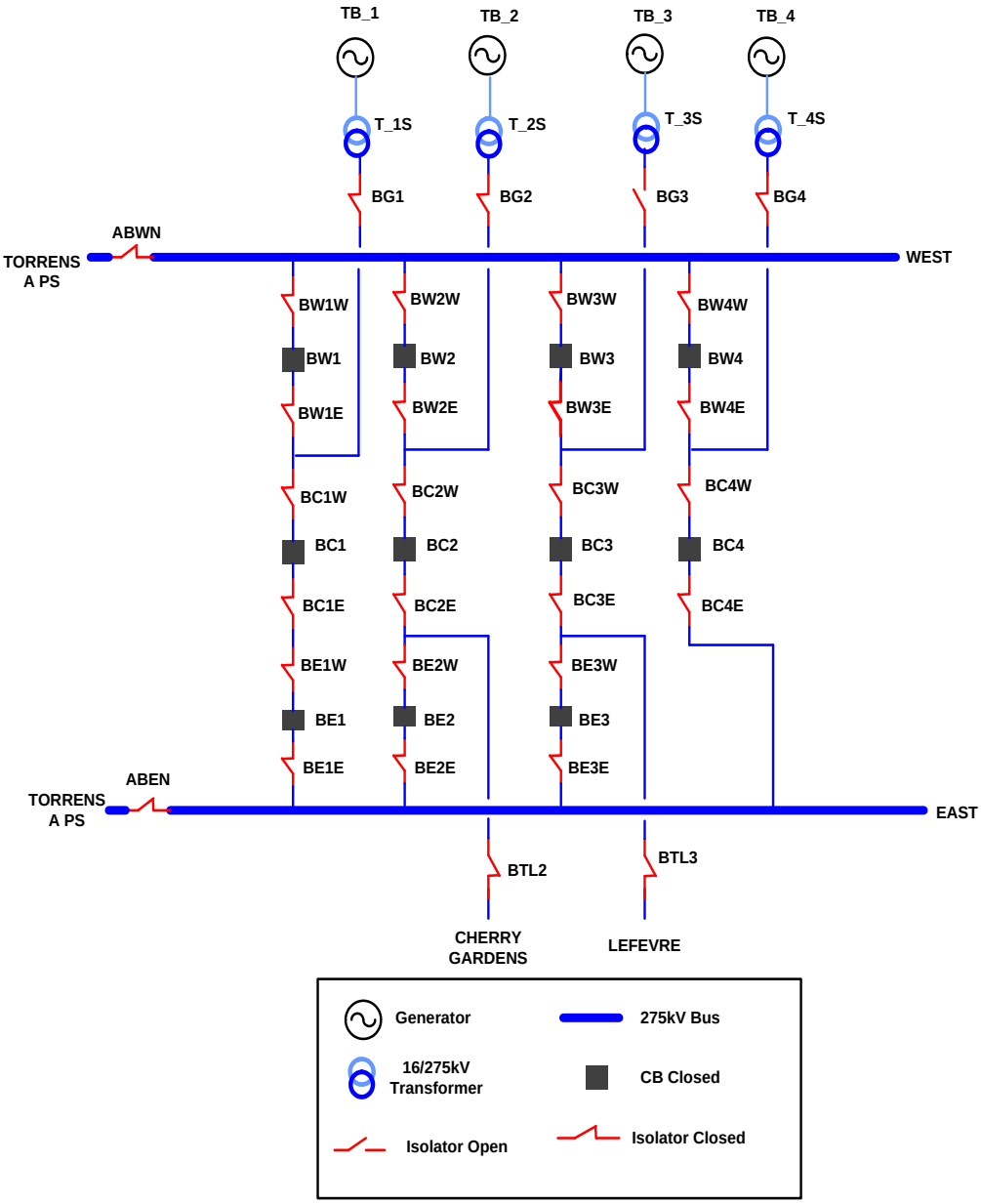

Figure 1: Network Topology at Torrens B Power Station before trip

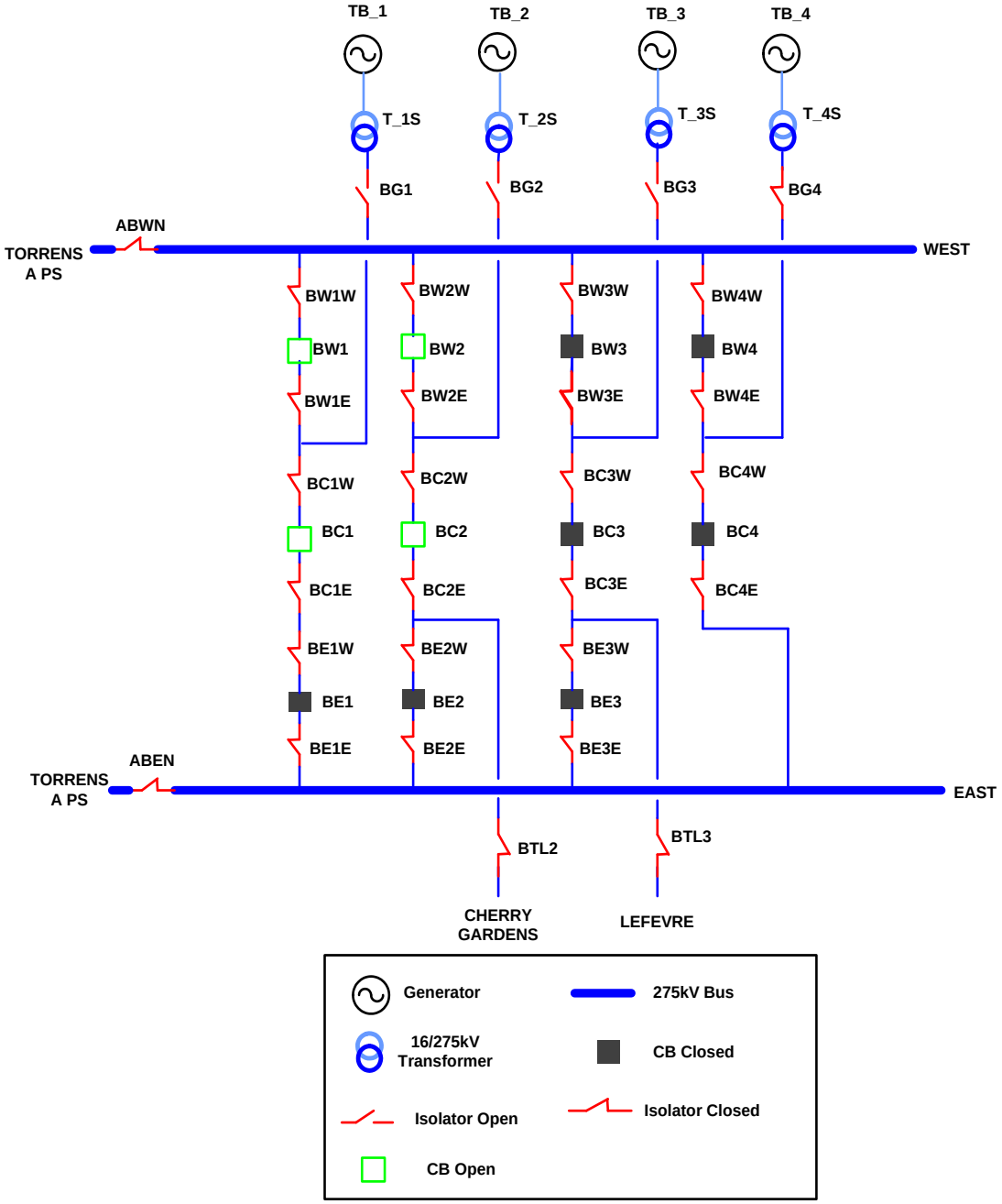

Figure 2: Network Topology at Torrens B Power Station after trip

3. Power System Security Assessment

Following the multiple contingency event, the power system remained in a satisfactory operating state. The Heywood interconnector power transfer increased from around 390 MW

at 18:04 hrs to 597 MW at 18:11 hrs immediately after the two generating units tripped. The Heywood Interconnector power transfer target was 362 MW in the dispatch interval (18:10-18:15) during which the two generating units tripped and 428 MW in the immediately following dispatch interval.

