TRIPPING OF GEORGE TOWN - TAMAR VALLEY NO 1 AND NO 2 110KV LINES IN TASMANIA ON 17 OCTOBER 2012.

PREPARED BY: Systems Performance and Commercial

DATE: 18 December 2012

FINAL

Disclaimer

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Abbreviations and Symbols

Abbreviation	Term
CAS	Contingency Arming Scheme
CB	Circuit Breaker
EMMS	Electricity Market Management System
EMS	Energy Management System
kV	Kilovolt
OCGT	Open Cycle Gas Turbine

Contents

Incident summary

Date and time of incident	17/10/2012 @ 08:59 hrs.
Region of incident	Tasmania.
Affected regions	Tasmania.
Event type	TT – Loss of multiple transmission elements.
Primary cause	PTN & CTR - Protection & Control
Impact	NIL
Associated reports	NIL

1 Introduction

At 08:59 hrs on 17 October 2012, the George Town – Tamar Valley No. 1 and No. 2 110kV lines tripped. These lines radially connect the Bell Bay 3 Power Station and Tamar Valley Open Cycle Gas Turbine (OCGT) 4 to the George Town Terminal Station.

No generation was tripped because at the time there was no generation in service at either Bell Bay 3 Power Station or Tamar Valley OCGT 4. Also there was no loss of customer load.

This report has been prepared under clause 4.8.15 (c) of the National Electricity Rules (NER) 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.

This report is largely based upon information provided by Transend. Data from AEMO's Energy Management System (EMS) and Electricity Market Management System (EMMS) has also been used in analysing the incident.

All references to time in this report are to National Electricity Market time (Australian Eastern Standard Time).

