POWER SYSTEM OPERATING INCIDENT REPORT - TRIP OF BOULDERCOMBE NO.2 275 KV BUSBAR ON 14 NOVEMBER 2012

PREPARED BY: System Performance and Commercial

DATE: 4 January 2013

FINAL

Disclaimer

Purpose

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Abbreviations and Symbols

Abbreviation	Term
CA	Contingency Analysis
CB	Circuit Breaker
NER	National Electricity Rules
EMS	Energy Management System
EMMS	Electricity Market Management System
kV	Kilovolt
PTP	Permission to Proceed

Contents

Incident summary

Date and time of incident	14 November 2012 @ 1200 hrs
Region of incident	Queensland
Affected regions	Queensland
Event type	Busbar Trip
Primary cause	OE & CON – Operating Error and Non-conformance
Impact	NIL
Associated reports	NIL

1 Introduction

At 1200 hrs on 14 November 2012, the No.2 275 kV busbar at Bouldercombe in Queensland tripped during a planned outage of the No.2 275/132 kV transformer at Bouldercombe for work on the busbar protection. The 849 Bouldercombe–Stanwell 275 kV transmission line was also de-loaded as a result. There was no generation or customer load interruption as a result of the incident.

By 1210 hrs on 14 November 2012, the No.2 275 kV busbar at Bouldercombe was returned to service. The No.2 275/132 kV transformer at Bouldercombe and its associated circuit breakers remained out of service for planned system work.

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 Powerlink. 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

There are two 275 kV transmission lines that connect Bouldercombe and Stanwell substations: 848 Bouldercombe–Stanwell 275 kV transmission line and 849 Bouldercombe–Stanwell 275 kV transmission line.

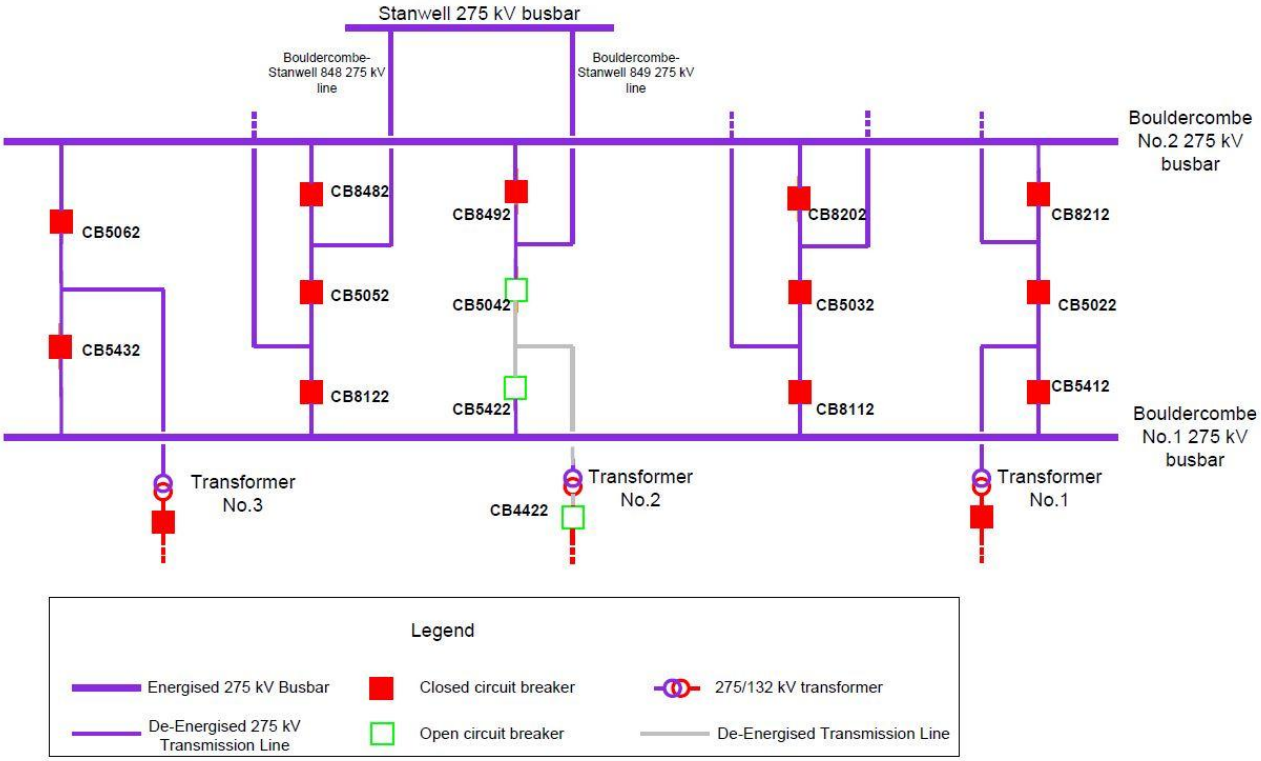
At the time of the incident, both transmission lines were in service.