The figure below shows the generation pattern of the Torrens B1 and B2 units, power transfer and market target of Heywood Interconnector and the mainland power system frequency during the course of the event.

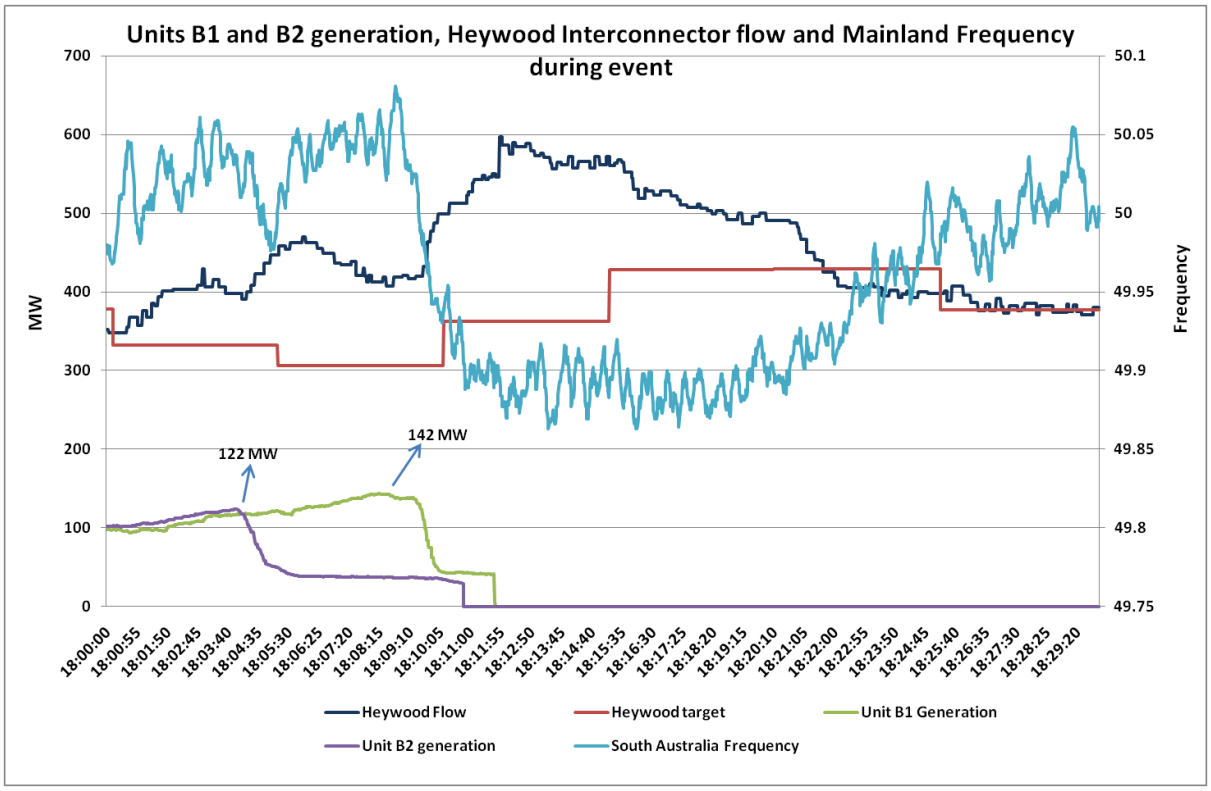

Figure 3: Generation pattern of B1 and B2 units, Heywood interconnector flow and its market Target, South Australian Frequency

Real Time Contingency Analysis (RTCA) flagged post-contingent thermal rating violations of Heywood-South East lines at 18:14 hrs but the violations cleared in the next RTCA run at 18:19 hrs. The power system was returned to a secure operating state at 18:21 hrs when the Heywood Interconnector flow was reduced below its power transfer limit. Response of generation in Queensland, New South Wales and Victoria to the frequency decline combined with the cumulative non-conformance of South Australian generation led to Heywood interconnector power transfer above its targets. The individual non-conformances of generation were small; hence the declaration of individual unit non-conformances wasn't necessary.

