

POWER SYSTEM OPERATING INCIDENT REPORT – TRIP OF CHALUMBIN–WOREE 275 KV LINE AND LOSS OF LOAD ON 1 DECEMBER 2011

PREPARED BY: Electricity System Operations Planning and Performance

DATE: 27 March 2012

FINAL

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Abbreviations and Symbols

Abbreviation	Term
CB	Circuit Breaker
kV	Kilovolt
MW	Megawatt
SVC	Static VAr Compensator

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1 Introduction

At 1051 hrs on 1 December 2011, in Queensland, the 877 Chalumbin–Woree 275 kV line tripped when the 876 Chalumbin–Woree 275 kV line was opened for the planned outage of the line circuit breaker at Woree. The operation of the 877 line protection systems was not expected.

The outage of one Chalumbin–Woree 275 kV line and trip of the parallel line, as well as the opening of the 132 kV networks at Woree and Edmonton substations as the network rearrangement to facilitate the planned outage of the 876 line, resulted in the loss of 188 MW of load in the Cairns area. Both Barron Gorge generating units were out of service at the time of the incident.

This report has been prepared under clause 4.8.15 (c) 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 or maintain power system security.

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

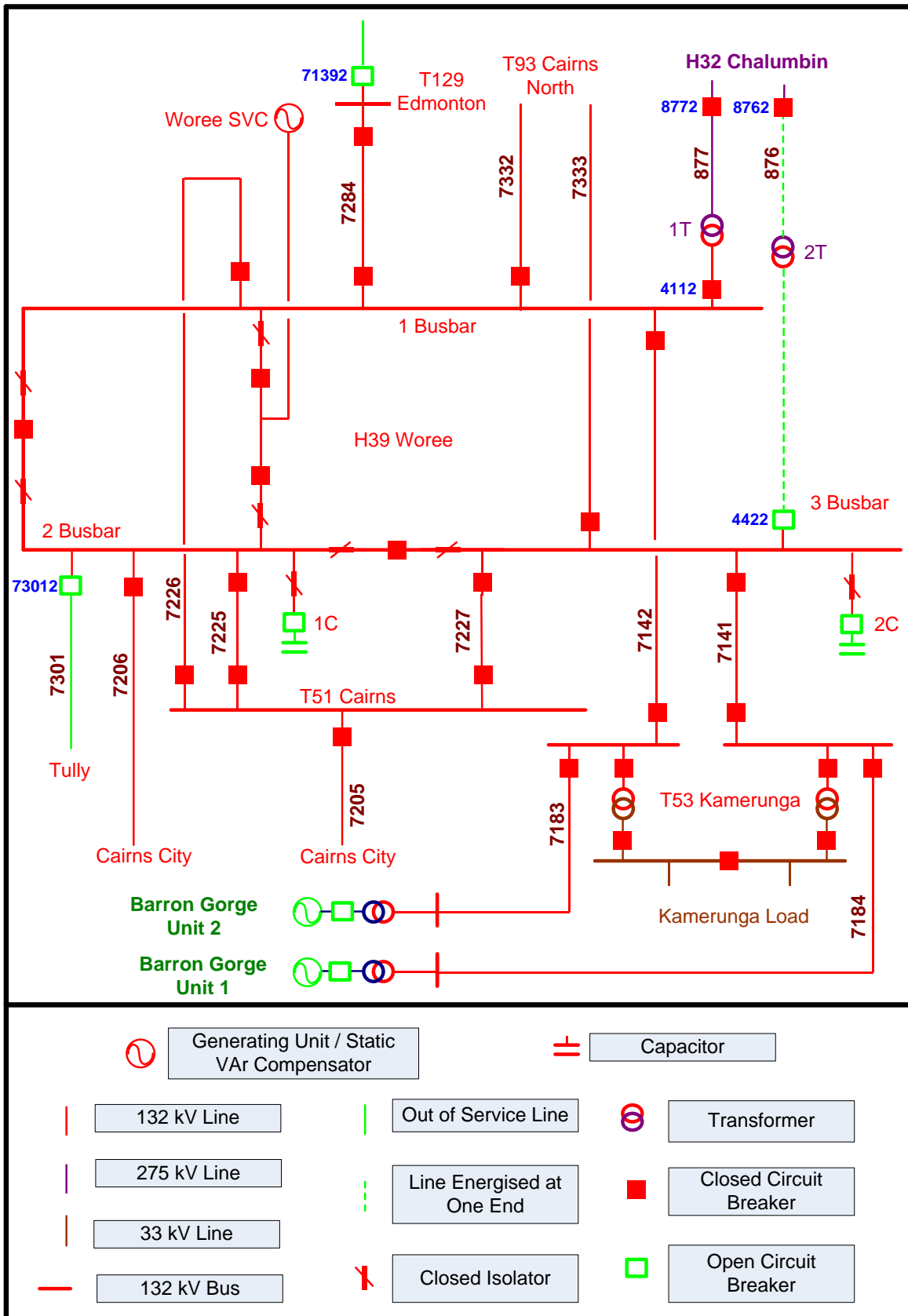
All references to time in this report are to National Electricity Market time (Australian Eastern Standard Time).

