POWER SYSTEM OPERATING INCIDENT REPORT – SIMULTANEOUS TRIP OF CAPITAL AND WOODLAWN WIND FARMS 11 JULY 2012

PREPARED BY: System Performance & Commercial

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FINAL

Disclaimer

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1 Introduction

At 1319 hours on 11 July 2012, tests were being carried out on the Capital-Canberra 330 kV No. 6 transmission line. During the test, 126 MW of generation at Capital Wind Farm and 45 MW of generation at Woodlawn Wind Farm were interrupted when all turbines at each wind farm tripped out of service at the same time.

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 Infigen and TransGrid. 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

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.

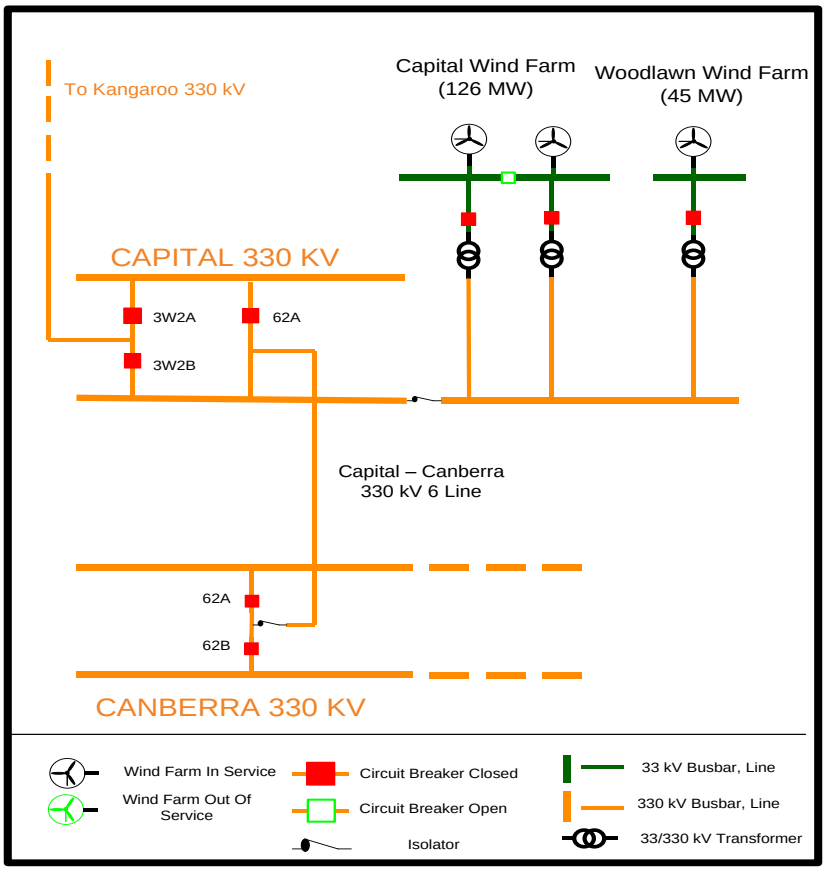

Figure 1: Status of the power system prior to the incident, 1318 hours 11 July 2012

3 Summary of Events

At 1319 hours on Wednesday 11 July 2012, automatic reclose tests were being performed on the Capital-Canberra 330 kV No. 6 transmission line. This involved tripping the line and then allowing circuit breakers to automatically reclose. During the brief line outage time Capital substation was disconnected from inductive loads at Canberra substation, and the voltage at Capital substation rose from 344 kV and stabilised at 351 kV.

Phase displacement protection[1] on all Capital Wind Farm and Woodlawn Wind Farm turbines operated to disconnect the turbines from the power system.

Table 1: Summary of Events: trip of Capital and Woodlawn Wind Farms 11 July 2012

Time	Event/Comments
1319 hours	Circuit breakers 62A and 62B at Canberra 330 kV substation, and circuit breakers 3W2B and 62A at Capital 330 kV substation tripped as part of planned test, removing Canberra-Capital 330 kV No. 6 line from service.
1319 hours	Capital Wind Farm tripped from 126 MW
1319 hours	Woodlawn Wind Farm tripped from 45 MW
1319 hours	Circuit breakers 62A and 62B at Canberra 330 kV substation, and circuit breakers 3W2B and 62A at Capital 330 kV substation automatically reclose as part of planned test, returning Canberra-Capital 330 kV No. 6 line to service.