Figure 4 below gives an indication of the cumulative non-conformance of South Australian generation, the power transfer on Heywood Interconnector and generation response from Queensland, Victoria and New South Wales during the course of the event.

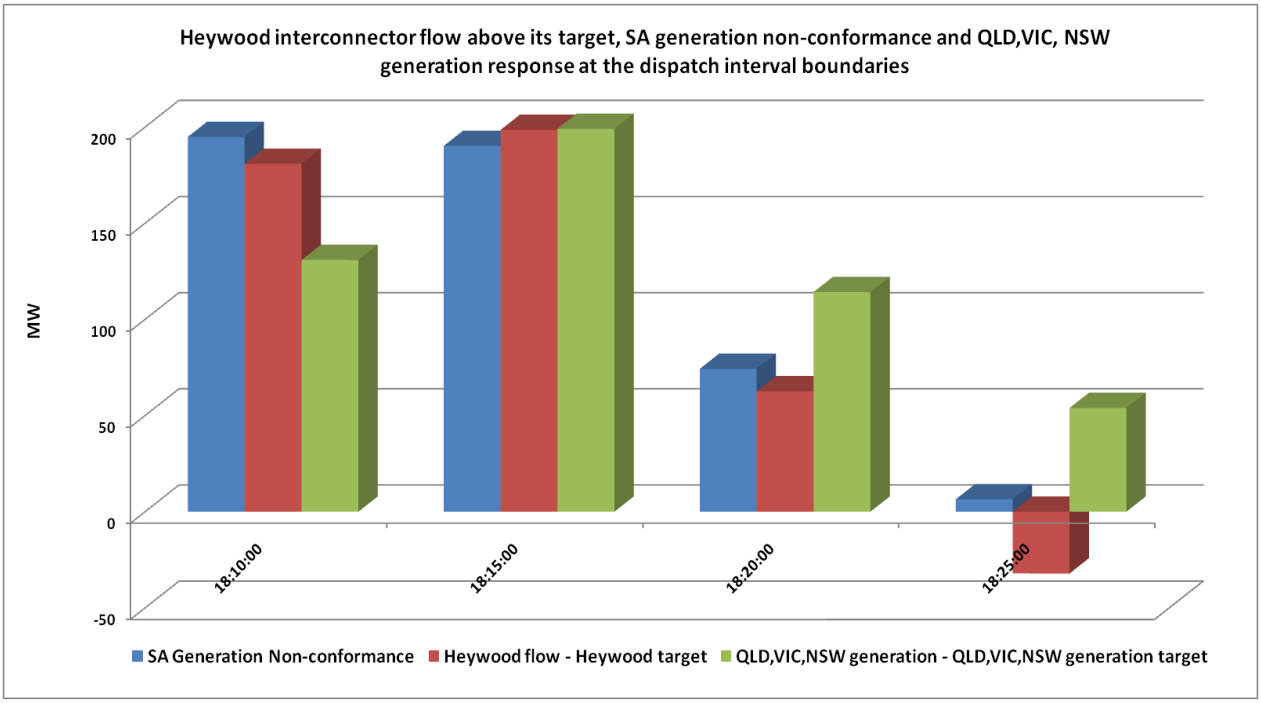

Figure 4: Increased Heywood Interconnector flow, generation response of Qld, NSW and VIC and generator non-conformance at the end of the dispatch intervals

The power system frequency reduced to 49.87 Hz during the event, but was well within the frequency operating standard requirement of 49.5Hz - 50.5Hz for a generation event.

There were no voltage or transient stability violations as a result of the event.

4. Conclusion

The trip of Torrens Island B power station generating units B1 and B2 was a result of a failure of the cooling water screen washing system.

AGL has implemented an improved design for the cooling water screen washing system. AGL has advised that the majority of equipment subjected to flooding have been inspected and remedial action taken where required. The remainder of inspections are scheduled to take place during forthcoming plant outages.

5. Recommendations

There are no recommendations for this event.