

POWER SYSTEM INCIDENT REPORT

SIMULTANEOUS TRIP OF HAZELWOOD TO ROWVILLE NO.1 AND NO.2 220 KV TRANSMISSION LINES ON 27 FEBRUARY 2010

PREPARED BY: Electricity System Operations Planning and Performance

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FINAL



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1. INTRODUCTION

At 08:00 hrs on 27 February 2010 in VIC region, Hazelwood to Rowville No.1 and No.2 220 kV transmission lines simultaneously tripped, the No. 1 line auto-reclosed at the Rowville end and the No. 2 line failed to auto-reclose.

This report has been prepared under clause 4.8.15 of the Rules 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.

Information for this report has been provided by SPAusNet. Additional information has been obtained from AEMO's Energy Management System (EMS) and Market Management System (MMS).

All references to time in this report refer to Market time (Australian Eastern Standard Time).

2. SUMMARY OF EVENTS

Figure 1 shows the single line diagram of the transmission network between Hazelwood and Rowville terminal stations immediately prior to the event.

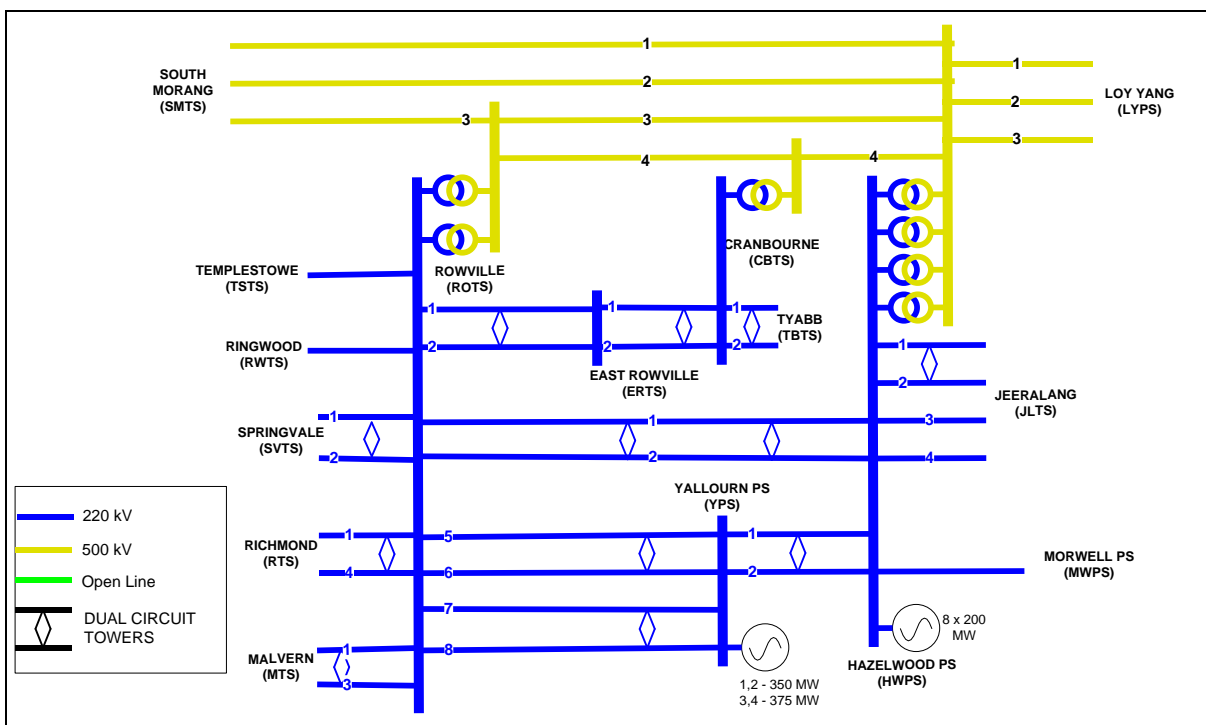


FIGURE 1: TRANSMISSION NETWORK PRIOR TO THE EVENT

The following events occurred during the incident on 27 February 2010:

- Lightning storms were in the vicinity at the Hazelwood Terminal Station
- At 08:00 hrs the Hazelwood to Rowville No.1 and No.2 220 kV transmission lines tripped.
- The No. 1 line auto-reclosed at the Rowville end and manually closed the Hazelwood end to place the line on load at 08:01 hrs.
- The No. 2 line did not attempt to auto-reclose and remained out of service until SPAusNet conducted a line patrol and confirmed that there was no damage to the line. The No. 2 line was returned to service at 14:29 hrs.

SPAusNet has attributed the event to lightning storms that were present in the vicinity at Hazelwood and suspect a direct lightning strike on the lines, based on indications.

Figure 2 shows the single line diagram of the transmission network between Hazelwood and Rowville Terminal Stations with Hazelwood to Rowville No.1 and No.2 lines out of service. These two Hazelwood to Rowville lines are on dual circuit towers.