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

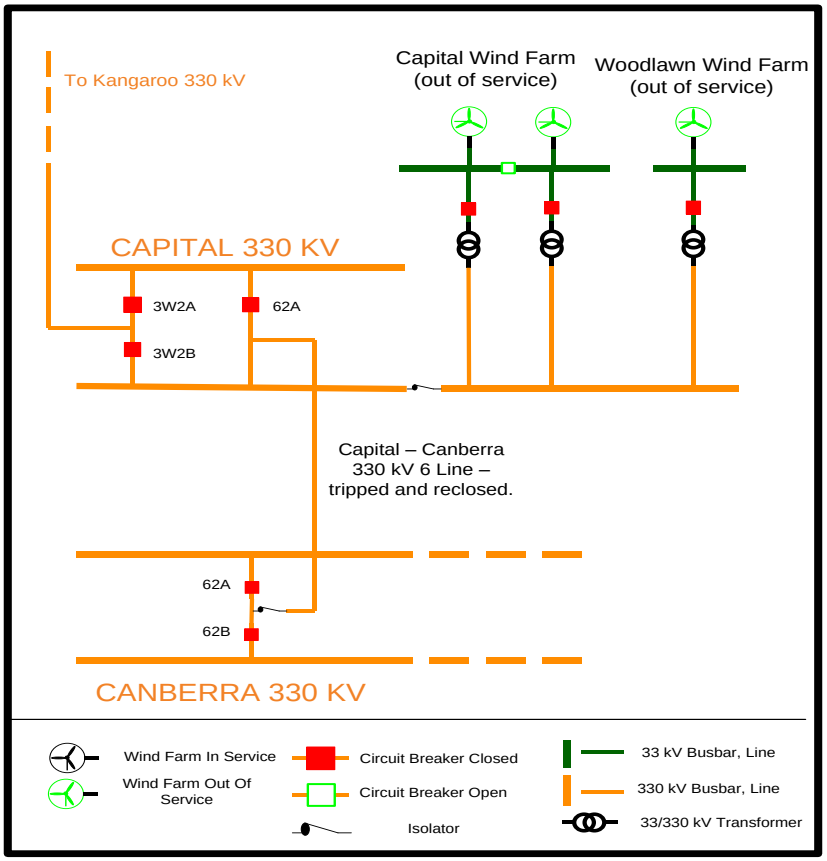

Figure 2: Status of the power system after the incident, 1320 hours 11 July 2012

[1] A form of anti-islanding generation protection used in some power systems, which operates on a step change in phase difference between voltage and output current.

4 Immediate Actions Taken

Capital Wind Farm and Woodlawn Wind Farm were returned to service by 1324 hours 11 July 2012. No further immediate action was taken by AEMO or participants.

5 Follow-up Actions

On 12 July 2012, AEMO issued Market Notice 39211, advising participants that based on the available information a non-credible contingency event had occurred. Following Market Notice 39211, AEMO received information from a participant about the wind turbines involved, and on the risk of the event re-occurring. On 13 July 2012 AEMO issued Market Notice 39223, advising participants that the simultaneous trip of Woodlawn Wind Farm, Capital Wind Farm and Canberra-Capital 330 kV No 6 line was re-classified as a credible contingency.

Infigen evaluated the protection response of Capital Wind Farm and Woodlawn Wind Farm against their Generator Performance Standards. The phase displacement protection was assessed as inconsistent with the Generator Performance Standard for Capital Wind Farm and Woodlawn Wind Farm. By 17 August 2012 Infigen completed work to remove phase displacement protection from all turbines at Capital Wind Farm and Woodlawn Wind Farm.

On 10 September 2012, AEMO issued Market Notice 39716, advising participants that the re-classification of the credible contingency in Market Notice 39223 was cancelled.

6 Power System Security Assessment

The power system voltages and frequencies remained within satisfactory limits and the power system remained in a secure operating state throughout the incident. The provision and response of facilities were adequate to maintain power system security.

In this case AEMO took 20 hours to issue a market notice outlining the change in technical envelope. Within SO_OP3715 Power System Security Guidelines, there is no time specified for the issue of the market notice.

Based on the information available at the time of notifying the market of the incident, AEMO correctly assessed the event as a non-credible contingency. Based on the information provided by a participant after advising the market of the incident, AEMO correctly re-classified the event as a credible contingency.

The cancellation by AEMO of the re-classification of the incident as a credible contingency was not done in a timely manner.

7 Conclusions

Infigen has carried out the appropriate work to mitigate the risk of a similar incident occurring in the future.

AEMO notifications to particpants during this incident were not done in a timely manner.

8 Recommendations

AEMO shall review and if necessary amend its processes to ensure the timely re-classification of non-credible contingencies, cancellation of re-classified non-credible contingencies, and the issuing of associated Market Notices. This was completed 19 October 2012.

AEMO shall include a requirement in SO_OP3715 Power System Security Guidelines that a Market Notice must be issued within two hours of a non-credible contingency occurring. This shall be completed by 16 November 2012.