POWER SYSTEM OPERATING INCIDENT REPORT – TRIPS OF GLADSTONE UNIT 1 AND THE GLADSTONE - CALLIOPE RIVER 8876 275 KV TRANSMISSION LINE ON 26 JANUARY 2013

PREPARED BY: Systems Performance and Commercial

DATE: 26 March 2013

FINAL

Disclaimer

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Abbreviations and Symbols

Abbreviation	Term
CB	Circuit Breaker
DI	Dispatch Interval
kV	Kilovolt
MW	Megawatt
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine

Contents

Incident summary

Date and time of incident	26 January 2013 at 0815 hrs
Region of incident	Queensland
Affected regions	Queensland
Event type	TG – loss of Transmission element(s) and Generating unit(s)
Primary cause	PTN and CTR – Protection and Control issue
Impact	Significant
Associated reports	Nil

1 Introduction

At 0815 hrs on 26 January 2013, Gladstone Power Station Unit 1 tripped from 95 MW. Following this trip, protection systems operated to trip the Gladstone – Calliope River 8876 275 kV Transmission Line at the Calliope River end. Investigations later identified a faulty switch was not indicating the correct circuit breaker status to the protection system circuitry.

At 0827 hrs on 26 January 2013, the Gladstone – Calliope River 8876 275 kV Transmission Line was returned into service. There was no loss of load as a result of this incident. The reduction in generation was 95 MW.

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 and CS Energy. 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

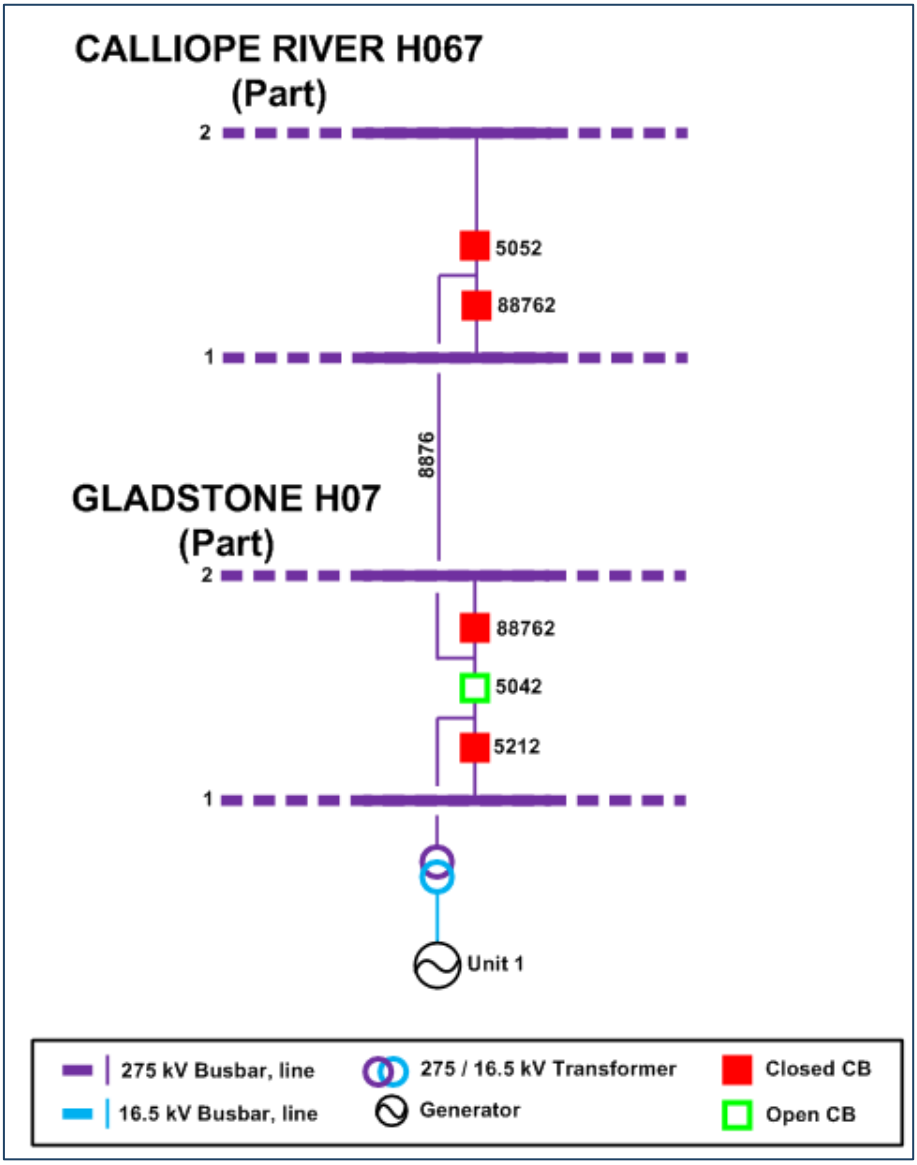
Prior to the event, 275 kV circuit breaker 5042 ('**CB 5042**') at Gladstone Substation was open.

