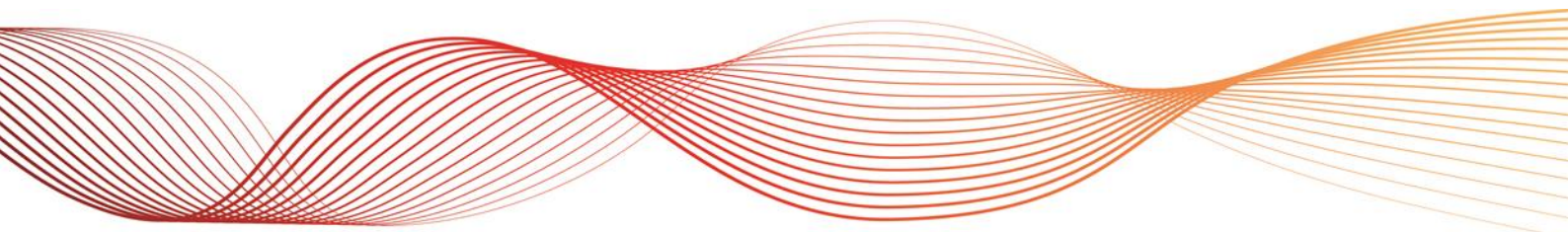




330kV Busbar Trip at Vales Point substation on 3 June 2017

REVIEWABLE OPERATING INCIDENT REPORT UNDER THE
NATIONAL ELECTRICITY RULES

Published: **26 July 2017**





INCIDENT CLASSIFICATIONS

| Classification | Detail |
|---------------------------|-----------------------------------------------------------------------|
| Time and date of incident | 2010 hrs Saturday 3 June 2017 |
| Region of incident | New South Wales |
| Affected regions | New South Wales |
| Event type | Busbar trip (BB) |
| Generation Impact | No loss of generation |
| Customer Load Impact | 10 MW of customer load was disconnected as a result of this incident. |
| Associated reports | Nil |

IMPORTANT NOTICE

Purpose

AEMO has prepared this report in accordance with clause 4.8.15(c) of the National Electricity Rules, using information available as at the date of publication, unless otherwise specified.

Disclaimer

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1. OVERVIEW

This report relates to a reviewable operating incident¹ on Saturday 3 June 2017 at the Vales Point substation in New South Wales. This incident involved the trip of the Generator 330kV busbar, a non-credible contingency.

There was no loss of generation as a result of this incident. Ten megawatts of customer load was disconnected.

As a reviewable operating incident, AEMO is required to assess power system security over the course of this incident, and 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

AEMO has concluded that:

- The incident was caused by process failure and human error.
- There was no high voltage fault on the busbar.
- The power system remained in a secure operating state during this incident.

This report is prepared in accordance with clause 4.8.15 of the National Electricity Rules (NER). It is based on information provided by TransGrid³ and from AEMO's Energy Management Systems.

Australian Eastern Standard Time (AEST) is used in this report.

2. PRE-EVENT CONDITIONS

Prior to this event the:

- No2 330/132kV transformer at Vales Point was out of service for planned work.
- Sydney North – Vales Point Main Bus circuit breaker (CB) 222M at Vales Point was out of service for planned work.
- Lake Munmorah – Munmorah 132kV line (97J line) was open at Lake Munmorah as per normal network configuration.

3. THE INCIDENT

On Saturday 3 June 2017 at 2010 hrs, the Generator 330kV busbar at Vales Point tripped during planned protection commissioning work on the No2 330/132kV transformer at Vales Point. There was no high voltage fault on the busbar.

As a consequence of this, the Sydney North – Vales Point 330kV line was de-loaded. As well, the No1 330/132kV transformer at Vales Point and the Vales Point – Lake Munmorah 132kV line (95T line) were both de-loaded, resulting in the loss of all supply (10 MW) from the Lake Munmorah substation and auxiliary supply transformers for the Vales Point power station.

No generation was lost as a result of the incident.

Appendix A provides a diagram of the relevant part of the power system before and immediately after the incident.

All load at Lake Munmorah was restored by 2019 hrs on 3 June. Supply to the Vales Point power station auxiliary transformers was restored at 2034 hrs on 3 June.

¹ See NER clause 4.8.15

² See NER clause 4.8.15(b).

³ TransGrid is the owner/operator of Vales Point substation.



The Generator 330kV busbar and the Sydney North – Vales Point line were both returned to service at 2030 hrs on 3 June. The No1 330/132kV transformer and 95T line were both returned to service at 2034 hrs on 3 June.

4. PARTICIPANT INVESTIGATION

The following is based on information provided by TransGrid.

The cause of the trip has been attributed to a failure in process, and human error.

The trip occurred during an injection test by TransGrid staff into the busbar protection relay as part of commissioning checks for proving the operation of the protection after relocating the No2 Transformer connection from the Main Busbar onto the Generator Busbar.

At Vales Point, there is an ongoing project to rebuild half of the Switchyard and install new control buildings and associated services. The project was at a phase where some of the transmission lines and generating units had been transferred to the new busbar protection schemes but not all. As such, a cross tripping scheme had been installed in the interim to operate between the old and new schemes.

Prior to this test commencing, the protection staff had identified the need to isolate the cross tripping signal between the two relay schemes, however had only isolated one of the two links required to prevent the cross tripping. This resulted in the direct trip as soon as the test injection commenced.

The process failure occurred when the check step by a second person did not pick up the original error.