At 0836 hrs on 6 November 2012, PTP was given for planned outage of the following plant at Bouldercombe:

- No.2 275/132 kV transformer
- 275 kV CB 5042
- 275 kV CB 5422
- 132 kV CB 4422

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

The following is a summary of events:

Time	Events
06/11/2012 0836 hrs	At Bouldercombe, PTP was given for the planned outage of No.2 132/275 kV transformer, 275 kV CB 5042, 275 kV CB 5422 and 275 kV CB 4422.
14/11/2012 1200 hrs	The Bouldercombe No.2 275 kV busbar tripped on bus zone protection.
14/11/2012 1207 hrs	The Bouldercombe No.2 275 kV busbar returned to service.
14/11/2012 1210 hrs	849 Bouldercombe–Stanwell 275 kV transmission line returned to service.
14/11/2012 1222 hrs	AEMO issued the Electricity Market Notice No.40275 advising the market of a non-credible contingency.

On 14 November 2012, work to remove redundant cables on the Bouldercombe busbar protection system was being conducted. This work required the isolation of the No.2 132/275 kV transformer at Bouldercombe.

At 1200 hrs while technicians were removing the redundant cables, established work procedures were not fully observed causing a wire to be inadvertently pulled from a terminal which initiated bus zone trip signals. The protection scheme triggered and the following 275 kV CBs at Bouldercombe operated:

