AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Trip of Newport D Power Station No. 2 220 kV busbar on 27 October 2020

February 2021

Reviewable Operating Incident Report under the National Electricity Rules

INCIDENT CLASSIFICATIONS

Classification	Detail
Time and date of Incident	1022 hrs on 27 October 2020
Region of incident	Victoria
Affected regions	Victoria
Event type	Equipment failure
Generation impact	No generating unit was disconnected or had its output limited as a result of this incident
Customer load impact	No customer load was disconnected as a result of this incident

ABBREVIATIONS

Abbreviation	Term
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
Hz	Hertz
kV	Kilovolt
MW	Megawatt
NEM	National Electricity Market
NER	National Electricity Rules
NSP	Network Service Provider
SF6 Gas	Sulfur Hexafluoride Gas
TNSP	Transmission Network Service Provider

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

AEMO has made every reasonable effort to ensure the quality of the information in this report but cannot guarantee its accuracy or completeness. Any views expressed in this report may be based on information given to AEMO by other persons.

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CONTACT

If you have any questions or comments in relation to this report, please contact AEMO at system.incident@aemo.com.au.

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1. Overview

This report relates to a reviewable operating incident[1] that occurred on 27 October 2020 in Victoria. The incident involved the trip of Newport D Power Station (NPSD) No. 2 220 kilovolt (kV) busbar (No. 2 busbar).

There was no loss of generation or customer load as a result of this incident.

As this was a reviewable operating incident, AEMO is required 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].

AEMO has concluded that:

1. Trip of the NPSD No. 2 busbar was due to low Sulphur Hexafluoride gas (SF6) pressure resulting from an unexpected leak between Gas-Insulated Switchgear (GIS) compartments.
2. The SF6 gas auto de-energisation control scheme operated as designed and as expected for this event.
3. The power system remained in a secure operating state throughout this incident.

This report is prepared in accordance with clause 4.8.15(c) of the National Electricity Rules (NER). It is based on information provided by AusNet Services[3] and AEMO.

National Electricity Market (NEM) time (Australian Eastern Standard Time [AEST]) is used in this report.

2. The incident

2.1 Pre-incident conditions

Prior to the incident, the Newport D Power Station to Fishermans Bend Terminal Station 220 kV line (the NPSD-FBTS line) and the NPSD-FBTS line circuit breaker (CB) were out of service for a planned work to repair a gas leak.

The generating unit at Newport Power Station was out of service with both CBs at NPSD open.

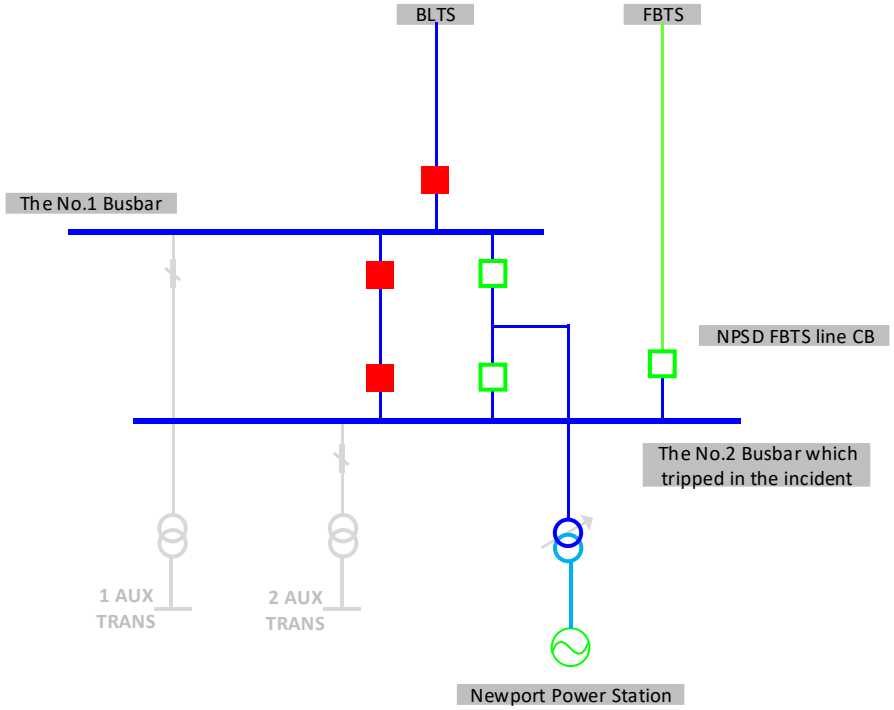
Figure 1 shows the configuration at NPSD immediately prior to the incident.

[1] See NER clause 4.8.15(a)(1)(i), as the event relates to a non-credible contingency event; and the AEMC Reliability Panel Guidelines for Identifying Reviewable Operating Incidents.