2 Pre-Contingent System Conditions

On 1 December 2011, planned work commenced associated with repairs to the 132 kV circuit breaker (CB) 4422 at Woree. To facilitate this planned work, the 876 Chalumbin–Woree 275 kV line was off-loaded at Woree. Because the 876 line was out of service, the 132 kV networks at Woree and Edmonton were opened to prevent an overloading condition for the next contingency. This was achieved by opening CB 73012 at Woree and CB 71392 at Edmonton. This switching resulted in the Woree, Cairns, Kamerunga and Barron Gorge 132 kV substations being supplied radially through the 877 line.

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 the power system prior to the incident



3 Summary of Events

At 1051 hrs on 1 December 2011, CB 4422 was opened as part of the planned work activities resulting in the de-loading of the 876 Chalumbin–Woree 275 kV line at Woree.

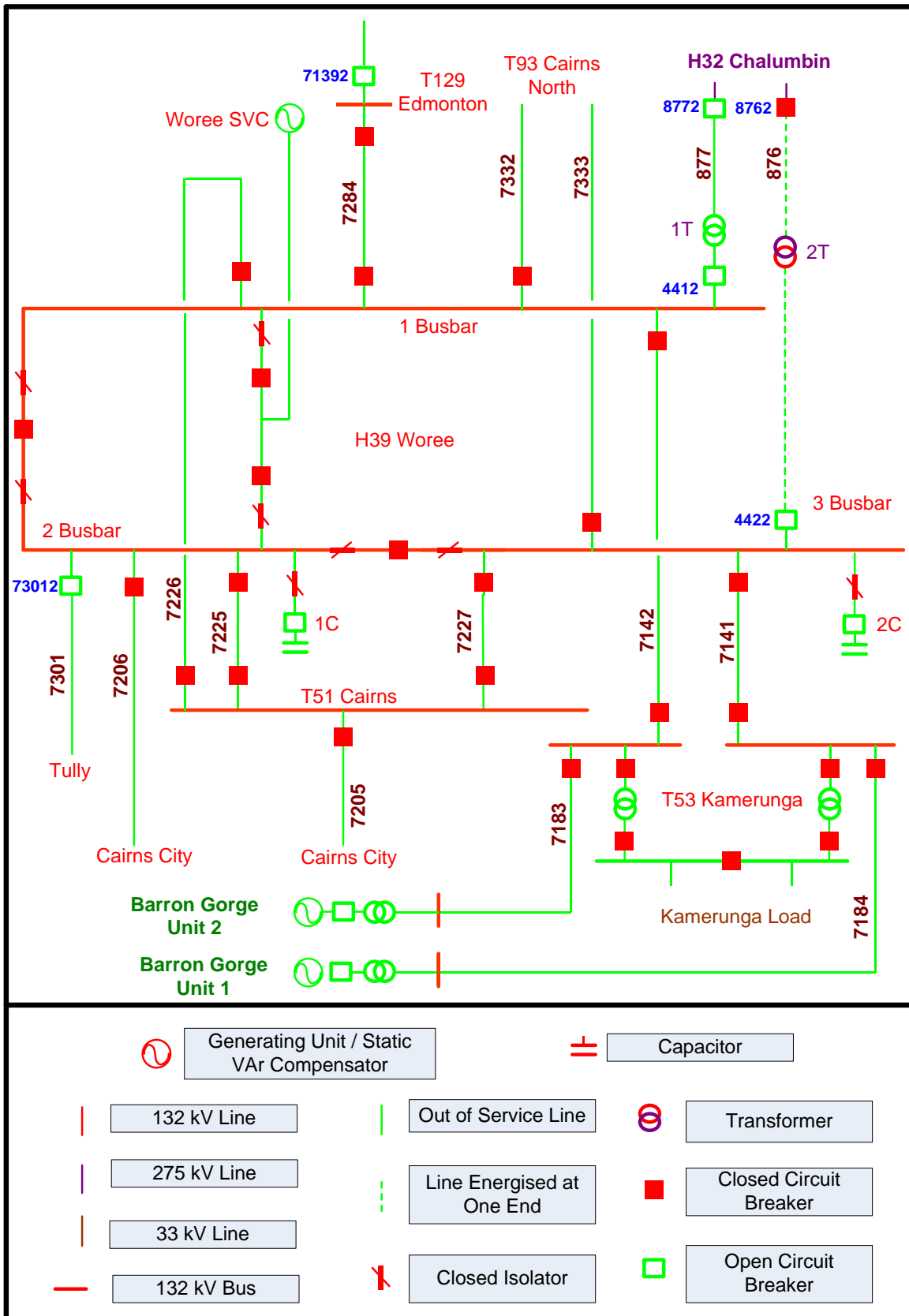
At the same time, the protection systems of the 877 Chalumbin–Woree 275 kV line operated to trip the 877 line out of service. The operation of these protection systems was not expected.

With the 132 kV networks opened between Woree and Tully and Edmonton and Innisfail open, and the 876 line off-loaded as part of the planned work, the trip of the 877 line resulted in the loss of 132 kV supply to the Woree, Cairns, Kamerunga and Barron Gorge substations. A total of 188 MW of load in the far north Queensland was interrupted as a result of this incident.

Barron Gorge Power Station was also disconnected from the power system due to the incident. However, both generating units were out of service at the time.

