TRIP OF EAST ROWVILLE B2 AND CRANBOURNE B3 TRANSFORMERS ON 2 AUG 2014

AN AEMO POWER SYSTEM OPERATING INCIDENT REPORT FOR THE NATIONAL ELECTRICTY MARKET

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AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

VERSION RELEASE HISTORY

VERSION	DATE	BY	CHANGES	CHECKED BY	AUTHORISED BY
1	19 Sept 2014	S Darnell	FINAL	R Burge	P Biddle

INCIDENT CLASSIFICATIONS

Time and date and of incident	1732 hrs Saturday 2 Aug 2014
Region of incident	Victoria
Affected regions	Victoria
Event type	TT – Loss of multiple transmission elements
Primary cause	TE – Transmission Equipment Failure
Impact	Nil
Associated reports	Nil

ABBREVIATIONS

Abbreviation	Term
AEMO	Australian Energy Market Operator
CB	Circuit Breaker
CT	Current Transformer
kV	Kilovolt
MW	Megawatt
NER	National Electricity Rules

IMPORTANT NOTICE

Purpose

AEMO has prepared this document to provide information about this particular Power System Operating Incident.

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1. INTRODUCTION

This report reviews a power system operating incident[1] that occurred on 2 Aug 2014 in Victoria at East Rowville and Cranbourne terminal stations.

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 AusNet Services[3] (AusNet) and AEMO[4]. National Electricity Market time (Australian Eastern Standard Time) is used in this report.

2. THE INCIDENT

On 2 August 2014 at 1732 hrs the East Rowville No.2 and Cranbourne No.3 transformers simultaneously tripped. The transformers tripped as a result of a failed surge diverter on the primary side of the East Rowville No.2 transformer.

No load or generation was lost as a result of this incident. See Appendix 1 for a power system diagram illustrating the incident and a chronological log of the incident.

The reason for investigating this incident[5] is that Cranbourne No.3 transformer tripped as a result of a fault associated with East Rowville No.2 transformer. Generally transmission elements such as transformers are required to remain connected to the power system for faults that occur in other parts of the power system.

3. AUSNET SERVICES INVESTIGATION

AusNet investigated this incident and found that a failed surge diverter caused the East Rowville No.2 transformer to trip, and a loose secondary circuit current transformer (CT) connection caused the Cranbourne No. 3 transformer to trip.

At East Rowville Terminal Station (East Rowville), the failed surge diverter was on the red phase on the high voltage (HV) side of East Rowville No.2 transformer and caused a phase to earth fault. The transformer protection operated correctly to clear the fault within required clearance times[6], and to de-energise the surge diverter and the East Rowville No.2 transformer. AusNet isolated the transformer and returned the No.2 section of 220 kV busbar to service at 2106 hrs on the same evening. AustNet then replaced the failed surge diverter, tested the transformer, and returned the transformer to service at 2018 hrs on 8 Aug 2014.

At Cranbourne Terminal Station (Cranbourne), the loose connection caused an open circuit on the neutral of the CT secondary circuit on 220 kV No.2 Bus CB. When the fault current, caused by the failed surge diverter at East Rowville, flowed through the transformer at Cranbourne, the B3

[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 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] Information provided by AusNet is without prejudice basis and nothing in this report is intended to constitute, or may be taken by any person as constituting, an admission of fault, liability, wrongdoing, negligence, bad faith or the like on behalf of AusNet (or its respective associated companies, businesses, partners, directors, officers or employees).

[4] In Victoria AEMO is both the National Electricity Market operator and the Victorian Transmission Network Service Planner.

[5] NER Clause 4.2.3 - Credible and non-credible contingency events; *AEMO Power System Security Guidelines,* Section 10 - Definition of a non-credible contingency events

[6] NER Schedule 5.1a System Standards Clause S5.1a.8

transformer protection operated, due to the incorrect CT wiring (open circuit), and tripped the transformer. The loose connection was identified and rectified, and the transformer was returned to service at 1106 hrs on 5 Aug 2014.

4. POWER SYSTEM SECURITY

This section assesses how the power system security was managed over the course of the incident[7].

AEMO issued Market Notice 46234 at 1814 hrs on the 2 Aug 2014 to notify the market of the non-credible contingency event[8].

On the 5 Aug, following the return to service of Cranbourne No.3 transformer, AEMO issued Market Notice 46244 to notify the market the incident would not be reclassified as a credible contingency[9]. AusNet had identified and rectified the cause of the Cranbourne No.3 transformer trip and AEMO was satisfied that the incident was unlikely to reoccur.

