

# POWER SYSTEM INCIDENT REPORT: TRIP OF 7139 AND 7284 132KV FEEDERS IN QUEENSLAND - 25 JANUARY 2010

PREPARED BY: Electricity System Operations Planning and Performance

VERSION: 1.0

FINAL

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# 1 Introduction

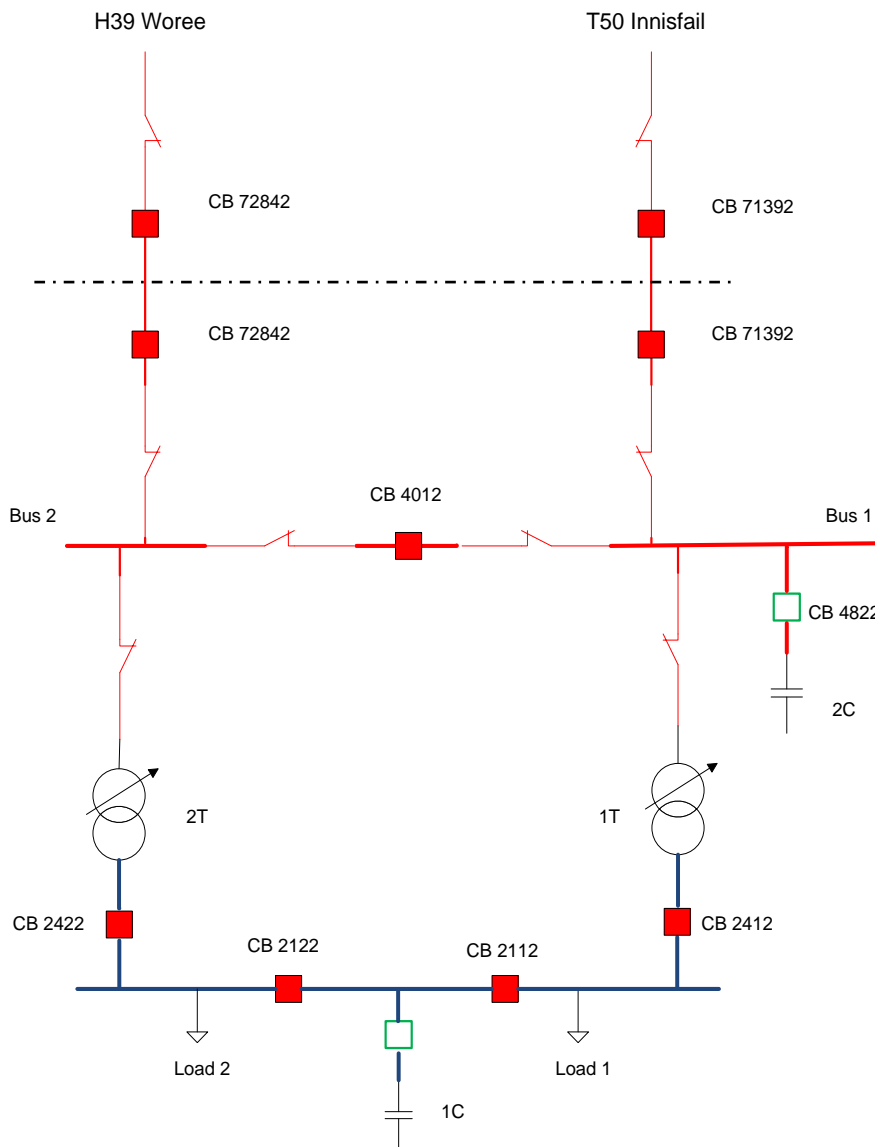
At 0345 hours on Monday 25<sup>th</sup> January 2010, 7139 (Innisfail – Edmonton), 7284 (Woree – Edmonton) 132kV lines and the No.1 132/22kV transformer at T129 Edmonton substation tripped. The 7284 line auto-reclosed five seconds later and approximately 14 MW of load was interrupted for the reclose time.

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 supplied by Powerlink has been used to prepare this report. Data from AEMO’s Energy Management and Market Systems has also been used in analysing the event.

All references to time in this report refer to Market Time (AEST).

