POWER SYSTEM OPERATING INCIDENT REPORT – TRIP OF BOULDERCOMBE No.1 275 kV BUSBAR 17 MAY 2013

PREPARED BY: Systems Performance and Commercial

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FINAL

Disclaimer

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Incident Classifications

Date and time of incident	17 May 2013 at 0851 hrs
Region of incident	Queensland
Affected regions	Queensland
Event type – (classification code)	Busbar Trip (BB)
Primary cause – (classification code)	Protection and Control (PTN & CTR)
Impact	Nil
Associated reports	Nil

Abbreviations and Symbols

Abbreviation	Term
AEMO	Australian Energy Market Operator
EMMS	Electricity Market Management System
EMS	Energy Management System
kV	Kilovolt
NEM	National Electricity Market
NER	National Electricity Rules
Q-BCCP_812	A NEM constraint set that is invoked for the outage of the Queensland 275 kV Transmission Line 812 Bouldercombe - Calliope River. The constraint set abbreviations are: Q-Queensland, BC Bouldercombe, CP-Calliope River, 812-Transmission Line 812
TNSP	Transmission Network Service Provider

Contents

1 Introduction

This report reviews a power system operating incident that occurred in the Queensland Region on Friday 17 May 2013 at Powerlink's Bouldercombe Substation. AEMO is required to review this incident as it classified as a non-credible contingency that satisfies the requirements of a reviewable incident under the NER[1].

The purpose of this incident review is to assess power system security over the course of the incident. More specifically the NER requires AEMO 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[2].

This report is based upon information provided by Powerlink, and data from AEMO's Energy Management System (EMS) and Electricity Market Management System (EMMS).

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

2 The Incident

At 0851 hrs on Friday 17 May 2013 at Bouldercombe Substation the busbar protection system of No. 1 275 kV Busbar operated. The busbar protection operation removed from service No. 1 275 kV Busbar at Bouldercombe Substation and off-loaded 275 kV Transmission Line 812 Bouldercombe-Calliope River.

The incident occurred during planned secondary systems work at the substation. In-service cabling was inadvertently removed during work to remove redundant decommissioned secondary cabling.

No load or generation was lost as a result of this incident. The No.1 275 kV Busbar and 275 kV Transmission Line 812 Bouldercombe-Calliope River were returned to service within 36 minutes.

3 TNSP Investigation

Powerlink investigated the incident and found that the busbar protection system of No. 1 275 kV Busbar operated due to a momentary operation of the busbar trip relay.

The busbar trip relay operated during work to remove redundant decommissioned secondary cabling. In the process of removing the cabling, established work procedures were not fully observed which resulted in an in-service cable being removed. The removal of the in-service cable initiated the busbar trip signal.