For this incident the power system remained secure over the course of the incident. Power system voltages[10] remained within limits and the fault was cleared within required timeframes[11]. AEMO correctly assessed the incident and did not reclassify the incident as a credible contingency, and appropriate notifications were issued.

5. CONCLUSIONS

1. East Rowville No.2 transformer tripped as a result of a failed surge diverter on the HV side of the transformer.
2. Cranbourne No.3 transformer tripped as a result of an incorrect (loose) CT connection which caused the transformer protection to operate in the presence of a through fault current.

6. PENDING ACTIONS

There are no pending Actions arising from this incident

7. RECOMMENDATIONS

There are no recommendations arising from this incident.

[7] 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.

[8] AEMO is required to notify the Market of a non-credible contingency event within two hours of the event - AEMO, *Power System Security Guidelines,* Section 10.3

[9] AEMO is required to assess whether or not to reclassify a non credible contingency event as a credible contingency - NER Clause 4.2.3A (c)) - and to report how re-classification criteria were applied - NER Clause 4.8.15 (ca). AEMO has to determine if the condition that caused the non-credible contingency event has been resolved.

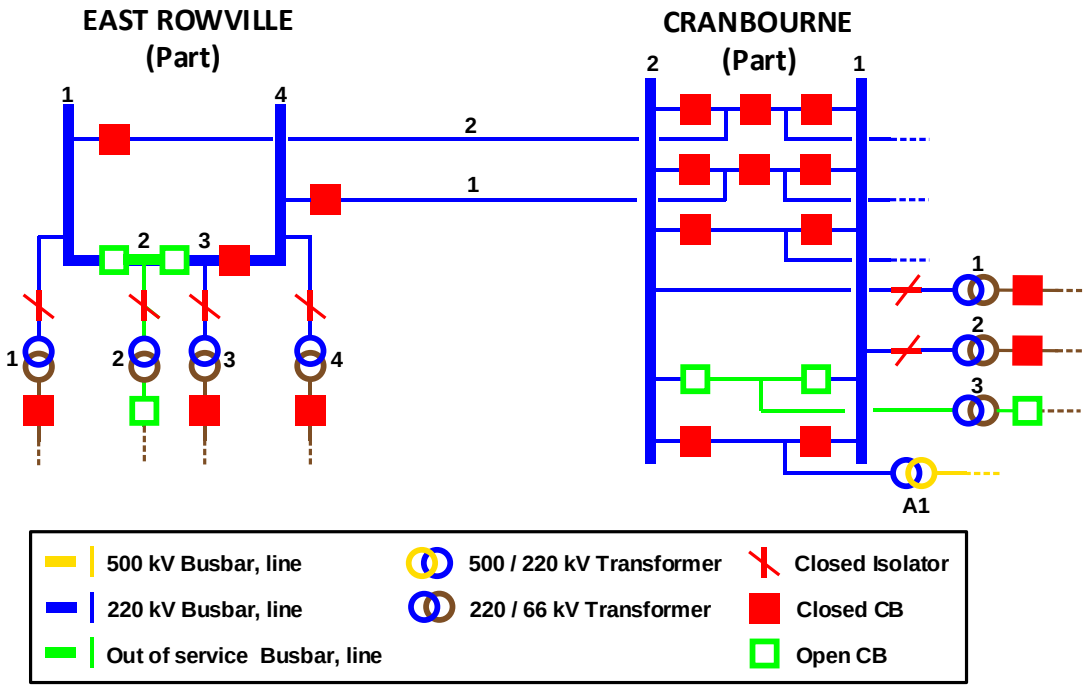
[10] NER Schedule 5.1a System Standards Clause S5.1a.4 - Power frequency voltage

[11] NER Schedule 5.1a System Standards Clause S5.1a.8 – Fault clearance times

APPENDIX 1 – POWER SYSTEM DIAGRAM AND INCIDENT LOG

The power system after the incident

All open CBs were closed before the incident.



Incident Log

Time and Date	Event
1732 hrs 2 Aug 2014	East Rowville No.2 transformer tripped
1732 hrs 2 Aug 2014	Cranbourne No.3 transformer tripped
1814 hrs 2 Aug 2014	Market Notice 46234 issued. Notification of a non-credible contingency event
2106 hrs 2 Aug 2014	220 kV No.2 Busbar section at East Rowville returned to service
1106 hrs 5 Aug 2014	Cranbourne No.3 Transformer returned to service
1359 hrs 5 Aug 2014	Market Notice 46244 issued. Notification that the cause of the non-credible contingency event has been identified and is unlikely to reoccur
2018 hrs 8 Aug 2014	East Rowville No.2 transformer returned to service.