POWER SYSTEM OPERATING INCIDENT REPORT
TRIP OF KEITH – SNUGGERY 132KV LINE AND SNUGGERY NO.2 132/33KV TRANSFORMER ON 15 FEBRUARY 2011

PREPARED BY: Electricity System Operations Planning and Performance

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FINAL

Disclaimer

Purpose

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Abbreviations and Symbols

Abbreviation	Term
AEMO	Australian Energy Market Operator Ltd
CB	Circuit Breaker
EST	Eastern Standard Time
kV	kilovolt
MW	megawatt
MWh	megawatt hour (also MW·h)
NEM	National Electricity Market
NER	National Electricity Rules

1 Introduction

At 1802 hrs on 15 February 2011 the Keith – Snuggery 132 kV line in South Australia tripped and auto-reclosed. At the same time the Snuggery No.2 132/33 kV transformer at Snuggery substation tripped out of service. Lightning activity was reported in the area at the time. At 1841 hrs ElectraNet returned the transformer to service after completion of preliminary investigations and transformer oil tests.

This report has been prepared under clause 4.8.15 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 ElectraNet. Data from AEMO's Energy Management System has also been used in analysing the incident.

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

2 Pre-Contingent System Conditions

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.

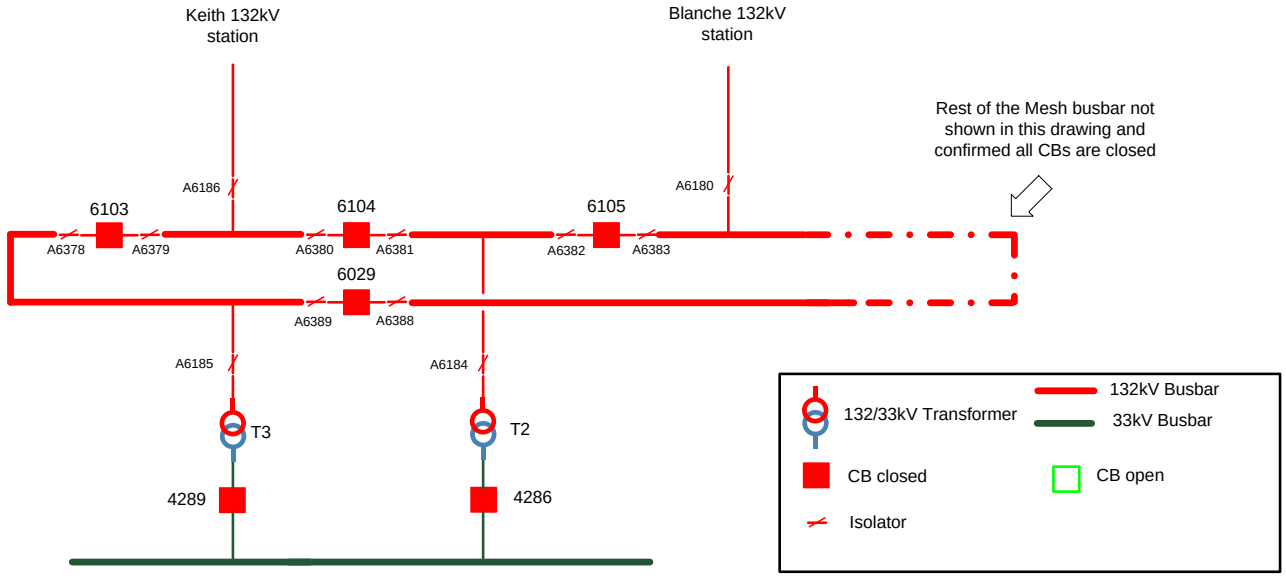

Figure 1 - Snuggery 132 kV substation configuration prior to the incident

3 Summary of Events

At 1802 hrs on 15 February 2011 the Keith – Snuggery 132 kV line tripped at both ends (Snuggery 132 kV CBs 6103 and 6104, and Keith 132 kV CBs 6108 and 6109) and auto-reclosed on all CBs except CB 6104 at the Snuggery end. At the same time as the line fault, the Snuggery No.2 132/33 kV transformer tripped out of service. Lightning activity was reported in the area at that time. ElectraNet's power system performance monitor recorded a large fault current on the red phase of the Keith – Snuggery 132kV line at the time of the incident.