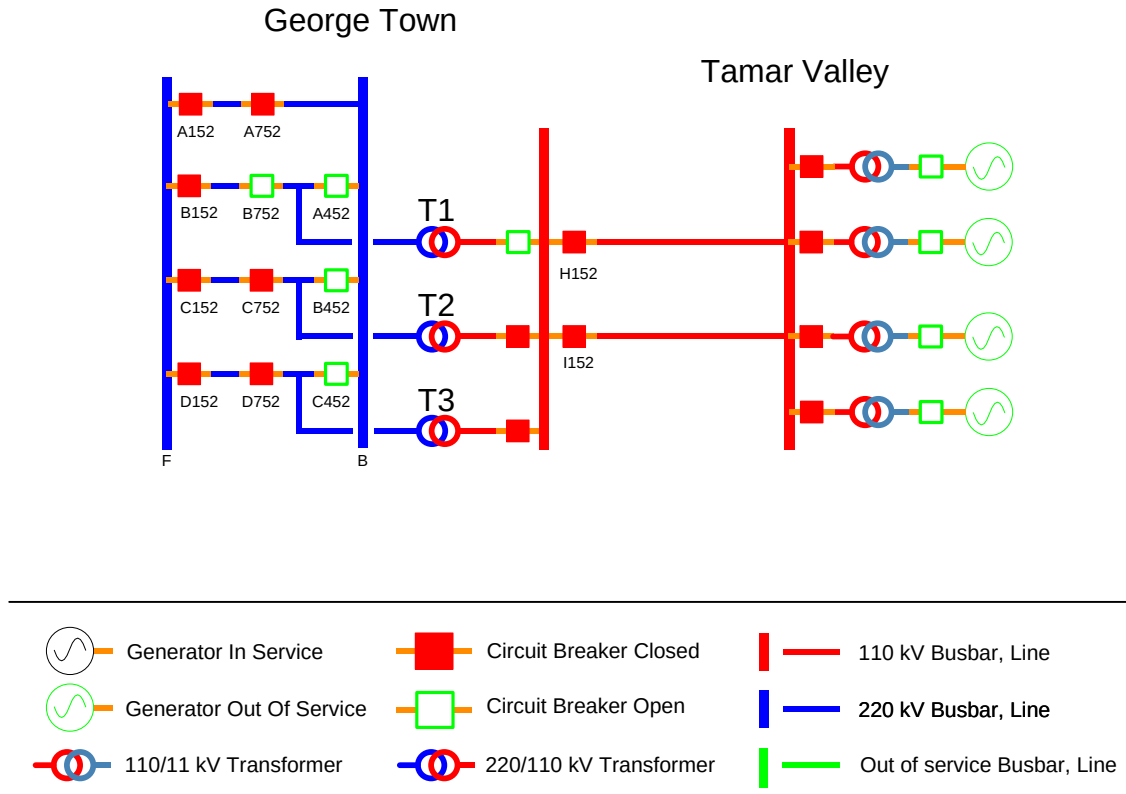
2 Pre-Contingent System Conditions

On 17 October 2012 there were planned outages of (1) the George Town B 220kV Bus and (2) the George Town No 1 220/110kV Transformer. The planned switching sequence was for the George Town No 1 220/110kV Transformer to be switched out of service first followed by the George Town B 220kV Bus.

At 05:52hrs the George Town No 1 220/110kV Transformer was switched out of service as planned. At 08:58hrs and 08:59hrs respectively, 220kV CBs B452 and C452 were opened as part of the planned outage of the George Town B 220kV bus.

The status of the power system prior to the incident is shown in Figure 1. For clarity only equipment relevant to this incident has been included in the diagram.

Figure 1 - Status of the power system prior to the incident.



3 Summary of Events

Table 1: Summary of Events

Date/Time	Event
17/10/2012 05:52hrs	At George Town, 220kV CBs A452 and B752 were opened as per planned outage of No 1 220/110kV transformer.
17/10/2012 08:58hrs	At George Town 220kV CB C452 opened as per planned outage of George Town B 220kV Bus.
17/10/2012 08:59hrs	At George Town 220kV CB B452 opened as per planned outage of George Town B 220kV Bus.
17/10/2012 08:59hrs	George Town to Tamar Valley No. 1 and No. 2 110 kV lines trip.
17/10/2012 09:02hrs	At George Town 220kV CB B452 closed.
17/10/2012 09:03hrs	At George Town 220kV CB C452 closed.
17/10/2012 09:12hrs	George Town to Tamar Valley No. 1 and No. 2 110 kV lines returned to service.
17/10/2012 09:52hrs	AEMO issued a Market Notice No 40042, advising the market of a non credible contingency.
17/10/2012 13:54hrs	At George Town No 1 220/110kV transformer returned to service.

At 08:58hrs and 08:59hrs respectively, 220kV CBs B452 and C452 were opened as per the planned outage of the George Town B 220kV bus. It was at this time that both the George Town to Tamar Valley No. 1 and No. 2 110kV lines tripped via the George Town Auto Transformer Contingency Arming Scheme (CAS).

