Power System Operating Incident Report – Trip of Ross – Chalumbin 858 275 kV Transmission Line at the Ross end on 23 April 2014

PREPARED BY: AEMO Systems Capability

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STATUS: FINAL

Version Release History

VERSION	DATE	BY	CHANGES	CHECKED BY	AUTHORISED BY
1	18 June 2014	R Burge	FINAL	S Darnell	P Biddle

Incident Classifications

Time and date and of incident	2251 hrs Wednesday 23 April 2014
Region of incident	Queensland
Affected regions	Queensland
Event type	OTH – Other
Primary cause	PTN & CTR – Protection and Control
Impact	NIL
Associated reports	NIL

Abbreviations

Abbreviation	Term
AEMO	Australian Energy Market Operator
CB	Circuit Breaker
kV	Kilovolt
Line 858	Ross – Chalumbin 858 275kV transmission line
MW	Megawatt
NER	National Electricity Rules

Disclaimer

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1 Introduction

This report reviews a power system operating incident[1] that occurred on Wednesday 23 April 2014 at Ross Substation in Queensland.

The purpose of this incident review is to assess power system security over the course of the incident. The NER requires AEMO 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[2].

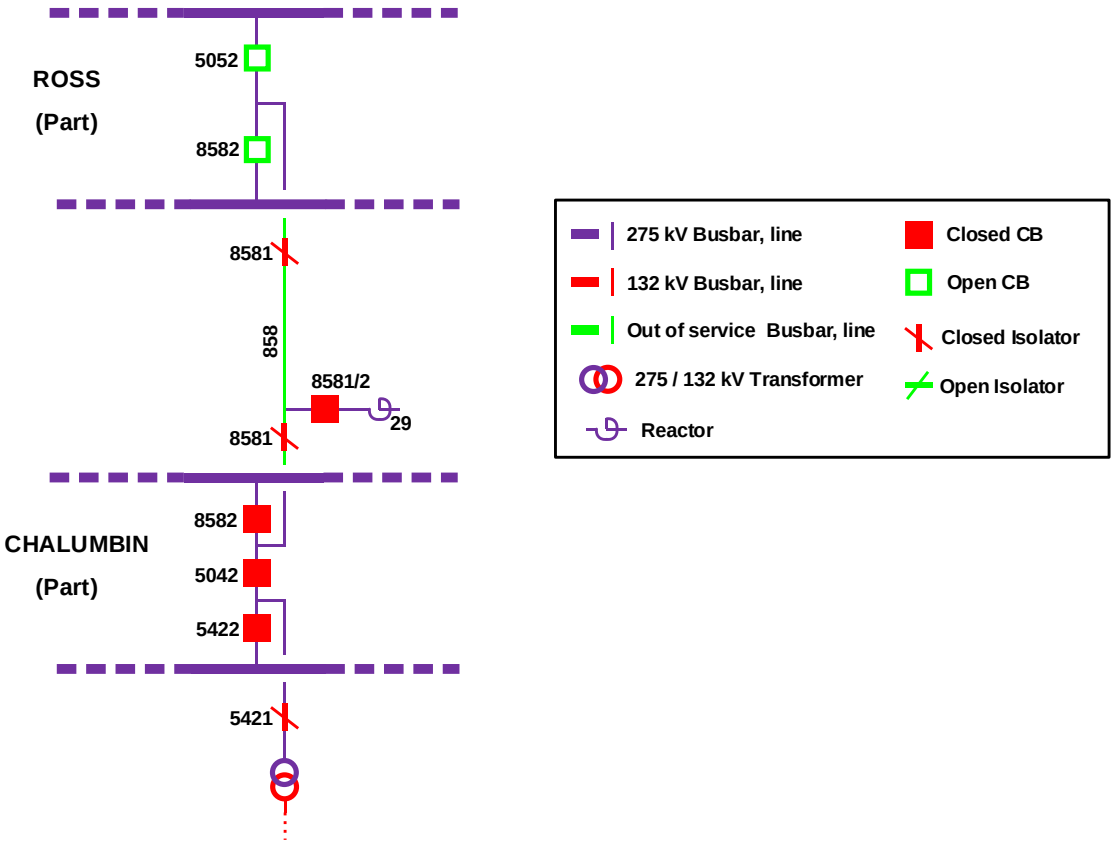
This report is based upon information provided by Powerlink[3] and AEMO. National Electricity Market time (Australian Eastern Standard Time) is used in this report.

