POWER SYSTEM INCIDENT REPORT

TRIP OF PENOLA WEST NO. 1 AND NO. 2 132/33KV TRANSFORMERS ON 15 APRIL 2010

PREPARED BY: ESOPP

FINAL

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1. Introduction

At 15:50 hrs on 15th April 2010 in South Australia (SA) region, both No. 1 and No. 2 132/33 kV transformers at Penola West substation tripped and as a result, the Penola West to Kincraig 132 kV line opened at Penola West. The incident occurred during the restoration of a 132 kV line between Penola West and Ladbroke Grove Power Station (PS), following a planned outage.

This report has been prepared under clause 4.8.15 of the National Electricity Rules to assess the adequacy of the provision and response of facilities and services and the appropriateness of actions taken to restore and maintain power system security.

Information for this report has been obtained largely from ElectraNet, AEMO's Market Management System (MMS) and Energy Management System (EMS).

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

2. Summary of events

On Thursday 15th April 2010 in SA region, there was a planned outage of Penola West to Ladbroke Grove PS 132kV line.

At 15:50 hrs, upon completion of the line outage, Penola West to Ladbroke Grove PS 132kV line and both 11/132 kV step-up transformers at Ladbroke Grove were energised by closing isolator 6128 and circuit breaker (CB) 6157 at Penola West (refer Figure 1). The protections of both Penola West 132/33 kV transformers operated on closing of the CB. This resulted in the tripping of CB 4580, CB 4581, CB 6260, CB 6261 and CB 6156, which caused the Penola West to Kincraig 132 kV line to be opened at Penola West (refer Figure 2) and the No. 1 and No. 2 132/33 kV transformers at Penola West substation to be de-energised.

At 16:05 hrs, the constraint set S-KNPW was invoked to manage the loss of the Penola West to Kincraig 132 kV line.

At 16:17 hrs, both Penola West 132/33 kV transformers and the Penola West to Kincraig 132 kV line were returned to service.

At 16:20 hrs, the constraint set S-KNPW was revoked.

The initial investigation conducted by ElectraNet suggested the energising of Penola West to Ladbroke Grove 132 kV line and both Ladbroke Grove 11/132 kV transformers had caused in-rush currents in these transformers. The in-rush currents were thought to have caused the restricted earth fault protection of both Penola West transformers to operate tripping the CBs (refer Figure 2).

However, further investigation revealed that the tripping was due to incorrect low-voltage (LV) current transformer (CT) connections associated with the two transformers at Penola West.

The CT connections were rectified on 11th May 2010.