All other transmission elements were in service.

Gladstone Power Station Unit 1 was generating at 95 MW prior to the event.

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

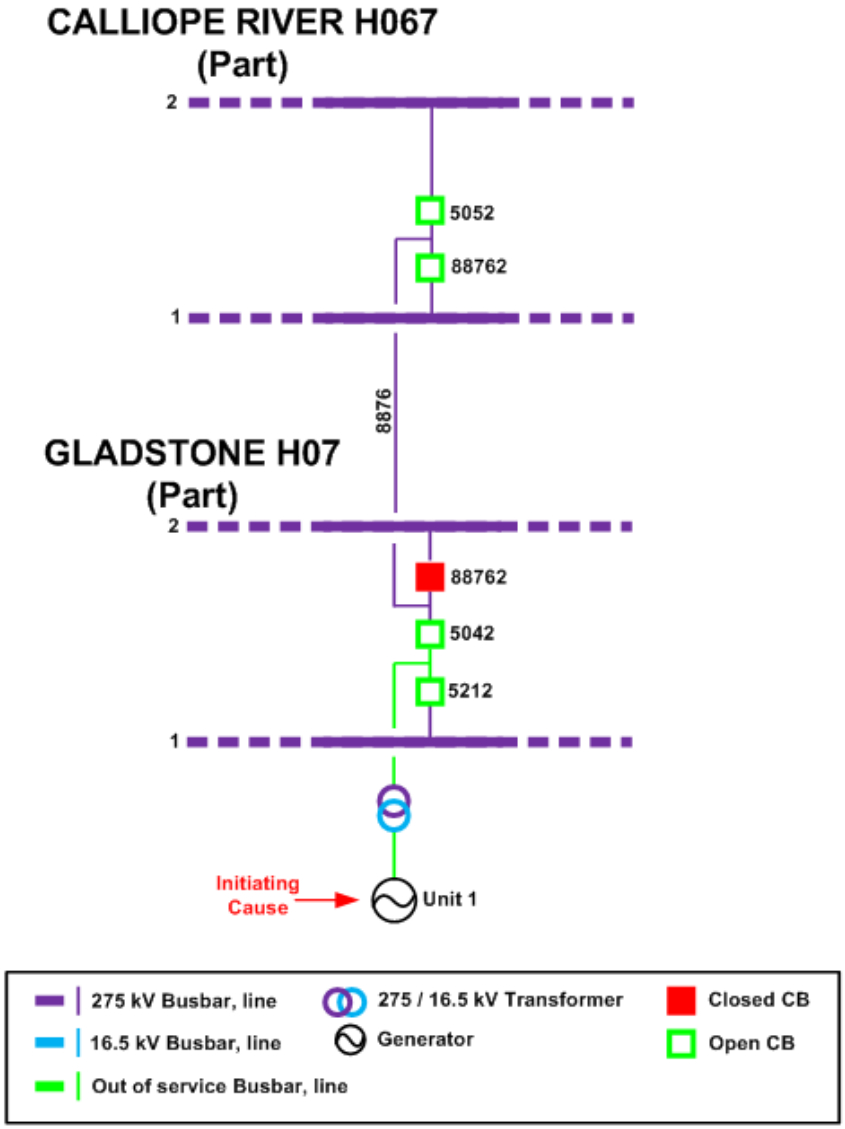
The key events that took place during this incident are summarised in Table 1.