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 Immediate Actions Taken

An investigation into the unexpected operation of the 877 line protection systems at Chalumbin and Woree was conducted. It was found that the protection systems operated due to a component fault internal to the 877 line protection relay at Woree.

At 1107 hrs, the 876 line was returned to service and load restoration commenced. All of the tripped load was restored at 1145 hrs.

At 1108 hrs, AEMO issued Electricity Market Notice No.36857 advising of the unplanned outage of the line 877 and the loss of load in far north Queensland.

At 1201 hrs, the 877 line was returned to service with the faulty components disconnected.

At 1209 hrs, AEMO issued Electricity Market Notice No.36858 advising the completion of the load restoration.

On 3 December 2012, the protection systems of the 877 line were returned to normal service after the replacement of the faulty components.

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.

A total of 188 MW of load was lost as the result of this incident.

6 Conclusions

The trip of the 877 Chalumbin–Woree 275 kV line was due to faulty components of the line protection relay. The trip of this line, concurrent with the planned outage of the 876 Chalumbin–Woree 275 kV line and opening of the 132 kV network to Tully and Innisfail, resulted in the loss of supply to the far north Queensland area. As a result of this incident, 188 MW of load was interrupted.

AEMO is satisfied that Powerlink has 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 did not warrant reclassifying similar incidents as a credible contingency event.

7 Recommendations

There are no recommendations arising from this incident.