

POWER SYSTEM INCIDENT REPORT

TRIP OF PLAYFORD POWER STATION EAST 132KV BUS ON 27 JANUARY 2010

PREPARED BY: ESOPP

DOCUMENT NO: 1.0

VERSION NO: 1.0

FINAL

1. INTRODUCTION

At 2147hrs on the 27th January 2010, the East 132kV busbar at Playford A Power Station Switchyard tripped. This resulted in the offloading of No.1 Playford A to Whyalla Terminal 132kV Line from the East busbar. The trip also resulted in an indirect weak tie between North and South 132kV busbars at Playford A Power Station.

The cause of the trip was identified to be faulty wiring insulation associated with protection combined with water penetration into protection circuits during a heavy storm. The East 132kV busbar was returned to service at 0336hrs on 28th January 2010.

This report has been prepared under clause 4.8.15 of the National Electricity Rule 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 ElectraNet. Additional information has been obtained from AEMO's Energy Management System and Market Management System.

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

2. SUMMARY OF EVENTS

At about 2147hrs on 27th January 2010, all circuit breakers of East 132kV busbar at Playford A Power Station switchyard tripped. The circuit breakers that were tripped during the event were:

- AL13
- AL2
- AC1

Figure 1 below illustrates the status of circuit breakers and isolators on all 132kV busbars at Playford A Power Station before tripping. The trip also offloaded the lightly loaded No.1 132kV Playford to Whyalla line, which did not result in any load interruptions. The trip of the 132kV East bus also resulted in the formation of a weak system tie via the 33kV distribution system between the Playford A Power Station 132kV North and South buses. The system tie was subsequently split to avoid any potential issues that could arise following loss of the Playford to Davenport 275kV line. Figure 2 outlines the status of Playford A Power Station after the bus trip.

The cause of the trip was identified to be water ingress into a 132kV East bus leakage protection relay during a heavy rain storm combined with a second earth fault on the DC wiring. During the system incident, no system security issues were identified and no load was interrupted.