After this incident, TransGrid reviewed its procedure for Protection/Metering Withdrawal Instruction(s) and determined it adequately caters for this scenario. The staff involved have undertaken a review of the process they performed and have corrected their methods to align with procedural requirements.

5. POWER SYSTEM SECURITY

AEMO is responsible for power system security in the National Electricity Market (NEM). This means AEMO is required to operate the power system in a secure operating state to the extent practicable and to take all reasonable actions to return the power system to a secure state following a contingency event in accordance with the NER.⁴

The power system was in a secure operating state over the course of this incident. AEMO invoked constraint set N-SNVP⁵ from 2025 hrs to 2035 hrs on 3 June, however no constraints in the set bound during this period.

No other actions were required by AEMO to manage power system security during this incident.

5.1 Reclassification

After the Vales Point 330kV Generator busbar and the No1 330/220kV transformer had been returned to service, AEMO considered whether to re-classify this incident as a credible contingency. On the basis that TransGrid had advised AEMO that the incident was an inadvertent trip caused by maintenance staff during planned work and was not likely to re-occur, AEMO did not reclassify this incident as a credible contingency.

For this incident, the power system remained in a secure operating state over the course of the incident. Power system frequency⁶ and voltages⁷ stayed within the limits. AEMO correctly assessed the incident and did not re-classify the incident as a credible contingency event.

⁴ Refer to AEMO's functions in section 49 of the National Electricity Law and the power system security principles in clause 4.2.6 of the NER

⁵ Out = Sydney North – Vales Point 330kV line

⁶ Operating Frequency Tolerance Band specified in AEMC Reliability Panel Frequency Operating Standards

⁷ NER Schedule 5.1a System Standards Clause S5.1a.4 - Power frequency voltage



6. MARKET INFORMATION

AEMO is required by the NER and operating procedures to inform the market about incidents as they progress. This section assesses how AEMO informed the market⁸ over the course of this incident.

For this incident, AEMO was required to inform the market on the following matters:

1. The occurrence of a non-credible contingency event - notify within two hours of the event.⁹
 - AEMO issued Market Notice 58684 at 2029 hrs – 19 minutes after the event, advising participants of the non-credible contingency.
 - AEMO issued Market Notice 58686 at 2052 hrs, advising participants that the faulted equipment at Vales Point had been returned to service and that AEMO would not re-classify the incident as a credible contingency.
 - AEMO issued Market Notice 58687 at 2123 hrs as an update to Market Notice 58686, to advise participants that customer load had been lost as a result of this incident.
2. Constraints invoked with interconnector terms on the LHS.¹⁰
 - AEMO issued Market Notice 58685 at 2045 hrs to advise participants that constraint set N-SNVP had been invoked.

No other notifications were required.

7. CONCLUSIONS

AEMO has assessed this incident in accordance with clause 4.8.15 of the NER. In particular, AEMO has assessed the adequacy of the provision and response of facilities or services, and the appropriateness of actions taken to restore or maintain power system security.

AEMO has concluded that:

- The incident was caused by process failure and human error.
- There was no high voltage fault on the busbar
- The power system remained in a secure operating state during this incident.

⁸ AEMO generally informs the market about operating incidents as the progress by issuing Market Notices – see AEMO website

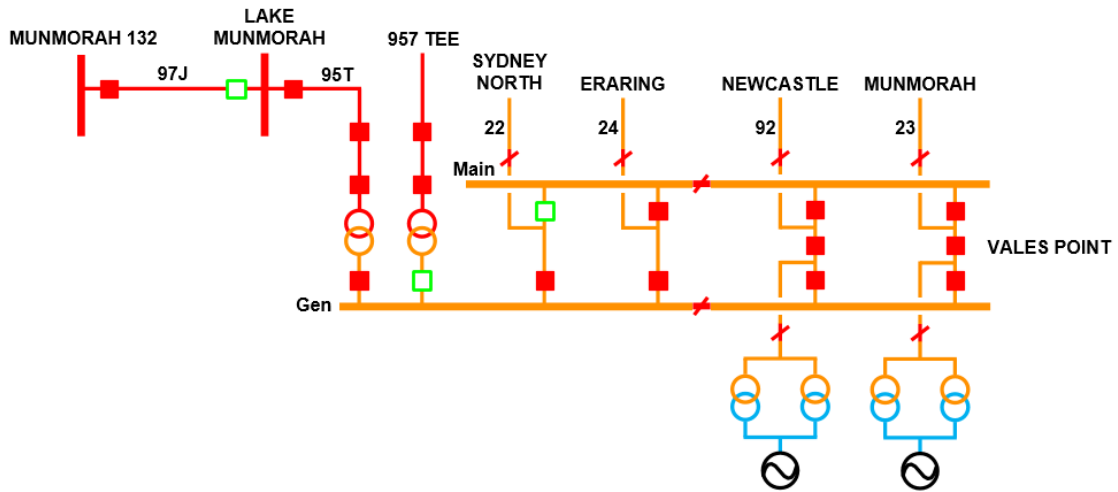
⁹ AEMO is required to notify the Market of a non-credible contingency event within two hours of the event - AEMO, *Power System Security Guidelines*, Section 10.3

¹⁰ For short term outage AEMO is required to notify the Market of variances to interconnector transfer limits AEMO, *Power System Security Guidelines*, Section 22



APPENDIX A. POWER SYSTEM DIAGRAM

Pre-incident



Post -incident