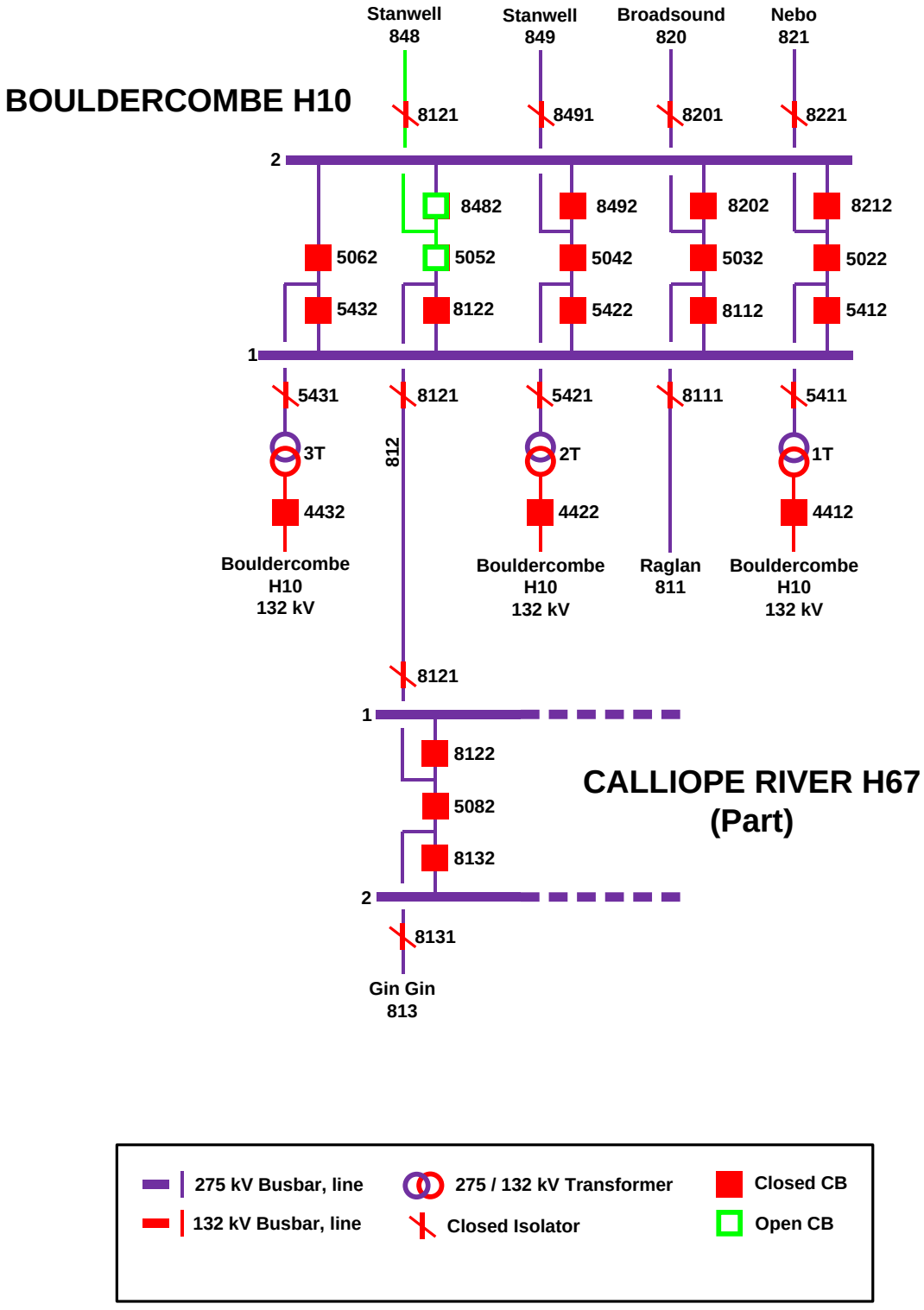
4 Pre-Incident Power System Conditions

Prior to the incident, 275kV Transmission Line 848 Stanwell-Bouldercombe was out of service. This was part of a Powerlink planned outage for secondary system replacement works. 275kV Transmission Line 812 Calliope River-Bouldercombe remained in service via No. 1 275kV Busbar at Bouldercombe Substation.

The status of the power system prior to the incident is shown in Figure 1. The diagram shows the out of service elements associated with the planned outage: 275kV Transmission Line 848 Stanwell-Bouldercombe and associated circuit breakers 8482 and 5052.

[1] *NER* v55 Clause 4.8.15(a)(1),and AEMC Reliability Panel *Guidelines for Identifying Reviewable Operating Incidents*
[2] *NER* v55 Clause 4.8.15 (b)

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



5 Incident Event Log

The sequence of events comprising the incident are itemised in Table 1. Power system elements were returned to service within 36 minutes, and the incident as a whole spanned approximately 45 minutes.