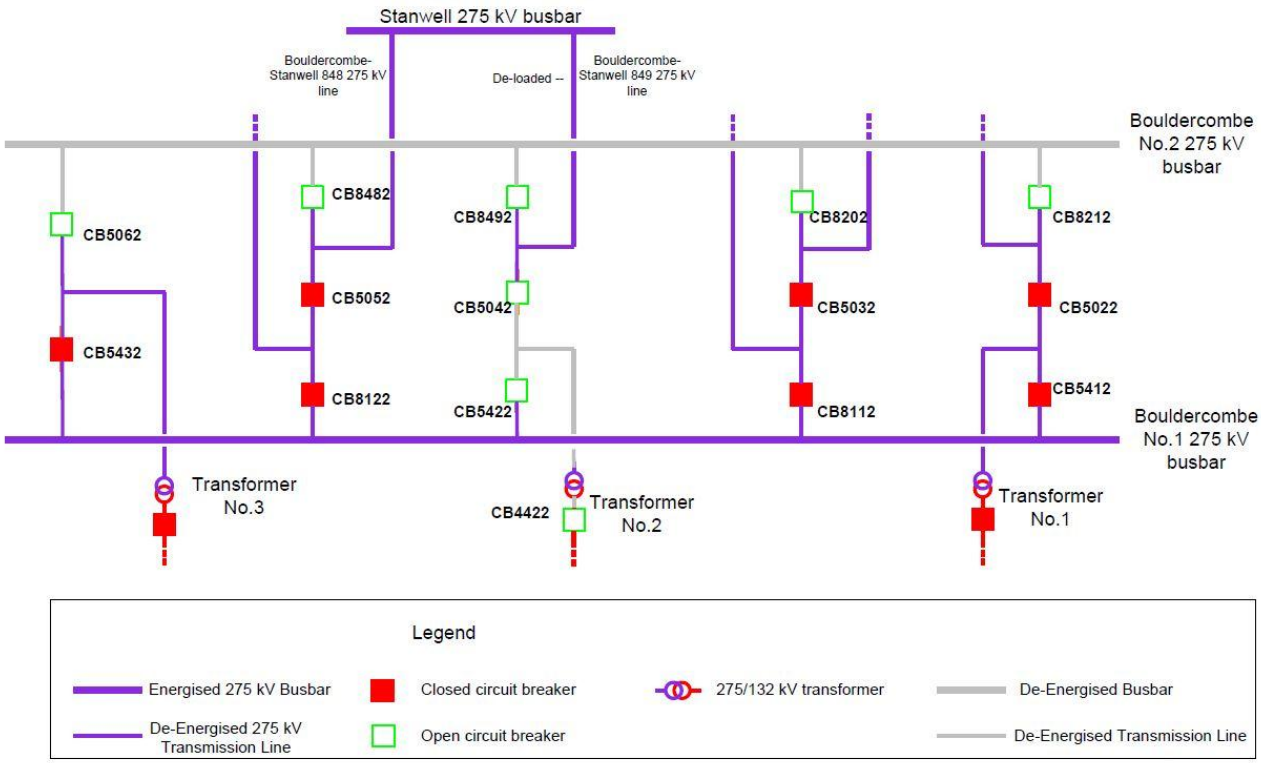
- CB 5062
- CB 8482

- CB 8492
- CB 8202
- CB 8212

The operation of the busbar trip relay was not expected given the work being performed at the time of the event.

The status of the power system immediately after the incident is shown in Figure 2.

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



4 Immediate Actions Taken

After discussions between AEMO and Powerlink to ascertain the nature of the trip, the No.2 275 kV busbar at Bouldercombe was returned to service at 1207 hrs. The 849 Bouldercombe–Stanwell 275 kV transmission line was returned to service at 1210 hrs.

Powerlink advised that the wire had been re-terminated and that other connections had been checked. AEMO applied SO_OP3715 Power System Security Guidelines[1] in determining that the simultaneous trip of the No.2 275 kV busbar at Bouldercombe and the 849 Bouldercombe–Stanwell 275 kV transmission line was unlikely to re-occur and would not be classified as a credible contingency.

At 1222 hrs on 14 November 2012, AEMO issued the Electricity Market Notice No.40275 advising the occurrence of this non-credible contingency event.

[1] Clause 4.2.3B of the NER requires that AEMO establish criteria to use when considering whether a non-credible contingency event is reasonably possible. This is published in AEMO operating procedure SO_OP3715 Power System Security Guidelines, which is available at: http://www.aemo.com.au/Electricity/Policies-and-Procedures/System-Operating-Procedures/Power-System-Security-Guidelines-SOOP

5 Follow-up Actions

Field technicians were reminded to check the mechanical strength of electrical connections in the vicinity before performing any work that may place mechanical stress on the connections as per established work procedures.

6 Power System Security Assessment

There was no loss of load or supply as a result of this event.

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

At 1200 hrs on 14 November 2012, the No.2 275 kV busbar at Bouldercombe in Queensland tripped due to the operation of bus zone protection. The protection scheme was triggered when a wire was inadvertently pulled from a terminal during removal of redundant cables from the bus zone protection cubicle.

AEMO correctly assessed and applied the criteria published in SO_OP3715 in the context of the non-credible contingency event under investigation.

AEMO is satisfied with the appropriateness of actions taken by Powerlink.

8 Recommendations

There are no recommendations arising from this incident.