

# POWER SYSTEM OPERATING INCIDENT REPORT – SIMULTANEOUS TRIP OF NO.2 NEW NORFOLK – TARRALEAH 110 KV LINE AND LAKE ECHO GENERATING UNIT ON 12 FEBRUARY 2012

PREPARED BY: Electricity System Operations Planning and Performance

DATE: 30 May 2012

FINAL

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## Abbreviations and Symbols

| Abbreviation | Term                       |
|--------------|----------------------------|
| kV           | Kilovolt                   |
| ms           | Millisecond                |
| MW           | Megawatt                   |
| NER          | National Electricity Rules |

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## 1 Introduction

At 0250 hrs on 12 February 2012, the No.2 New Norfolk – Tarraleah 110 kV transmission line and the Lake Echo generating unit in Tasmania region simultaneously tripped out of service. Lake Echo was generating 24 MW prior to the incident.

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.

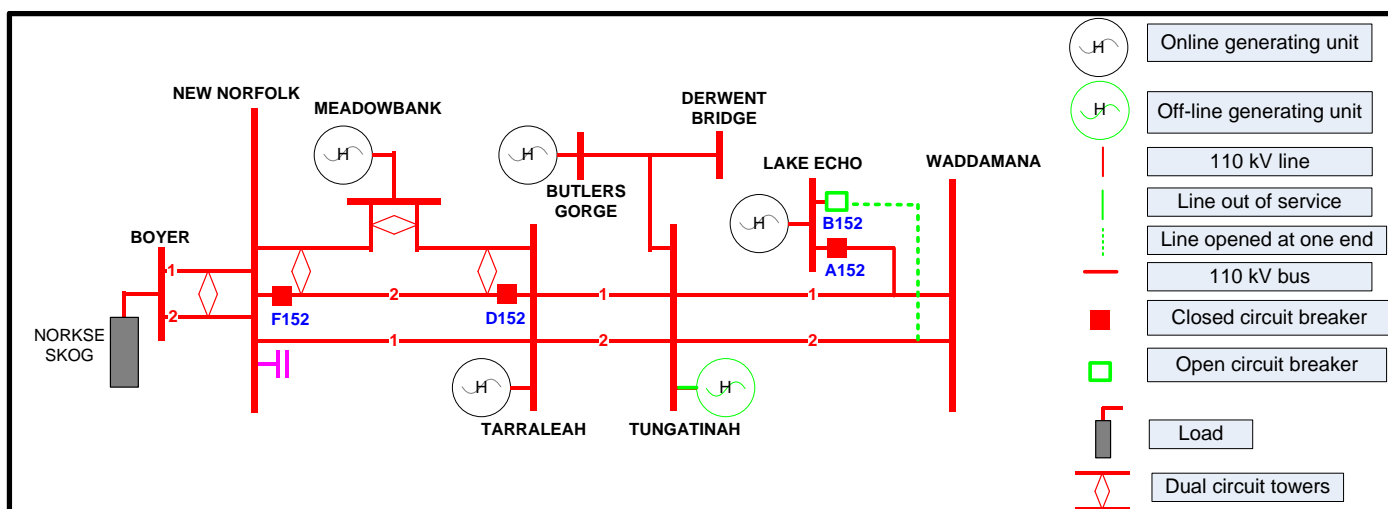
This report is largely based upon information provided by Transend and Hydro Tasmania. Data from AEMO's Energy Management System and Electricity Market Management System has also been used in analysing the incident.

All references to time in this report are to National Electricity Market time (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 New Norfolk, Tarraleah and Lake Echo prior to the incident