2 The Incident

On Wednesday 23 April 2014 at 2251 hrs the Ross – Chalumbin 858 275kV transmission line (Line 858) opened at the Ross end only. The line remained energised from the Chalumbin end. No load or generation was lost as a result of this incident.

The reason for investigating this incident is that a transmission line opened at one end only. This is an unexpected event known in power system security terms as a non-credible contingency. Generally, transmission lines open at both ends under fault conditions.

The status of the power system after the incident is shown below. The two circuit breakers at the Ross end of Line 858 opened. The two circuit breakers at the Chalumbin end of the Line 858 did not open.



[1] AEMO is required to review this incident as it is classified as a non-credible contingency that satisfies the requirements of a reviewable operating incident under the National Electricity Rules (NER) - NER Clause 4.8.15(a)(1)(i) and AEMC Reliability Panel Guidelines for Identifying Reviewable Operating Incidents.

[2] NER Clause 4.8.15 (b)

[3] Powerlink is the Transmission Network Service Provider in Queensland.

3 Investigation

Powerlink investigated this incident and found that the Y protection relay at the Ross end of Line 858 failed and sent a trip signal to open the two circuit breakers at Ross Substation. The protection relay activated its trip outputs on failure. This was unexpected as this relay is designed so that it should not issue a trip signal during failure mode.

Powerlink identified the cause of the trip, determined that the Y protection relay was inoperative, and returned Line 858 to service at 2257 hrs. Line 858 remained in service protected by X protection only at the Ross end until the replacement Y protection relay was commissioned on Friday 25 April 2014[4].

4 Power System Security

This section assesses how AEMO managed power system security over the course of the incident[5].

Powerlink identified the cause of the incident and returned Line 858 to service within 6 minutes. AEMO did not invoke any constraints.

AMEO issued Market Notice 45609 at 2311 hrs and Market Notice 45610 at 2329 hrs to notify the market:

- Of the non-credible contingency event
- That the incident would not be reclassified as a credible contingency event

AEMO did not reclassify the incident as a credible contingency because AEMO was satisfied that the cause of the incident had been identified and was unlikely to reoccur.

Power system security was maintained over the course of the incident. See Appendix 1 for a chronological log of the incident.

5 Conclusions

1. Line 858 opened at the Ross end because of a trip signal sent by a failed protection relay.
2. Power system security was maintained over the course of the incident.

6 Recommendations

There are no recommendations arising from this incident.

[4] In accordance with Section 16.3 of AEMO Power System Security Guidelines SO_OP3715

[5] AEMO is responsible for power system security in the NEM and is required to operate the power system in a secure operating state (NER Clause 4.2.4 (a)). AEMO must thereby ensure that the power system is maintained in, or returned to, a secure operating state following a contingency event.

Appendix 1 - Incident Event Log

The sequence of events comprising the incident are itemised in Table 1. The incident spanned approximately 6 minutes.

Table 1 – Event Log

Time and Date	Event
2251 hrs 23 April 2014	Line 858 tripped at the Ross end only
2257 hrs 23 April 2014	Line 858 Y protection relay diagnosed as failed Line 858 line restored
2311 hrs 23 April 2014	Market Notice 45609 issued informing the Market of the non-credible contingency event
2329 hrs 23 April 2014	Market Notice 45610 issued informing the Market of the cause of the non-credible contingency event
25 April 2014	Replacement relay commissioned