[2] See NER clause 4.8.15(b).

[3] AusNet Services is the Transmission Network Service Provider (TNSP) in the Victoria region. Note that "Information provided by AusNet Services has been provided on a 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 Services (or its respective associated companies, businesses, partners, directors, officers or employees)."

Figure 1 The configuration at Newport D Power Station immediately before the incident



2.2 The incident

At 1022 hrs on 27 October 2020, the No. 2 busbar tripped due to operation of the SF6 gas[4] auto de-energisation control scheme at the same time as the NPSD-FBTS line CB was being de-gassed.

There was no electrical fault on the power system as a result of this event.

The No. 2 busbar remained out of service pending repairs and was returned to service at 1019 hours on 20 November 2020.

The NPSD No. 2 busbar being out of service did not affect the availability of Newport Power Station, as the power station switched its auxiliaries to the NPSD No. 1 busbar.

2.3 Analysis

The following is based on information provided by AusNet Services.

GIS has been installed at NPSD, where the conductors and contacts are insulated by pressurised SF6 gas as an insulating medium.

Maintenance work being carried out at the time of the incident involved de-gassing the NPSD-FBTS line CB. During this process, the SF6 gas auto de-energisation control scheme for the No.2 busbar operated and tripped the No. 2 busbar automatically due to a low gas pressure.

The SF6 gas auto de-energisation control scheme operates and trips the busbar if the SF6 gas pressure falls below acceptable levels in any of the 220 kV CB compartments associated with the No. 2 busbar. Therefore, the scheme prevents any possible maloperation of the CBs when the SF6 gas pressure is too low for interrupting current if required.

Investigation by AusNet Services determined there was an SF6 gas leak in the internal barrier board between the NPSD-FBTS line CB and its No. 2 bus side isolator-current transformer compartment. As the NPSD-FBTS

[4] SF6 is an insulating medium commonly used in high voltage switchgear.

line CB was being de-gassed, the isolator-current transformer compartment gas pressure reduced due to the SF6 gas leak, which resulted in operation of the SF6 gas auto de-energisation control scheme. The scheme operated as designed and as expected.

The gas leak was repaired, and the No. 2 busbar and NPSD-FBTS line CB were returned to service at 1019 hrs on 20 November 2020.

As an outcome of this event, AusNet Services revised the work plans for other planned maintenance work at NPSD and will also update its Standard Maintenance Instructions associated with NPSD to take account of potential gas leaks between switchgear compartments. This is in progress and is expected to be in place by mid-2021.

3. Security

AEMO is responsible for power system security in the NEM. This means AEMO is required to operate the power system in a secure operating state to the extent practicable and take all reasonable actions to return the power system to a secure state following a contingency event in accordance with the NER[5].

The power system was in a secure operating state throughout this incident and no action was required by AEMO.

3.1 Reclassification

AEMO assessed whether to reclassify this incident as a credible contingency event[6].

AusNet Services advised AEMO that the cause of the trip of the NPSD No. 2 busbar had been identified and the incident was unlikely to reoccur. Based on this advice, AEMO determined the incident was unlikely to reoccur and therefore correctly determined that reclassification as a credible contingency event was not required.

4. 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 market[7] over the course of this incident.

For this incident, AEMO informed the market on the following matters:

1. A non-credible contingency event – notify within two hours of the event[8].
   - AEMO issued Market Notice 79309 at 1138 hrs on 27 October 2020, 76 minutes after the event, to advise of the non-credible contingency event.

[5] 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.

[6] AEMO is required to assess whether or not to reclassify a non-credible contingency event as a credible contingency event – NER clause 4.2.3A(c) – and to report how the reclassification criteria were applied – NER clause 4.8.15(ca).

[7] AEMO generally informs the market about operating incidents as they progress by issuing Market Notices – see https://www.aemo.com.au/Market-Notices.

[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 7.3.

2. Reclassification, details, and cancellation of a non-credible contingency – notify as soon as practical[9].
   - AEMO issued Market Notice 80181 at 0109 hrs on 21 November 2020, advising that the cause of this non-credible contingency event had been identified and AEMO would not reclassify the trip of the NPSD No. 2 busbar as a credible contingency event.

5. Conclusions

AEMO has assessed this incident in accordance with clause 4.8.15(b) 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:

1. Trip of the NPSD No. 2 busbar was due to low SF6 gas pressure resulting from an unexpected leak between switchgear compartments.
2. The SF6 gas auto de-energisation control scheme operated as designed and as expected for this event.
3. The power system remained in a secure operating state throughout this incident.

[9] AEMO is required to notify the market of a reclassification – NER clause 4.2.3(g), details of the reclassification – 4.2.3(c), and when AEMO cancels the reclassification – 4.2.3(h).