ElectraNet has advised AEMO that the Snuggery No.2 132/33 kV transformer tripped on the operation of transformer differential protection.

At 1829 hrs AEMO issued Electricity Market Notice No.34521 advising the occurrence of this incident as a non-credible contingency event.

The status of the power system immediately after the line and transformer trip is shown in Figure 2.

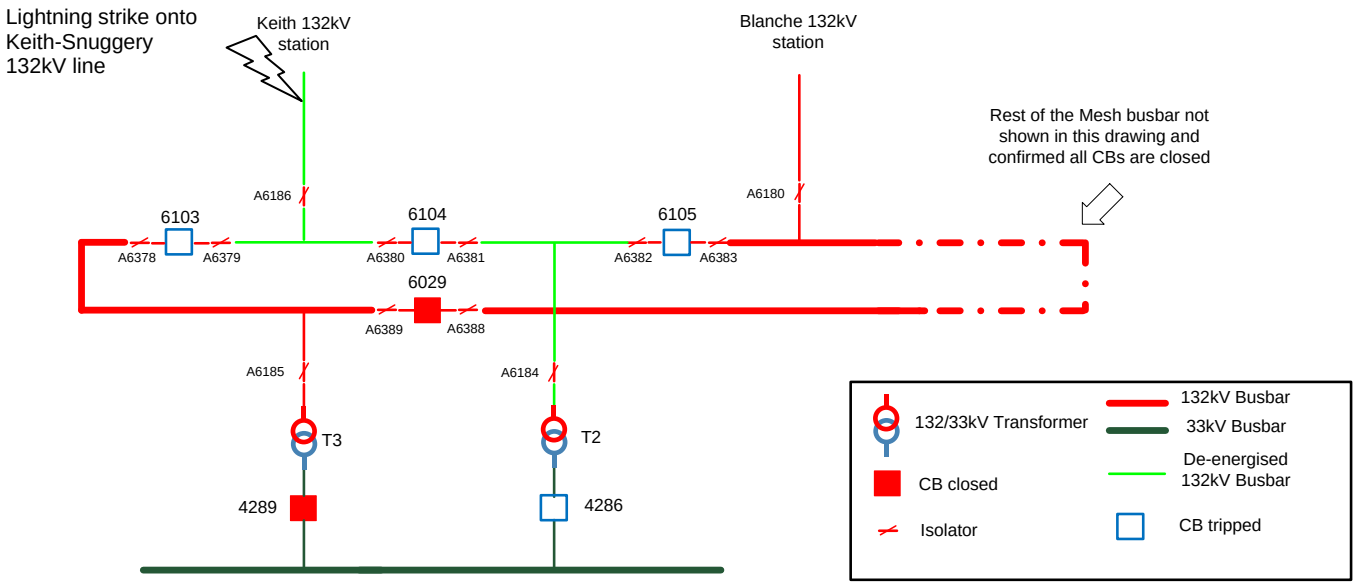

Figure 2 - Snuggery 132 kV substation after Keith – Snuggery 132 kV line and Snuggery 132/33 kV No.2 transformer tripped.

The status of the power system after the Keith – Snuggery 132 kV line auto-reclosed is shown in Figure 3.

