

POWER SYSTEM OPERATING INCIDENT REPORT – SIMULTANEOUS TRIP OF 97G MURRAY - GUTHEGA 132 KV LINE AND MURRAY TIE TRANSFORMERS 330/132 KV ON 14 FEBRUARY 2013

PREPARED BY: System Performance and Commercial

DATE: 16 May 2013

FINAL

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Abbreviations and Symbols

Abbreviation	Term
CB	Circuit Breaker
EMMS	Electricity Market Management System
EMS	Energy Management System
kV	Kilovolt
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market

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Incident summary

Date and time of incident	14 February 2013 at 1311 hrs
Region of incident	New South Wales
Affected regions	New South Wales, Victoria
Event type	TT – Loss of multiple transmission elements
Primary cause	PTN & CTR – Protection and Control
Impact	NIL
Associated reports	NIL

1 Introduction

At 1311 hrs on 14 February 2013, the 97G Murray – Guthega 132 kV Transmission Line (97G2 CB) and the Murray 1 and 2 330/132 kV Tie Transformers (5412 CB) at Murray station tripped simultaneously. Lightning was reported in the vicinity of the line at the time of the incident and at the time of trip. The 97G Murray – Guthega 132 kV Transmission Line was offloaded at Guthega prior to the incident.

The Murray Tie Transformers were re-energised at 1343 hrs and the 97G Murray – Guthega 132 kV Transmission Line was re-energised at 1421 hrs. There was no loss of generation or customer load associated to this event.

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 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

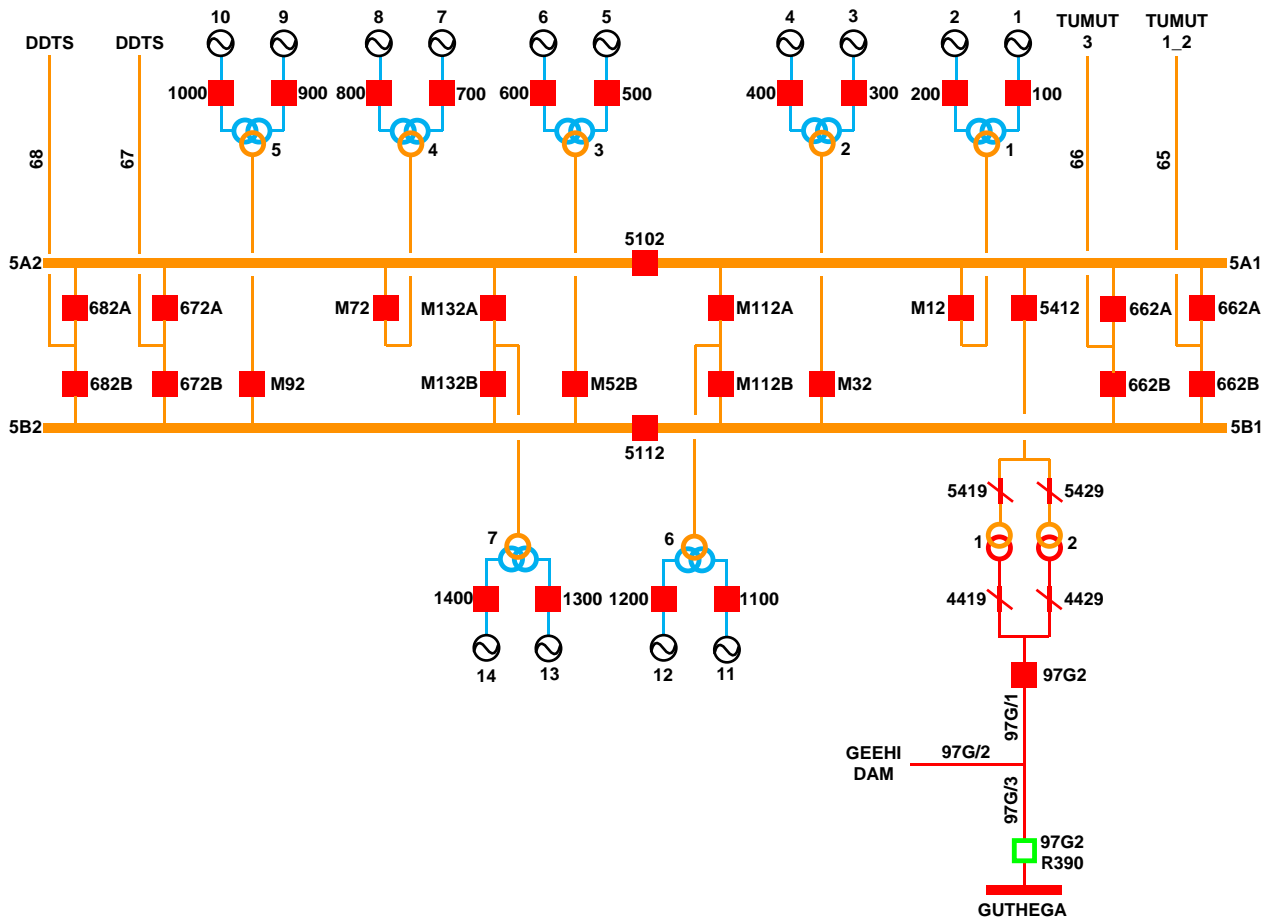
The 97G Murray – Guthega 132 kV Transmission Line and the Murray 1 and 2 330/132 kV Tie Transformers were energised but deloaded at the time of the event because the 97G Murray – Guthega 132 kV Transmission Line was open at the Guthega Power Station¹.