Table 1: Summary of Post-contingent Events

Time	Events
0815 hrs	**Gladstone Power Station Unit 1 tripped** Gladstone Power Station Unit 1 protection systems operated to issue the following trip signals to Gladstone Substation: • Unit 1 protection trip • Unit 1 local backup protection trip – Reverse Power and Turbine trip condition **At 275 kV Gladstone Substation** Gladstone Power Station Unit 1 Protection Trip sent signal to: • Open H007 Gladstone 275 kV CB 5212 • Open H007 Gladstone 275 kV CB 5042 (Already open) **At 275 kV Calliope River Substation** Gladstone Power Station Unit 1 local backup protection trip sent signal to: • Open H067 Calliope River 275 kV CB 88762 • Open H067 Calliope River 275 kV CB 5052
0815 hrs	**Gladstone – Calliope River 8876 275 kV line opened at Calliope River end**
0827 hrs	**Restored 8876 Gladstone – Calliope River 275 kV line** Gladstone – Calliope River 8876 275 kV line placed on load at Calliope River: • Close H067 Calliope River 275 kV CB 88762 • Close H067 Calliope River 275 kV CB 5052

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

The immediate actions that that took place after this incident are summarised in Table 2.

Table 2: Summary of immediate actions taken

Time	Events
0858 hrs	AEMO issued Electricity Market Notice No.41247 advising that the non-credible contingency event of the loss of Gladstone Unit 1 and 8876 Gladstone – Calliope River line at 0815 hrs as a credible contingency event. In the notice AEMO also indicated their intention, pending the outcome of an investigation, to reclassify the loss of these two elements a s a credible contingency event,
1037 hrs	Gladstone Power Station Unit 1 synchronised to the transmission network via the closing of 275 kV CB 5212.
1045 – hrs	Gladstone Power Station Unit 1 was given a target by NEMDE for the first time after the simultaneous trip event. Unit 1 was generating at the target. In consecutive DIs, the unit ramped up to normal load.
1600 hrs	H007 Gladstone 275 kV CB 5042 closed.
2048 hrs	AEMO issued Electricity Market Notice No.41257[1] to reclassify the simultaneous trip of the above plant to be a credible contingency event from 0858 hrs 26 January 2013 until further notice. The cause of the simultaneous trip was not known at this time.

5 Follow-up Actions

NRG Gladstone Operating Services via CS Energy investigated the trip of Gladstone Power Station Unit 1 and found the trip condition occurred during run-up of Unit 1. This issue was rectified. At 1045 hrs on the same day, Unit 1 received a dispatch target and incrementally ramped up generation.

Powerlink's investigation found a faulty auxiliary switch associated with CB 5042 caused an incorrect CB position status to be indicated in the Gladstone Power Station Unit 1 local backup protection system trip circuitry. This incorrect CB position status indication resulted in the required conditions for the Unit 1 local backup protection system to trip the remote end of the 8876 Gladstone – Calliope River 275 kV transmission line.

At 1139 hrs on 11 March 2013, Powerlink confirmed via email that the auxiliary switch that had the fault was rectified on 5 March 2013.Upon receiving confirmation from Powerlink, at 1148 hrs on 11 March 2013, AEMO issued Electricity Market Notice No.41840 cancelling the reclassification of the simultaneous trip of the 8876 Gladstone – Calliope River 275 kV transmission line and the Gladstone Power Station Unit 1 generator in Queensland Region to be a credible contingency event.

6 Power System Security Assessment

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

No reserve issues were identified in the region during the time Gladstone Power Station Unit 1 was out of service. The loss of this generation unit did not impact Power System Security.

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

[1] AEMO issued this market notice as soon as they became aware that a formal reclassification notice was not previously issued, although AEMO had expressed their intention to reclassify in Electricity Market Notice No.41247.

AEMO initially reclassified the loss of Gladstone Power Station Unit 1 and the Gladstone – Calliope River 8876 275 kV Transmission Line as a credible contingency, however on advice from Powerlink as to the cause of the trip, AEMO correctly applied the criteria published in section 12 of its Power System Security Guidelines in assessing that the circumstances of this incident did not warrant reclassifying similar incidents as a credible contingency event.

7 Conclusions

At 0815 hrs on 26 January 2013, a sequence of generating unit and network protection events occurred resulting in the trip of both Gladstone Power Station Unit 1 and off-loading of the Gladstone – Calliope River 8876 275 kV Transmission Line at the Calliope River end.

Further investigation from Powerlink found a faulty auxiliary switch associated with CB 5042 and this was rectified on 5 March 2013.

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

AEMO initially reclassified this simultaneous trip to be a credible contingency when the cause was not known. After identifying and assessing the cause of this event, AEMO considered it unlikely to reoccur. Therefore, AEMO correctly applied the criteria published in section 12 of its Power System Security Guidelines in assessing that the circumstances of this incident did not warrant reclassifying similar incidents as a credible contingency event.

8 Recommendations

There are no recommendations arising from this incident.