# 2 Summary of Events



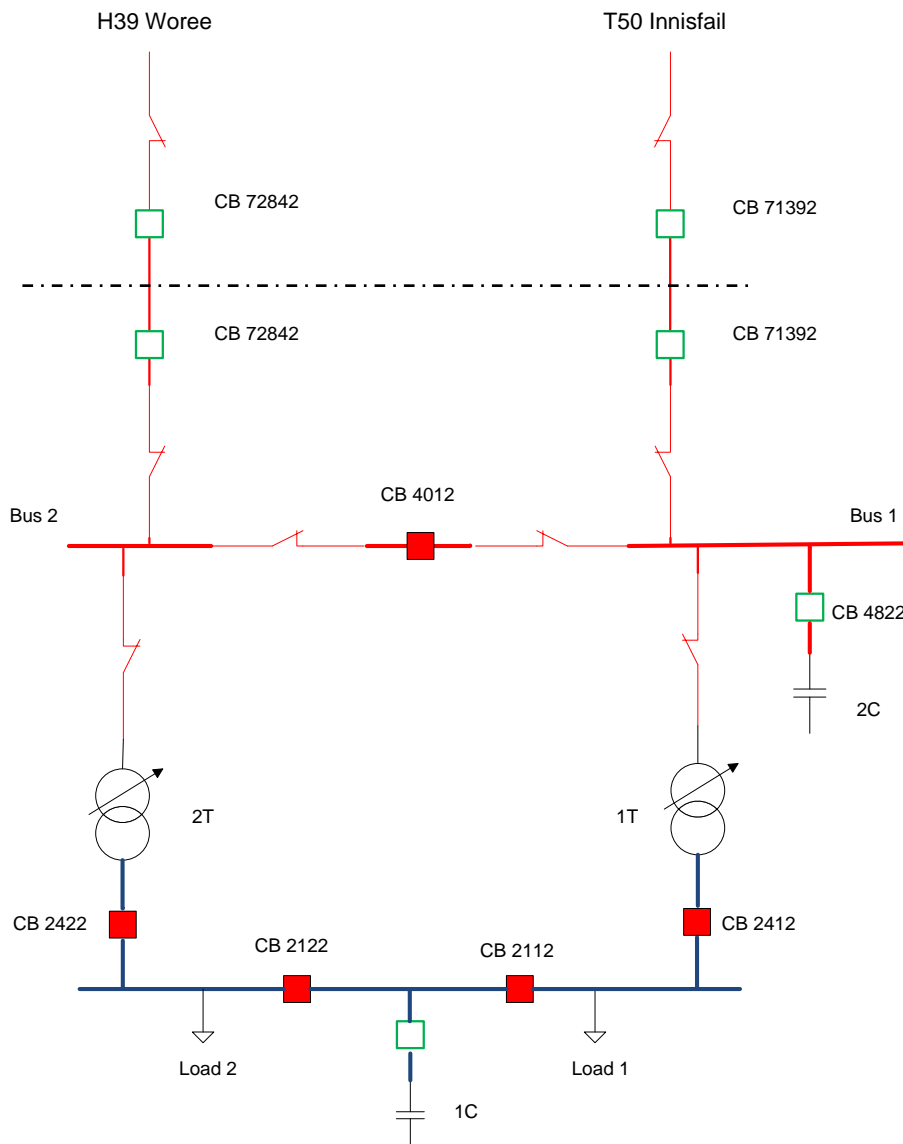
**Figure 1 Edmonton substation system configuration prior to tripping**

At 03:45:12 hours on 25 January 2010, protection systems detected a high voltage fault on the 7284 Woree – Edmonton 132kV line. The fault was believed to have been caused by thunder

storm and lightning activity present close to the Edmonton substation at the time. To clear the high voltage fault, protection systems operated to trip the circuit breakers (CB 72842) at Woree and Edmonton.

Coincident to the tripping of the Woree – Edmonton line, the Innisfail – Edmonton 132kV line also tripped at both Edmonton and Innisfail, interrupting approximately 14 MW of Edmonton load. The Woree – Edmonton line auto-reclosed at 03:45:17 restoring the Edmonton load.

Subsequent analysis and testing by Powerlink identified that a faulty protection relay was responsible for the tripping of the Innisfail – Edmonton line.