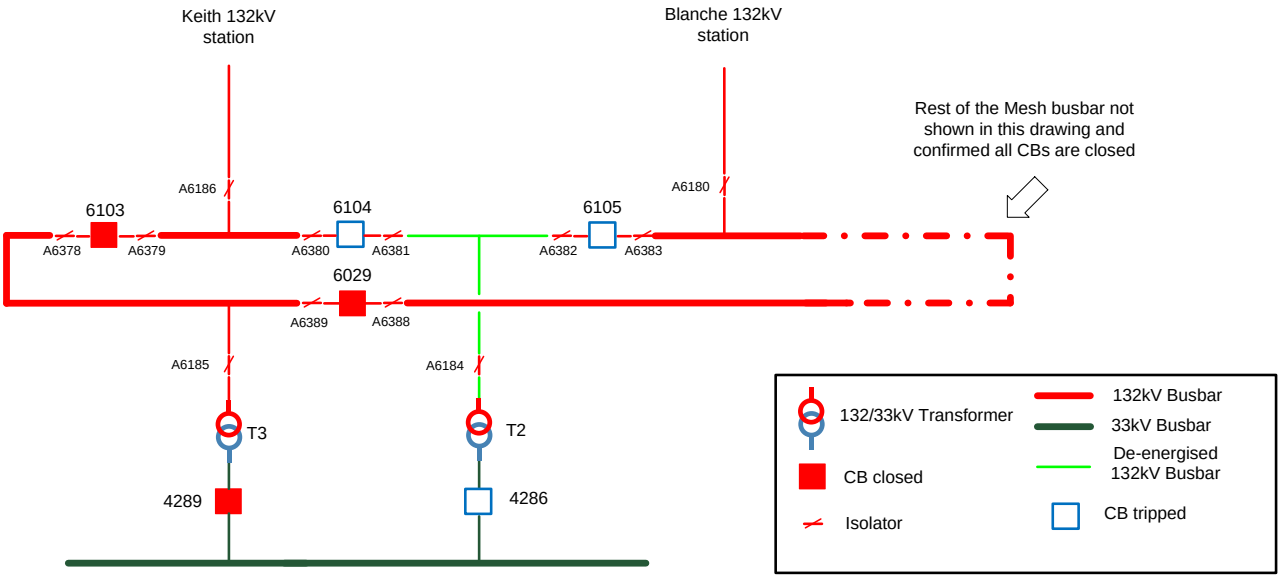

Figure 3 - Snuggery 132 kV substation after Keith – Snuggery 132kV line auto-reclosed.

4 Power System Security Assessment

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

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

5 Immediate Actions Taken

ElectraNet conducted preliminary investigations to identify whether there had been a high voltage fault on the Snuggery 132/33 kV No.2 transformer. There was no evidence of a high voltage fault on the transformer and the oil test results were satisfactory. ElectraNet also checked transformer protection settings and found them to be appropriate.

ElectraNet also carried out an aerial patrol of the Keith – Snuggery 132 kV line and found no evidence of damage to the line or its insulators. At 1841 hrs on 15 February 2011 ElectraNet returned the Snuggery 132/33 kV No.2 transformer to service.

At 1858 hrs on 16 February 2011 AEMO issued Electricity Market Notice No.34535 declaring the simultaneous trip of the Keith – Snuggery 132 kV line and the Snuggery No.2 132/33 kV transformer as a credible contingency event, effective from 1845 hrs until further notice.

AEMO has not invoked any additional constraint equations to manage this credible contingency event as they are not required.

6 Follow-up Actions

ElectraNet conducted maintenance of CB 6104 and also scheduled further testing of the No.2 transformer. The testing of CB 6104 confirmed that it was functioning correctly. ElectraNet has also conducted maintenance of current transformers associated with CBs 6104 and 6105 and are awaiting test results of the gas analysis.

ElectraNet's power system performance monitor recordings showed signs of re-striking of CB 6104 immediately after Keith – Snuggery 132 kV line tripped. However ElectraNet has concluded that re-striking of CB 6104 was not a contributing factor to the transformer trip. ElectraNet has scheduled a further inspection of the Snuggery 132/33 kV No.2 transformer protection zone to identify the cause of operation of the transformer differential protection. ElectraNet inspected the earth wires on Keith – Snuggery 132kV line and the earthing of Snuggery 132kV substation and found them to be in a satisfactory condition.

7 Conclusions

At 1802 hrs on 15 February 2011, the Keith – Snuggery 132 kV line tripped and auto-reclosed. At the same time, the Snuggery No.2 132/33 kV transformer tripped out of service. The line trip is attributable to lightning activity in the area at the time. ElectraNet is still investigating the reason for the transformer trip.

AEMO has reclassified the simultaneous trip of the Keith – Snuggery 132kV line and the Snuggery 132/33 kV No.2 transformer as a credible contingency event. AEMO will review this reclassification once ElectraNet completes its investigation into the cause of the Snuggery No.2 132/33 kV transformer trip.

8 Recommendations

ElectraNet will continue its investigation of the trip of the Snuggery 132/33 kV No.2 transformer and provide an update to AEMO by the end of July 2011.