Table 1 – Event Log	
Time	**Event**
7 May 2013 0704 hrs	Powerlink planned outage commences • 275 kV Transmission Line 848 Stanwell-Bouldercombe out of service • Bouldercombe 275kV Circuit Breakers 8482 and 5052 open
17 May 2013 0851 hrs	Busbar Protection System Operates • Trip of No. 1 275 kV Busbar at Bouldercombe • Off-load of 275 kV Transmission Line 812 Calliope River-Bouldercombe
17 May 2013 0900 hrs	Constraint set Q-BCCP_812 invoked
17 May 2013 0915 hrs	Market Notice 42398 issued. Notifies market of • A non-credible contingency event • Unplanned outage of No. 1 275 kV Busbar at Bouldercombe • Off-loading of 275 kV Transmission Line 812 Bouldercombe-Calliope River
17 May 2013 0926 hrs	Return to service of • No. 1 275 kV Busbar at Bouldercombe
17 May 2013 0927 hrs	Return to service of • 275 kV Transmission Line 812 Calliope River-Bouldercombe
17 May 2013 0934 hrs	Market Notice 42399 issued. Notifies the market of • The cause of the non-credible contingency event has been identified • The event is not to be reclassified as a credible contingency event
17 May 2013 0935 hrs	Constraint set Q-BCCP_812 revoked
21 May 2013	Powerlink planned outage complete

The status of the power system immediately after the incident is shown in Figure 2. The diagram shows the out of service No.1 275 kV Busbar and associated circuit breakers, and the off-loaded 275kV Transmission Line 812 Calliope River-Bouldercombe.

6 Immediate Actions Taken

AEMO invoked constraint set Q-BCCP_812 approximately ten minutes after the busbar tripped. This action ensured that the power system was in a secure operating state. AEMO is required to return the power system to a secure state within thirty minutes following a contingency event.[3]

AEMO then issued Market Notice 42398 to notify the market of:

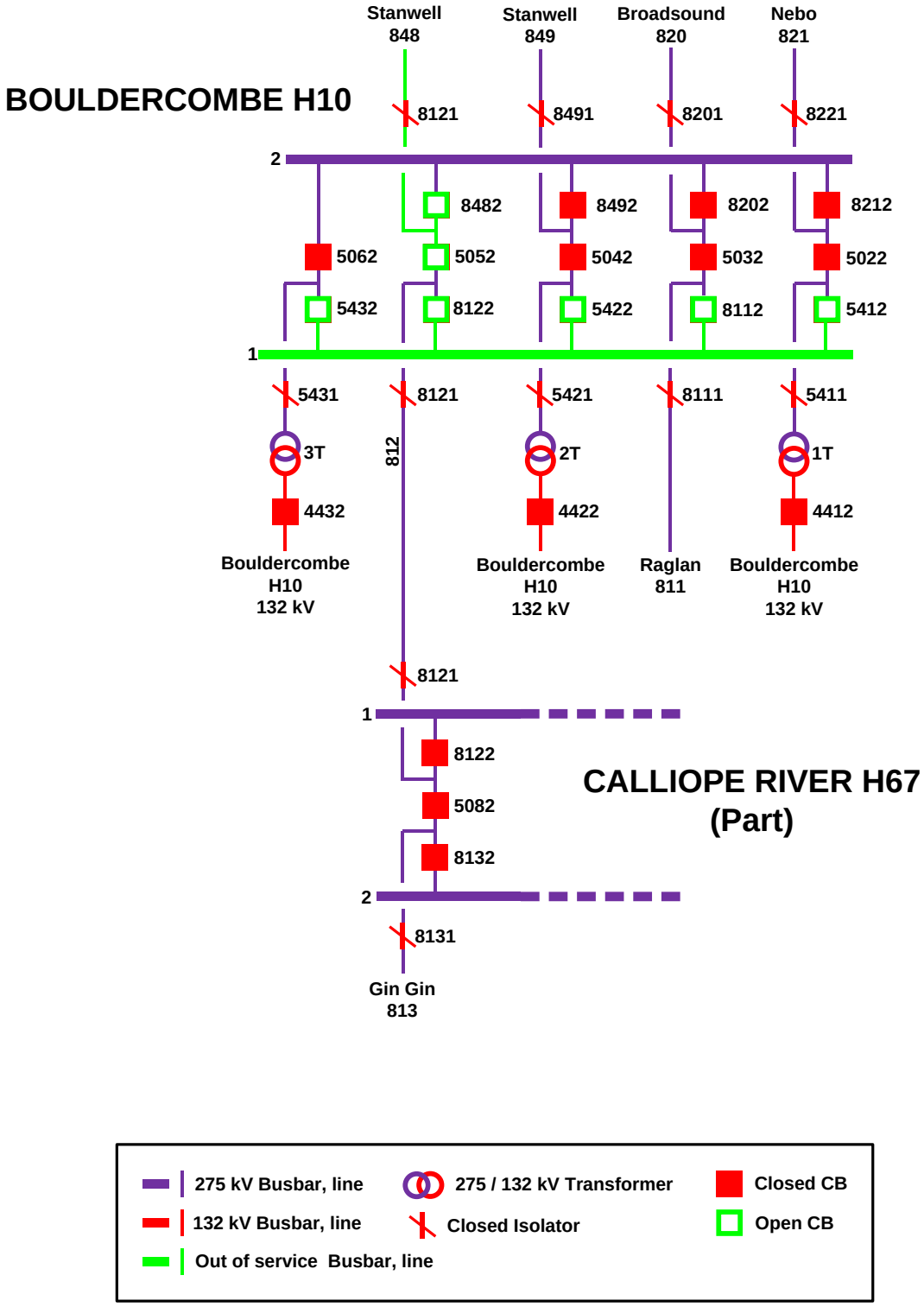
- A non-credible contingency event
- The unplanned off-loading 275 kV Transmission Line 812 Calliope River–Bouldercombe
- Constraint set Q-BCCP_812 invoked