The status of the power system prior to the incident is shown in Figure 1.

¹ This CB is normally open when Guthega is switched to Munyang.

Figure 1 - Status of the power system prior to the simultaneous trip

MURRAY



330 kV Busbar, line	330/15/15 kV Transformer	Closed CB	Closed Isolator
132 kV Busbar, line	330/132 kV Transformer	Open CB	Open Isolator
15 kV Busbar, line		Generator	Out of service Generator
Out of service Busbar, line			

3 Summary of Events

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

Table 1: Summary of events

Time	Events
1311 hrs	The 97G Murray – Guthega 132 kV Transmission Line and the Murray 1 and 2 330/132 kV Tie Transformers tripped simultaneously.
1343 hrs	Murray 1 and 2 330/132 kV Tie Transformers energised.
1421 hrs	97G Murray – Guthega 132 kV Transmission Line energised.
15/02/13 0939 hrs	AEMO issued Market Notice No. 41507 advising Non-credible contingency Event Vic/NSW. “At 1311 hrs Thursday, 14 February 2013, the 132kV line 97G and the Murray 330 / 132 kV Tie Transformer tripped simultaneously. There was no loss of load or generation as line 97G was off-loaded at the time (open at Guthega). The cause of this non credible contingency event is under investigation. The transformer was energised at 1343 hrs and 97G was energised at 1421hrs.”
19/02/13 1122 hrs	AEMO issued Market Notice No. 41566 advising Reclassification of a Non Credible Contingency Event: 97G Murray – Guthega 132 kV Transmission Line and the Murray 1 and 2 330/132 kV Tie Transformers in VIC/NSW Regions “At 1311 hrs Thursday, 14 February 2013, the Murray - Guthega (97G) 132kV line and the Murray 330/132kV Tie Transformer tripped simultaneously. The cause of this non credible contingency event is under investigation, AEMO has reclassified the simultaneous trip of these transmission elements to be a credible contingency event from 1130 hrs 19 February 2013 until further notice.”