## 3 Summary of Events

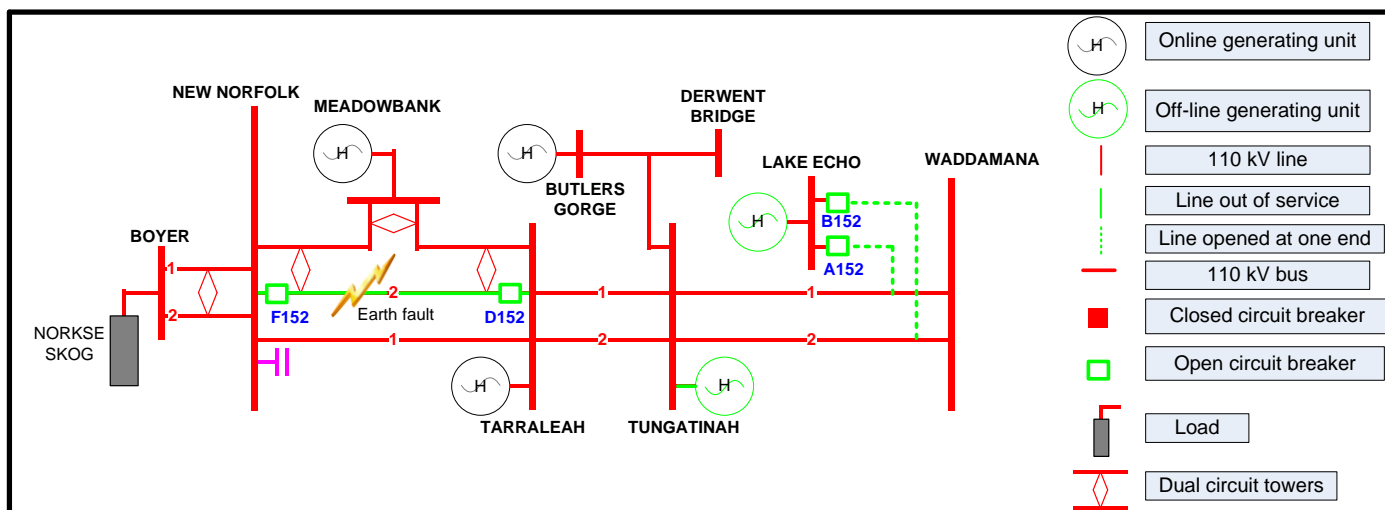
At 0250 hrs on 12 February 2012, the No.2 New Norfolk – Tarraleah 110 kV transmission line and the Lake Echo generating unit simultaneously tripped, opening the 110 kV circuit breakers F152, D152, and A152. Lake Echo was generating 24 MW prior to the incident.

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

The No.2 New Norfolk – Tarraleah 110 kV line successfully auto-reclosed at the New Norfolk end and was manually placed on load at the Tarraleah end at 0252 hrs.

The Lake Echo generating unit was returned to service at approximately 1105 hrs on 13 February 2012.

Figure 2 - Status of New Norfolk, Tarraleah and Lake Echo immediately after the incident



## 4 Immediate Actions Taken

At 0413 hrs, AEMO issued the Electricity Market Notice No. 37769 advising the unplanned trip of the No.2 New Norfolk – Tarraleah 110 kV transmission line and the Lake Echo generating unit.

As the cause of the incident was unknown, AEMO applied the criteria in its Power System Security Guidelines<sup>1</sup> and determined to reclassify, effective from 0420 hrs, the simultaneous trip of the No.2 New Norfolk – Tarraleah 110 kV transmission line and the Lake Echo generating unit as a credible contingency event. At 0431 hrs AEMO issued the Electricity Market Notice No. 37770 advising market participants of this contingency reclassification.

## 5 Follow-up Actions

Transend investigations revealed that the trip of the No.2 New Norfolk – Tarraleah 110 kV transmission line was caused by a one phase to ground fault on the blue phase of the line. The protection systems of the line operated correctly and the fault was cleared in approximately 100 ms, which is within the required fault clearing time specified in the NER<sup>2</sup>. After its investigations, Transend suspected that the line fault was caused by either flying debris or animal activities. No lightning activity was recorded in the vicinity of the line at the time of the incident.

Investigations by Hydro Tasmania revealed that the simultaneous trip of the Lake Echo generating unit occurred as a result of an incorrect setting applied to a protection relay associated with the Lake Echo generator transformer. The incorrect setting had been in place since commissioning of the generator transformer in 2003. Hydro Tasmania has since modified the protection relay settings so that the Lake Echo generating unit does not trip when line faults occur on nearby transmission lines. Following advice from Hydro Tasmania of completion of this work, AEMO issued Electricity Market Notice No.38472 at 1603 hrs on 23 March 2012 advising the cancellation, effective from 1600 hrs, of the contingency reclassification advised in Electricity Market Notice No. 37770.

<sup>1</sup> 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/electricityops/3715.html>

<sup>2</sup> Refer Schedule S5.1a.8 in the NER.

## **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.

24 MW of generation was disconnected as a result of this incident.

The blue phase to ground fault on the No.2 New Norfolk – Tarraleah 110 kV transmission line was cleared by the protection systems in accordance with the requirements specified in the NER.

The provision and response of facilities and services were adequate to maintain power system security.

## **7 Conclusions**

The No.2 New Norfolk – Tarraleah 110 kV transmission line tripped to clear a blue phase to ground fault. The Lake Echo generating unit simultaneously tripped due to an incorrect setting applied to its generator transformer protection relay.

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

AEMO correctly applied the criteria published in section 12 of its Power System Security Guidelines in assessing that the circumstances of this incident warranted the reclassification of similar incidents as a credible contingency event.

## **8 Recommendations**

There are no further recommendations arising from this incident.