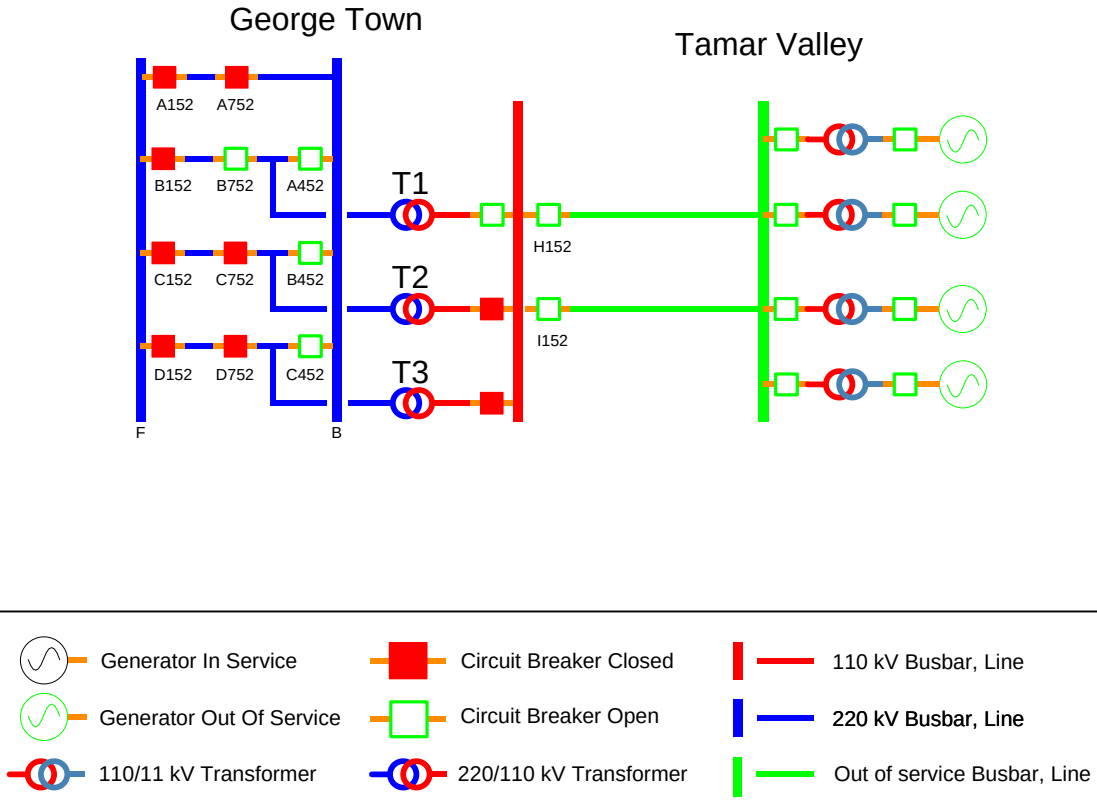
The CAS is designed to guard against possible islanding of George Town 110kV generation and load in the event when all the three transformers at George Town are out of service.The scheme is designed to be armed in the event when any one of the three transformers is taken out of service at George Town. On the contingent loss of all transformers resulting in the islanding of the George Town 110 kV system, the Tamar Valley 110kV CBs H152 & I152 are tripped. This will result in a loss of supply to the George Town 110kV Bus.

Transend investigations discovered that the CAS had not been updated to cater for the new breaker and a half design associated with the new 220kV George Town switchyard. Only CBs connected to the George Town B 220kV bus were being monitored by the CAS. The CAS did not monitor the 220kV centre breakers, B752, C752 and D752.

When 220kV CBs A452, B452 and C452 were opened the CAS assumed that all 220kV connections to all 3 transformers had been disconnected and in response the CAS tripped the George Town to Tamar Valley No. 1 and No. 2 110kV lines as per its design.

The status of the power system immediately after the incident is shown in Figure 2. For clarity only equipment relevant to this incident has been included in the diagram.

Figure 2 - Status of the power system immediately after the incident



4 Immediate Actions Taken

At 09:12 hrs on 17 October 2012, the George Town – Tamar Valley No. 1 and No. 2 110kV lines were returned to service.

At 09:52 hrs, AEMO issued Market Notice No. 40042 advising the market that a non-credible contingency had occurred.

AEMO decided that the event would not be reclassified as a credible contingency as the CAS had been disabled by Transend immediately after the incident.

5 Follow-up Actions

By 27 November 2012 Transend had completed modifications to the CAS which resulted in the inclusion of 220kV CB's namely B752, C752 and D752 (refer Figure 2).

The CAS now monitors the status of the centre circuit breakers of the George Town 220kV breaker and a half switchbays, as well as the CBs directly connected to the George Town B 220kV bus that it monitored previously.

6 Power System Security Assessment

There was no loss of load or generation as a result of this incident.

The power system voltages and frequencies remained within the normal operating bands and the power system remained in a secure operating state throughout the incident.

7 Conclusions

After receiving advice from Transend, AEMO correctly applied the criteria published in section 12 of its Power System Security Guidelines in assessing that the circumstances of a further trip of both George Town – Tamar Valley No. 1 and No. 2 110kV lines did not warrant reclassifying as a credible contingency event.

AEMO is satisfied that Transend has carried out the appropriate work to mitigate the risk of a similar incident occurring in the future.

8 Recommendations

There are no recommendations arising from this incident.