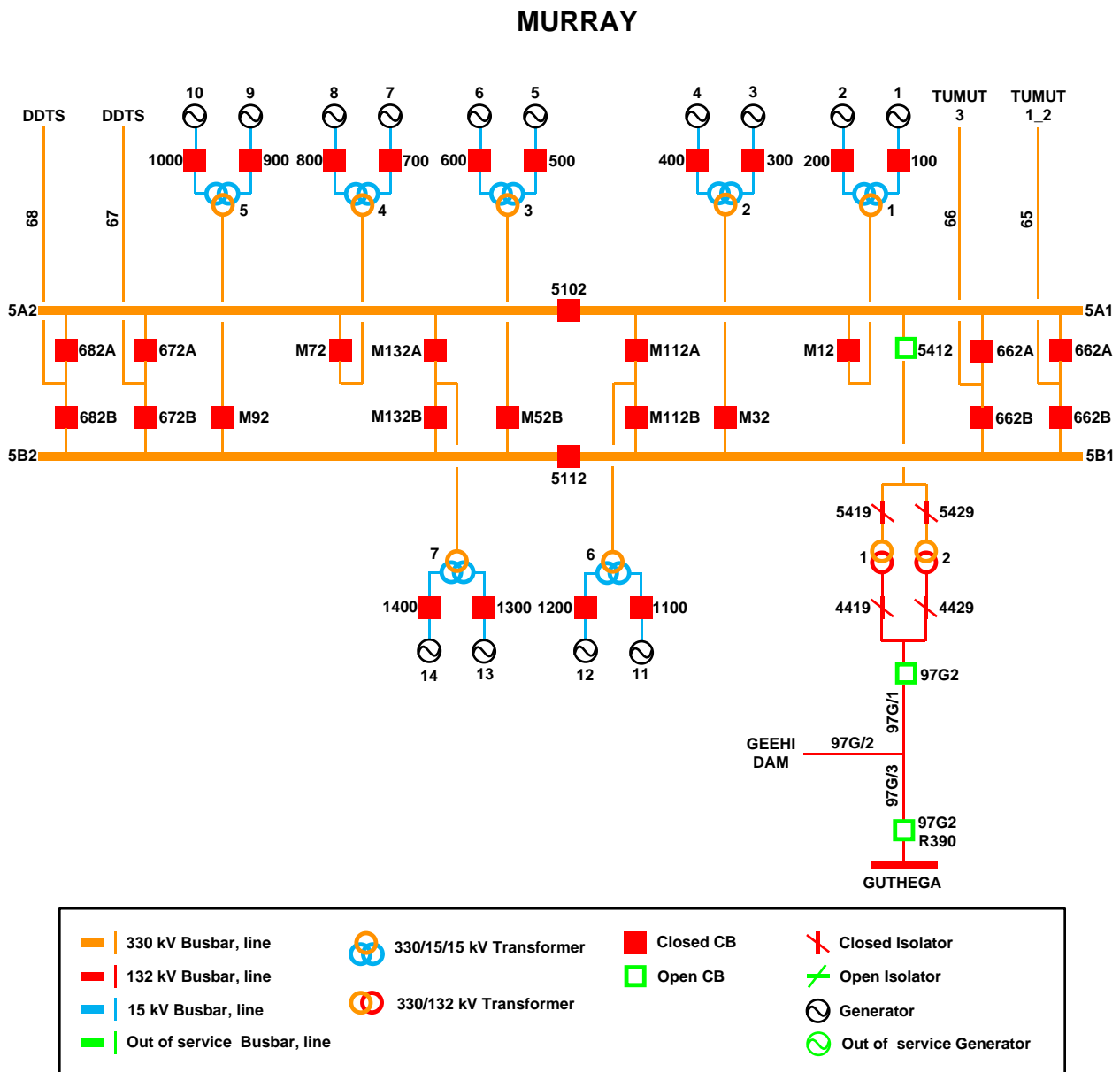
On 14 February 2013 at 13:11 hrs the 97G Murray – Guthega 132 kV Transmission Line and the Murray 1 and 2 330/132KV Tie Transformers tripped simultaneously. Lightning was present in the vicinity of the line at the time. Transgrid advised that the trip of the Murray 1 and 2 330/132 kV Tie Transformers was unexpected and likely due to either slow circuit breaker operation or mal-operation of the local back-up protection, but this has not been confirmed.

The Murray Tie Transformers were re-energised at 13:43 hrs and the 97G Murray – Guthega 132 kV Transmission Line was re-energised at 14:21 hrs.

There was no loss of load or generation as a result of this incident.

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 Follow-up Actions

On 14 February 2013, this event was initially treated by AEMO as a single series circuit with a protection mal-operation. After further consideration it was determined that the initial assessment was incorrect and that it should have been treated as a multiple contingency event. Also there should have been a non credible event market notice and a reclassification of the event as credible.

AEMO issued Market Notice No. 41507 on 15 February 2013 at 09:39 hrs advising of the non-credible contingency event that occurred on 14 February 2013, but failed to declare the loss of these elements as a credible contingency.

AEMO issued Market Notice No. 41566 on 19 February 2013 at 1122 hrs advising of the reclassification of the loss of 97G Murray – Guthega 132 kV Transmission Line and the Murray 1

and 2 330/132 kV Tie Transformers as non credible contingency event. This reclassification remains in place pending the outcome of investigations by TransGrid. TransGrid have carried out a number of checks on the protection systems associated with the 97G Murray – Guthega 132 kV Transmission Line and the Murray 1 and 2 330/132 kV Tie Transformers. However, to date TransGrid have not been able to determine the cause of the trip of the Murray Tie Transformers and are awaiting field tests of the CB's which are likely to be carried out in June 2013.

5 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.

6 Conclusions

The likely cause of the trip is lightning combined with protection or equipment mal-operation however this has not been confirmed.

AEMO has reclassified the simultaneous trip of the 97G Murray – Guthega 132 kV Transmission Line and the Murray 1 and 2 330/132 kV Tie Transformers to be a credible contingency event from 1130 hrs 19 February 2013 until further notice.

AEMO did not meet its requirements to advise the market of a non credible contingency within two hours and failed to reclassify this event as a credible contingency as soon as possible as per Power System Security Guidelines (SO_OP_3715).

TransGrid is continuing to investigate the cause of this event.

7 Recommendations

Transgrid to complete protection and circuit breaker testing and advise AEMO of the outcomes by 30 June 2013.