

POWER SYSTEM OPERATING INCIDENT REPORT – MULTIPLE CONTINGENCY EVENT IN NORTH WEST TASMANIA ON 6 APRIL 2012

PREPARED BY: Systems Capability

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FINAL

Disclaimer

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Abbreviations and Symbols

Abbreviation	Term
CB	Circuit Breaker
EMS	Energy Management System
kV	Kilovolt
MW	Megawatt
RTCA	AEMO real-time contingency analysis tool
WF	Wind farm

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1 Introduction

During a severe lightning storm on 6 April 2012 at 1934 hrs, a transmission line fault resulted in the trip of a number of transmission lines in the north west Tasmanian network. During the event, Woolnorth wind farm (WF) tripped from 86 MW. Approximately 65 MW of customer load was also interrupted.

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.

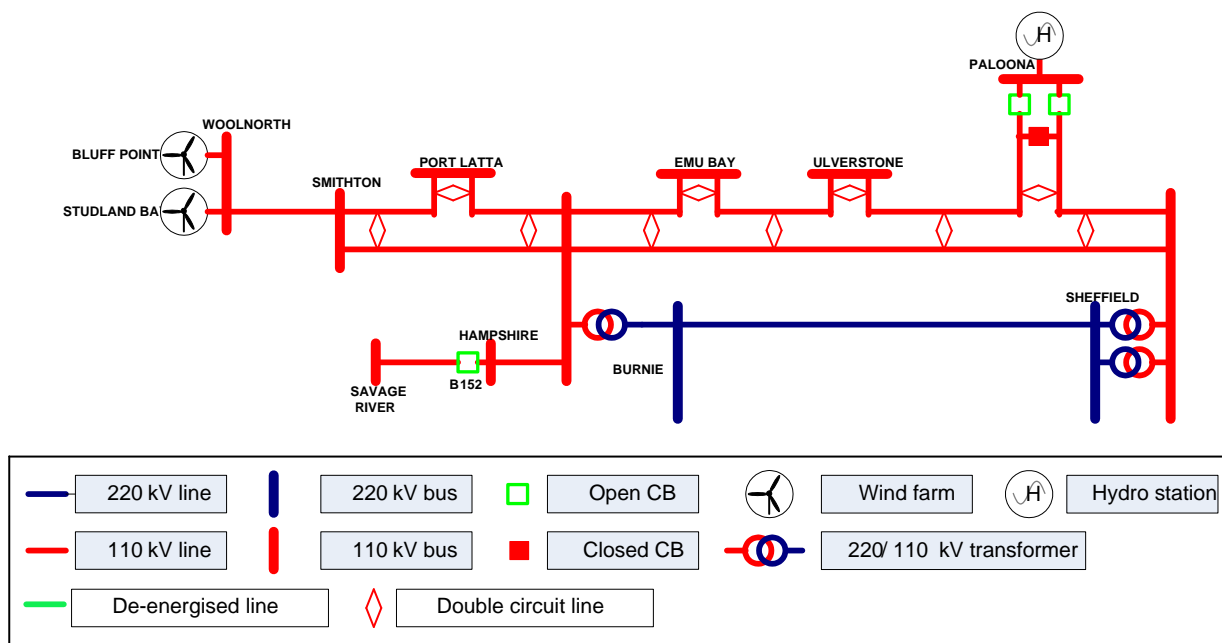
This report is largely based upon information provided by Transend Networks and Hydro Tasmania. Data from AEMO's Energy Management System and Electricity Market Management System has also been used in analysing the incident.

All references to time in this report are 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. Note that Hampshire-Savage River 110 kV line is operated normally open at Hampshire end, i.e. CB B152 is normally open. Palooona hydro power station was not in service during this event.

Figure 1 - Overview of the Tasmanian North West power system prior to the incident



3 Summary of Events

According to the records of AEMO real time systems, at 1934 hrs on 6 April 2012, following transmission lines tripped when a fault was experienced on the high voltage North West Tasmanian power system.