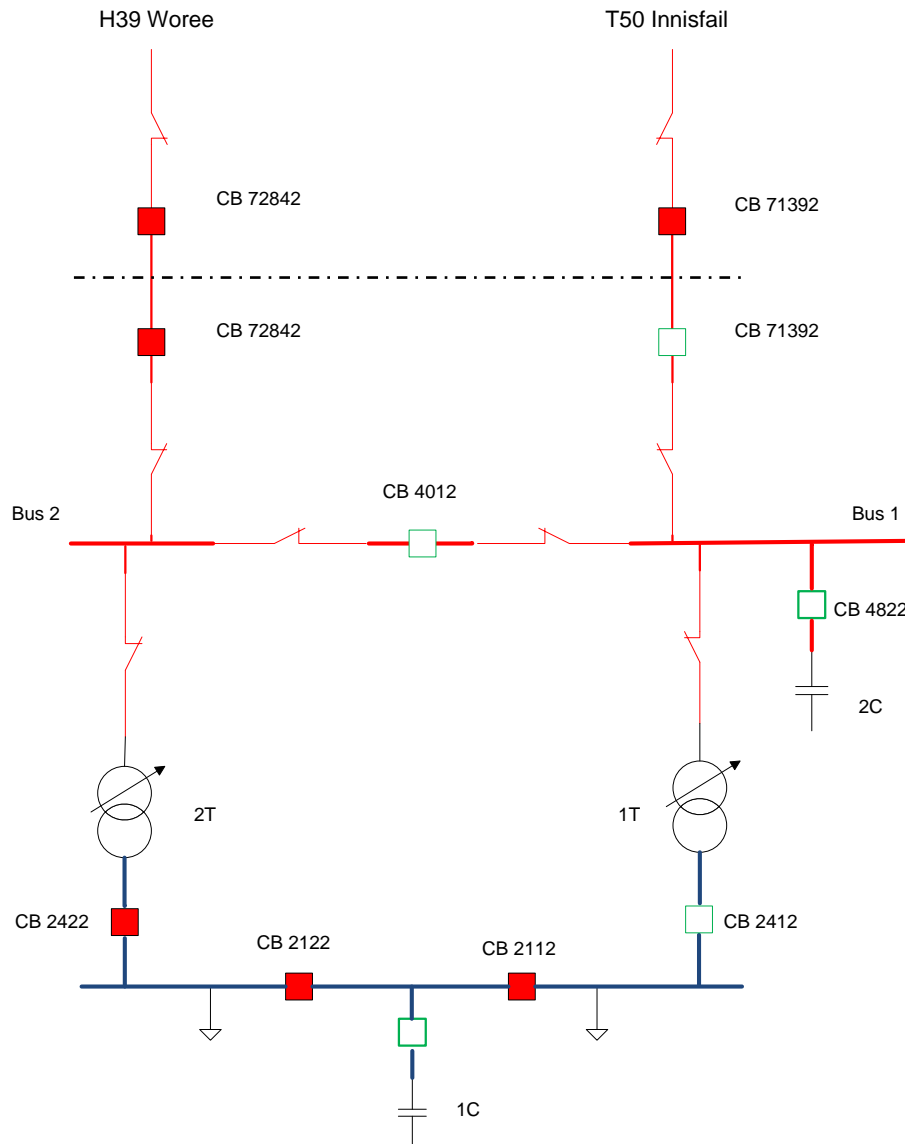
**Figure 2 Edmonton substation following the clearance of the high voltage fault**

Following the auto-reclosure of the Woree – Edmonton line approximately 5 seconds after the initial fault and the consequent energization of the Edmonton substation, the protection system of the 132/22 kV No. 1 transformer operated and initiated signals to trip the following circuit breakers:

- Bus section CB 4012
- CB 71392 of the Edmonton – Innisfail feeder (open following the trip of 7284)
- No. 2 Capacitor CB 4822 (previously open pre-fault)
- No. 1 Transformer 22kV CB2412

There was no interruption to Edmonton load this time since the supply was maintained via the No. 2 132/22kV transformer.

At 03:45:22 hours, 10 seconds after the initial fault, auto reclose of the Innisfail – Edmonton line was initiated. The line successfully reclosed only at the Innisfail end, while the Edmonton end failed to reclose. This was as expected due to a latched trip signal that was still present following the tripping of the No.1 transformer.



**Figure 3 Edmonton substation following the auto reclose operations**

At 05:27 hours, the AEMO control room issued Market Notice 29963 to inform the market that a non-credible contingency event had occurred at Edmonton 132kV substation.

Plant restoration commenced at 06:55 hours once the cause of the No. 1 transformer trip was identified. Powerlink established that there was an issue with the manufacturer’s firmware installed on the No. 1 transformer protections.

At 11:29 hours, the AEMO control room issued Market Notice 29967 to inform the market that AEMO was not reclassifying the event as a credible contingency event. This was in accordance with section 10.6 of the AEMO Operating Procedure – Power System Security Guidelines (SO\_OP3715). The decision was made based on the information from Powerlink that the faulty protection relay had been isolated.

### **3 Power System Security Assessment**

During the event, loss of approximately 14 MW of load was experienced at Edmonton for approximately 5 seconds until the Woree – Edmonton line auto-reclosed. Due to the relatively low load loss, no frequency excursions were experienced. There were no power system security violations during the event.

### **4 Follow Up Actions**

Investigations into the tripping of the Innisfail – Edmonton line identified a faulty protection relay. This protection relay was then replaced.

The tripping of the No. 1 transformer at Edmonton was due to an issue with the manufacturer's firmware used on the No. 1 132/22kV transformer protections. The firmware has been upgraded to a version that addresses the protection issues as recommended by the manufacturer.

### **5 Conclusion**

On 25 January 2010 at 03:45 hours, Woree – Edmonton 132kV line tripped and auto-reclosed when thunderstorm and lightning activity were present in the area. Protection systems operated correctly to clear the fault by tripping the Woree – Edmonton feeder.

Tripping of the Innisfail – Edmonton 132kV line and the No. 1 transformer were caused by the operation of a faulty protection relay and an issue with the manufacturer's firmware on a protection relay respectively. Both issues have since been resolved by Powerlink.

AEMO deemed that this incident would not require reclassification of the loss of Woree – Edmonton and Innisfail – Edmonton 132kV lines as a credible contingent event.