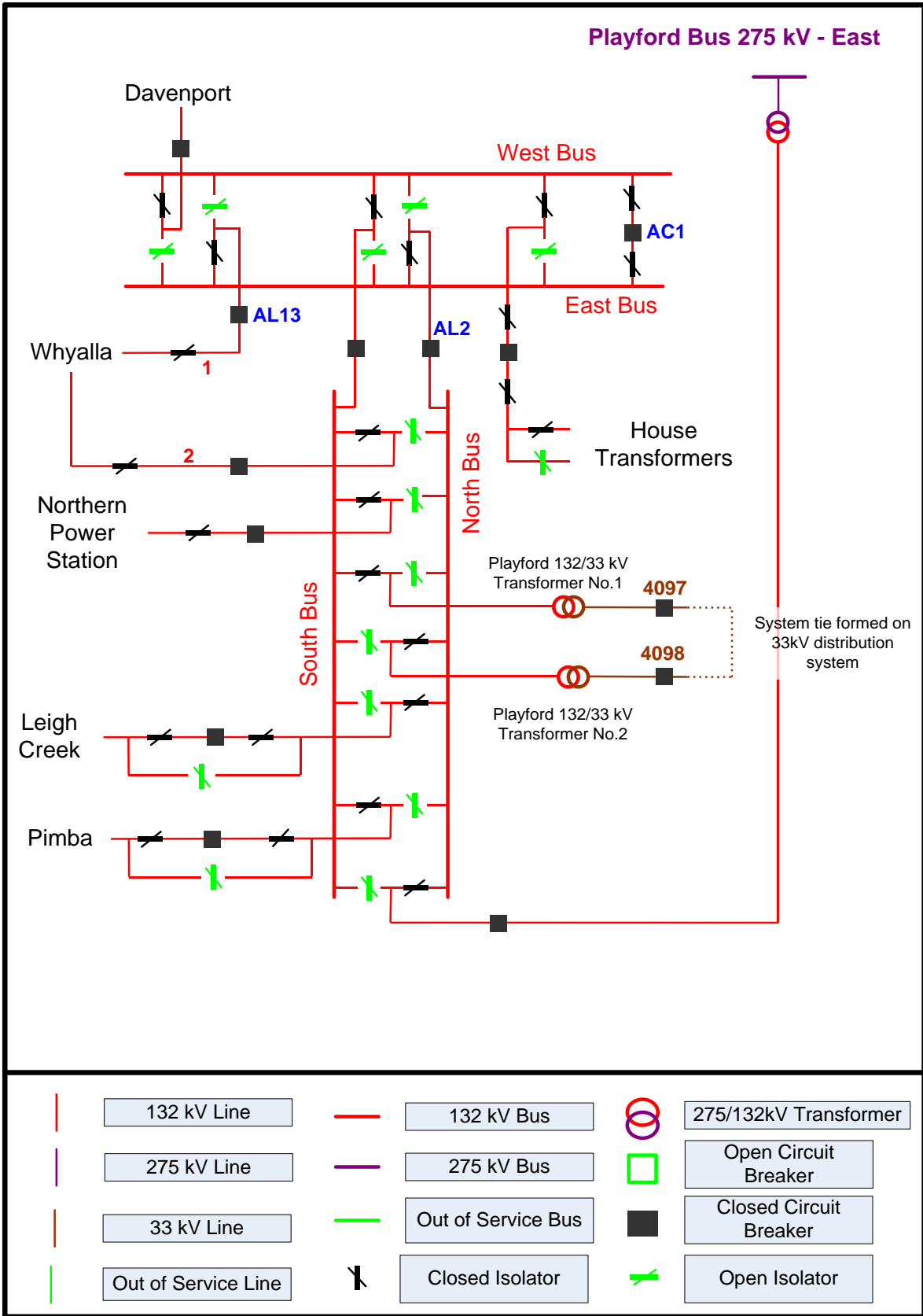


FIGURE 1: STATUS OF 132KV BUSSES OF PLAYFORD A POWER STATION SWITCHYARD BEFORE THE BUS TRIP AT 21:47 HRS

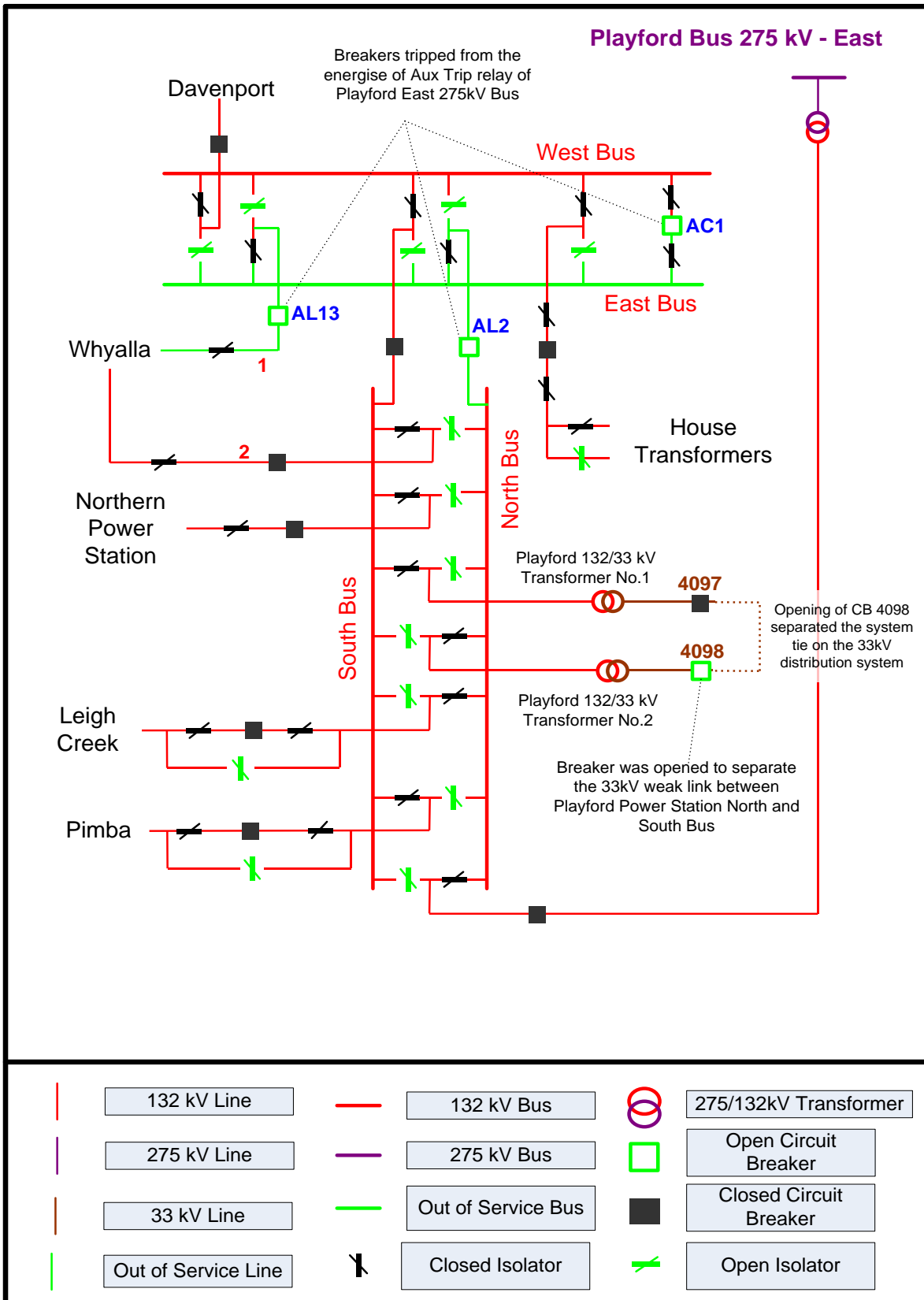


FIGURE 2: STATUS OF 132KV BUSSES ON PLAYFORD A POWER STATION SWITCHYARD AFTER THE BUS TRIP

3. ANALYSIS OF EVENTS

The nature of this incident is similar to two previous incidents on 22nd and 23rd November 2009, where all the above mentioned circuit breakers associated with the East 132kV bus at Playford A Power Station Switchyard opened. Inspection by ElectraNet identified that only the East bus auxiliary trip relay had operated, while the main East 132kV busbar protection relay that energises the auxiliary trip relay had not operated.

Inspections also found evidence of a second earth fault which had been present on the protection wiring between a set of isolator auxiliary contacts and the East bus auxiliary trip relay when the water ingress took place. This second fault completed the path for the current through protection circuits causing the 132kV East bus auxiliary relay to operate. In addition, the isolator auxiliary switches were found to be damp internally and the Bakelite backplate was slightly deteriorated. The specific location of the second earth fault could not be identified, however, drying and cleaning of the auxiliary contact assemblies cleared the fault and allowed the auxiliary trip relay to be reset.

The East bus trip resulted in the offloading of the No.1 132kV Playford to Whyalla line. It also resulted in the formation of a weak bus tie via the 33kV distribution system between the Playford A Power Station 132kV North and South buses. This system tie was subsequently split to avoid any potential operational issues on the contingent loss of the Playford to Davenport 275kV line. The splitting of the 33kV tie was a temporary measure adopted only for this day.

At 0336 hrs on 28th January 2010, Playford A Power Station 132kV East bus returned to service and the No.1 132kV Playford to Whyalla line was placed on load at 0339 hrs.

4. POWER SYSTEM SECURITY

There were no power system security violations during this event. The power system frequency remained within the normal operating frequency band.

5. CONCLUSIONS

At 2147hrs on the 27th January 2010, the 132kV East bus at Playford A Power Station Switchyard tripped. The nature of this incident was similar to two previous trips of the same busbar on 22nd and 23rd November 2009 (these were covered in a previous system incident report),

Investigations determined the Playford East bus trips (in late 2009 and early 2010) were caused by moisture ingress on the protection circuit negative bus (following heavy rain), combined with a pre-existing earth fault on the wiring of a protection circuit. These two

separate faults together provided a path for current to flow on the protection circuit, tripping the East bus trip relay.

Following the East Bus trip on the 27/1/2010, faulty wiring insulation (associated with the East bus protection) was located and isolated. It was concluded that this faulty wiring insulation was causing the second earth fault path.

6. RECOMMENDATION

The existing measures are considered adequate to avoid similar events until the relevant 132kV equipment at Playford Power Station Switchyard is decommissioned in late 2010.