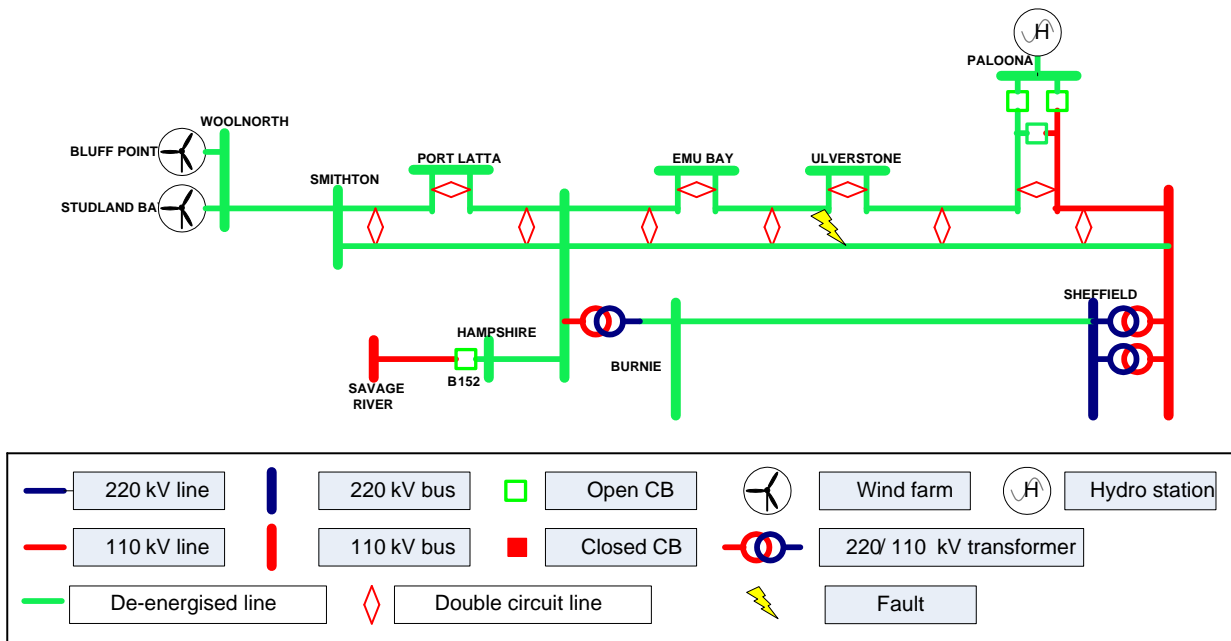
- Burnie Sheffield 110 kV line tripped
- Burnie Emu Bay 110 kV line open at Burnie
- Palooona Sheffield 110 kV line open at Palooona

- Burnie Sheffield 220 kV line tripped
- Ulverston Palooana 110 kV line open at Palooana
- Studland Woolnorth Smithton 110 kV line open at Studland
- Pt Latta Smithton 110 kV line tripped
- Burnie Smithton 110 kV line tripped
- Smithton Woolnorth 110 kV line tripped
- Burnie Pt Latta 110kV Line tripped
- Burnie Hampshire 110 kV line tripped

Lightning activity in the region was recorded in Transend lightning detection systems at the time.

As a result, the North West Tasmanian power system disconnected from the rest of the Tasmanian power system. Woolnorth wind farm tripped from 86 MW resulting in a black out of the affected part of the power system. Approximately 65 MW of customer load was interrupted in this incident. Figure 2 illustrates that North West power system following the incident..

Figure 2 - Overview of the Tasmanian North West power system immediately after the incident



4 Immediate Actions Taken

Transend commenced the power system restoration process at 1937 hrs, and the North West power system was restored to its normal configuration at 2009 hrs. Transend also undertook an aerial line inspection of the affected area based on lightning activity data records but no evidence of a fault was found.

AEMO issued market notices 38579 and 38582 at 1953 hrs and 2042 hrs respectively to inform market participants of this event.

5 Follow-up Actions

Following subsequent site inspections, Transend confirmed that evidence of a fault was located along the 110 kV Ulverstone-Emu Bay and Sheffield-Burnie 110 kV line corridor where no overhead ground wires are used. There has been a lightning strike on one of the transmission towers along this corridor initiating the fault. Records suggested that this fault had affected both ‘B’

phases of the double circuit lines, which were the top conductors, and thus making them most vulnerable to lightning.

Transend investigations revealed some issues on the operation of protections. The relatively low fault currents experienced during this event, which is indicative of a high impedance fault. For much of the fault period, the fault currents were close to the maximum load currents making it difficult for protection relays to discriminate correctly. Transend suggested that these low fault currents could be due to the high tower footing resistance.

Transend have since replaced distance protection schemes along the Burnie-Emu Bay-Ulverstone lines with differential protection schemes to avoid these issues in future.

6 Power System Security Assessment

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.

The provision and response of facilities and services of Transend and AEMO were adequate to restore the power system following this multiple contingency.

7 Conclusions

From 1934 hrs to 2009 hrs on 6 April 2012, the north west Tasmanian power system experienced a transmission line fault caused by a lightning strike on one of the transmission towers between Sheffield and Burnie. This event had resulted in 86 MW and 65 MW losses of generation and customer load respectively.

AEMO correctly applied the criteria published in section 12 of its Power System Security Guidelines¹ in assessing that the circumstances of this incident did not warrant reclassifying similar incidents as a credible contingency event.

8 Recommendations

Transend will investigate the operation of its protection systems during this incident and provide a report to AEMO. Transend will inform the progress of this investigation by the end of October 2012.