AEMO issued Market Notice 42398 approximately 25 minutes after the busbar tripped. AEMO is required to notify the market of a non-credible contingency event within two hours of the event[4].

[3] *NER* v55 Clause 4.2.6 (b)
[4] *AEMO Power System Security Guidelines* v54 Section 10.3

Powerlink immediately implemented additional precautions to minimise the risk of any further operations of the busbar trip relay. No further unexpected power system events occurred during the planned work at Bouldercombe Substation.

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



7 Follow-up Actions

AEMO issued Market Notice 42399 following the return to service of the Busbar at Bouldercombe substation. This notice advised the market that:

- The cause of the non-credible contingency had been identified
- The trip of No.1 275 kV Busbar at Bouldercombe was not re-classified as a credible contingency

AEMO is required to assess whether or not to reclassify a non credible contingency event as a credible contingency[5], and to report how re-classification criteria were applied[6]. AEMO has to determine if the condition that caused the non-credible contingency event has been resolved.

AEMO did not reclassify the busbar trip as a credible contingency because the cause of the trip had been identified and that the cause of the trip was unlikely to re-occur. AEMO was satisfied that Powerlink had identified the cause of the condition and had taken remedial measures to minimise the risk of a reoccurrence.

Powerlink also reminded field staff of the need to adhere to the procedure for removing decommissioned cables.

8 Power System Security Assessment

AEMO is responsible for power system security in the NEM and is required to operate the power system in a secure operating state[7]. AEMO must thereby ensure that the power system is returned to, or maintained in, a secure operating state following a contingency event.

By invoking constraint set AEMO ensured that the power system was in a secure operating state. Constraint set Q-BCCP_812 limits the potential flow on transmission lines in the surrounding network. This ensures that in the event of a further credible contingency event the power system would be in at least a satisfactory operating state post-contingency.

Constraint set Q-BCCP_812 is required when 275 kV Transmission Line 812 Calliope River–Bouldercombe is off-loaded or out of service. The constraint set remained invoked, but did not bind, for the period while 275 kV Transmission Line 812 Bouldercombe-Calliope River was off-loaded.

9 Conclusions

AEMO and Powerlink correctly discharged their power system security obligations following the non-credible contingency event. Power system security was maintained throughout the course of the incident.

10 Recommendations

There are no recommendations arising from this incident.

[5] *NER* v55 Clause 4.2.3A (c)
[6] *NER* v55 Clause 4.8.15 (ca)
[7] *NER* v55 Clause 4.2.4