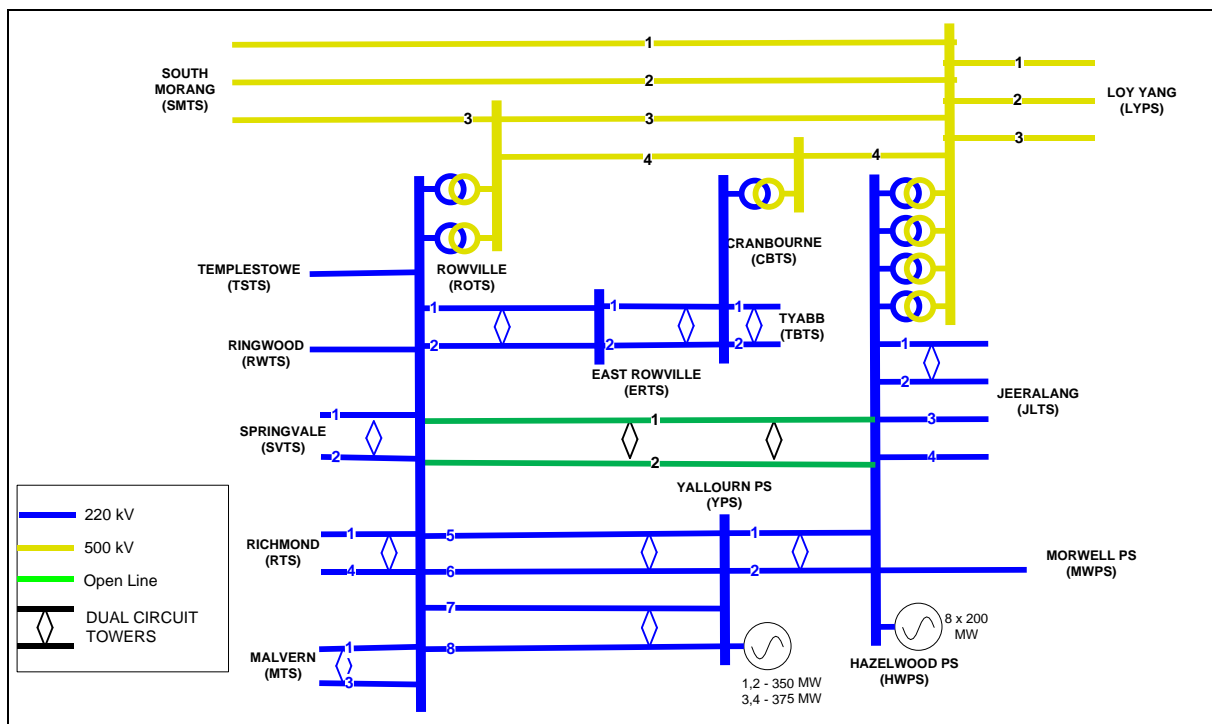


FIGURE 2: TRANSMISSION NETWORK WITH BOTH HAZELWOOD – ROWVILLE LINES OUT OF SERVICE

3. FOLLOW-UP ACTIONS

The guidelines for reclassifying the loss of double circuit transmission lines as a credible contingency event are specified in AEMO's Power System Operating Procedure SO_OP3715 Power System Security Guidelines¹. Based on this Procedure, the Hazelwood to Rowville lines could not be reclassified as a credible contingency event during lightning in the vicinity since the two lines were not classified as 'Vulnerable Transmission Lines'. Therefore, simultaneous loss of both Hazelwood to Rowville lines were not declared as a credible contingency event during lightning storms in the vicinity of Hazelwood Terminal Station on this day.

Following this event, the Hazelwood to Rowville No.1 and No.2 220 kV transmission lines were included in the category of 'Vulnerable Transmission Lines' in SO_OP 3715. According to SO_OP 3715, double circuit transmission lines in this category are eligible to be reclassified as credible contingency events during lightning storms if clouds to ground lightning strikes are detected within a specified distance.

No1 line was returned to service within a minute following tripping and the No. 2 line failed to auto-reclose. After a line patrol, the No. 2 line was returned to service at 14:29 hrs.

AEMO developed appropriate constraint equations to maintain secure operation along with the reclassification of this double circuit line to a credible contingency event.

SPAUsNet carried out investigation on the No. 2 line auto-reclose system on failure to reclose during this event. The reason for this failure could not be established due to data loss. SPAUsNet then adjusted data recording instruments and set up arrangements for remote data interrogation to improve reliability of event data acquisition. SPAUsNet also carried out tests to confirm proper operation of the auto-reclose equipment.

4. POWER SYSTEM SECURITY

The power system remained in a secure operating state for the duration of the incident. Power system frequency remained within the normal operating frequency band during the event. No load or generation was interrupted as a consequence of the event.

¹ AEMO Power System Operating Procedure SO_OP3715 Power System Security Guidelines is available at:

<http://www.aemo.com.au/electricityops/3715.html>

The section 10.4 of SO_OP3715 covers the process to be followed for reclassification due to lightning.

5. CONCLUSIONS

Simultaneous trip of both Hazelwood to Rowville lines were not in the list of 'Vulnerable Transmission Lines' that are eligible to be reclassified as a credible contingency event during lightning storms in their vicinity at the time of this event. Following this event, the Hazelwood to Rowville lines were included in the list of 'Vulnerable Transmission Lines'.

The No. 2 line auto-reclose equipment failed during this event and SPAusNet carried out tests to confirm its operation. The reason for its failure could not be established due to data loss. SPAusNet has improved its data recording and retrieval processes.

This power system incident was effectively managed by AEMO and SPAusNet in accordance with the Rules.

6. RECOMMENDATION

Nil