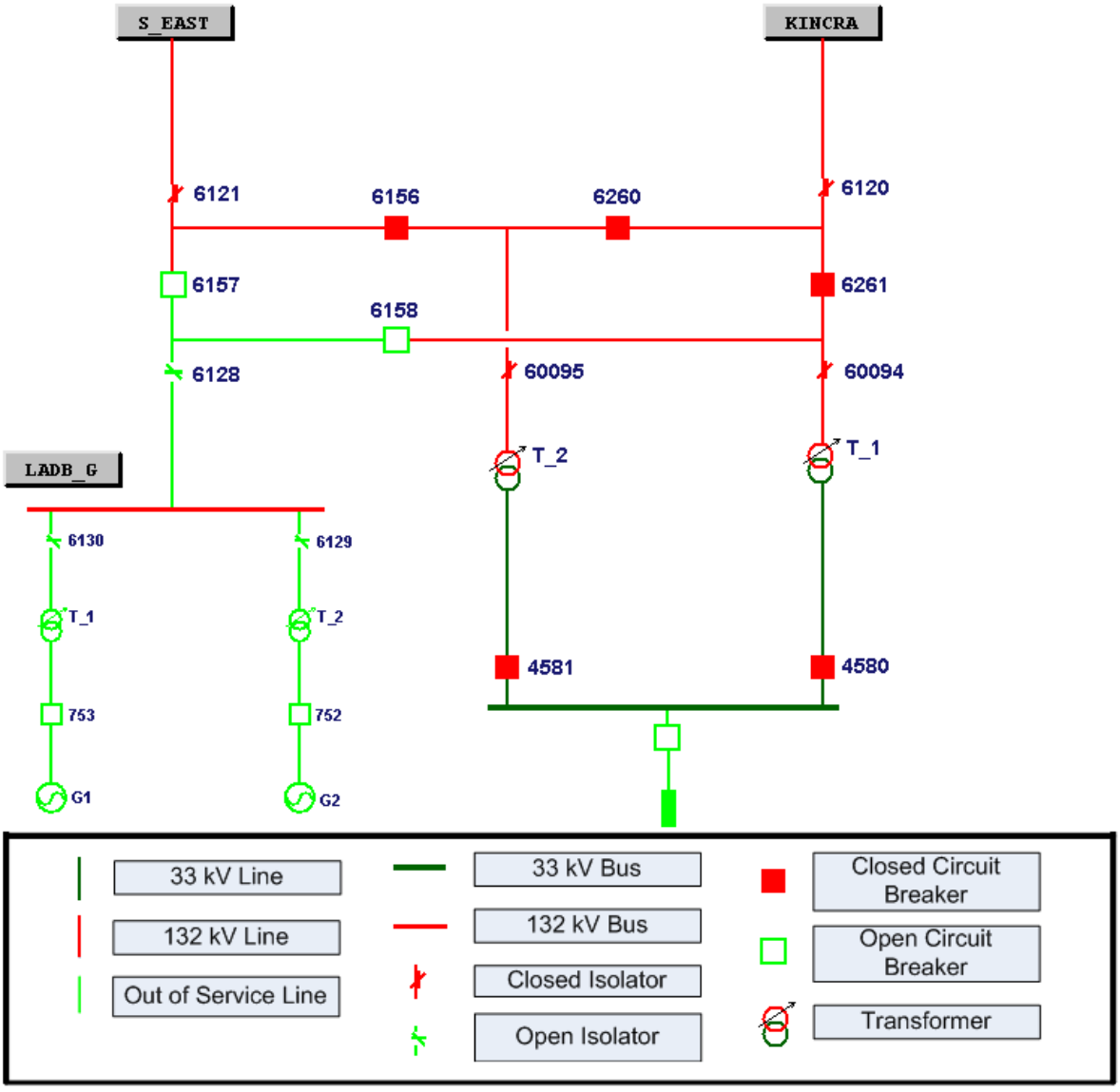

FIGURE 1. PENOLA WEST SUBSTATION DURING PLANNED OUTAGE OF PENOLA WEST TO LADBROKE GROVE PS 132 KV LINE (BEFORE THE INCIDENT)

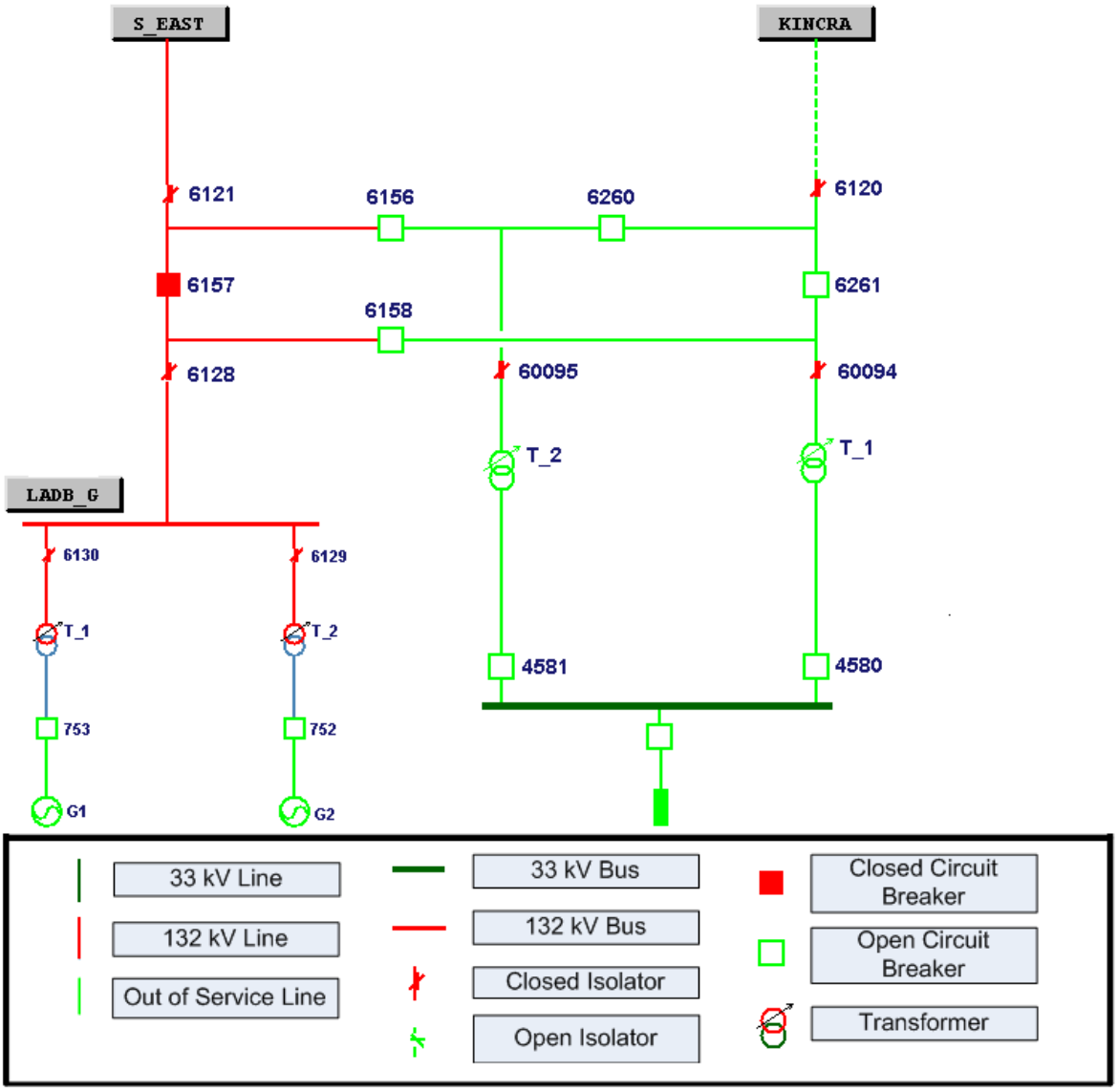

FIGURE 2. PENOLA WEST SUBSTATION IMMEDIATELY FOLLOWING THE CLOSURE OF CB 6157

3. Power System Security Assessment

During this multiple contingency event, there were no system security issues flagged in AEMO's real-time power system security monitoring applications. There was no loss of customer load as a result of the incident. The power system frequency remained well within the frequency operating standard. All affected equipment was returned to service soon after the incident.

4. Conclusions

On 15th April 2010 at 15:50 hrs, both Penola West 132/33 kV transformers tripped, which resulted in the Penola West to Kincraig 132 kV line opening at Penola West. This incident has been attributed to incorrect LV CT connections associated with the two transformers at Penola West. ElectraNet corrected the transformer CT connections on 11th May 2010.

5. Recommendations

Nil.