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Chapel Street Liapootah No. 2  
220 kV line and Chapel Street  
220 kV CB S752 trip, 16 January  
2020

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**June 2020**

Reviewable Operating Incident Report under the  
National Electricity Rules

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## INCIDENT CLASSIFICATIONS

Classification	Detail
Time and date of incident	0531 hrs on 16 January 2020
Region of incident	Tasmania
Affected regions	Tasmania
Event type	Protection mal-operation
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
Associated reports	Nil

## ABBREVIATIONS

Abbreviation	Term
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
CB	Circuit breaker
kV	Kilovolt
NER	National Electricity Rules

# 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.

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# 1. Overview

This report relates to a reviewable operating incident<sup>1</sup> that occurred on 16 January 2020 in Tasmania. The incident involved the trip of the Chapel Street Liapootah No. 2 220 kilovolt (kV) line and Chapel Street 220 kV circuit breaker (CB) S752.

No generation or customer load was lost 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<sup>2</sup>.

AEMO has concluded that:

1. The trip of the Chapel Street Liapootah No. 2 220 kV line was due to a fault caused by lightning, and all protection systems operated as designed and as expected to clear the fault and automatically reclose the line.
2. The trip of the Chapel Street 220 kV CB S752 was due to a protection system setting error. TasNetworks identified and corrected the protection system error and updated procedures to prevent similar errors in future.
3. AEMO correctly reclassified the simultaneous trip of the Chapel Street Liapootah No. 2 220 kV line and the Chapel Street S752 220 kV CB as a credible contingency from 0645 hrs on 16 January 2020.
4. 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 TasNetworks<sup>3</sup> and AEMO.

National Electricity Market time (Australian Eastern Standard Time [AEST]) is used in this report. At the time of this incident, local time in Tasmania was AEST plus one hour.

## 2. The incident

### 2.1 The incident

At 0531 hrs on 16 January 2020, the Chapel Street Liapootah No. 2 220 kV line tripped at both ends and successfully auto-reclosed. At the same time, the Chapel Street 220 kV CB S752 (CB S752 hereafter) tripped and remained out of service until manually closed at 0537 hrs.

### 2.2 TasNetworks investigation

The following is based on information provided by TasNetworks.

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<sup>1</sup> 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.

<sup>2</sup> See NER clause 4.8.15(b).

<sup>3</sup> TasNetworks is the Transmission Network Service Provider (TNSP) for Tasmania.

### 2.2.1 Trip of Chapel Street Liapootah No. 2 220 kV line

At 0531 hrs on 16 January 2020, the Chapel Street Liapootah No. 2 220 kV line tripped at both ends due a line to earth fault as a result of lightning activity in the area. Protection systems on the Chapel Street Liapootah No. 2 220 kV line detected the line to earth fault and operated correctly and as expected. The Chapel Street Liapootah No. 2 220 kV line auto-reclosed successfully at the Chapel Street Substation in 0.843 sec and at Liapootah Substation in 0.838 sec.

Tripping of the Chapel Street Liapootah No. 1 and No. 2 lines had been reclassified as credible at 0419 hrs due to lightning activity in the region.

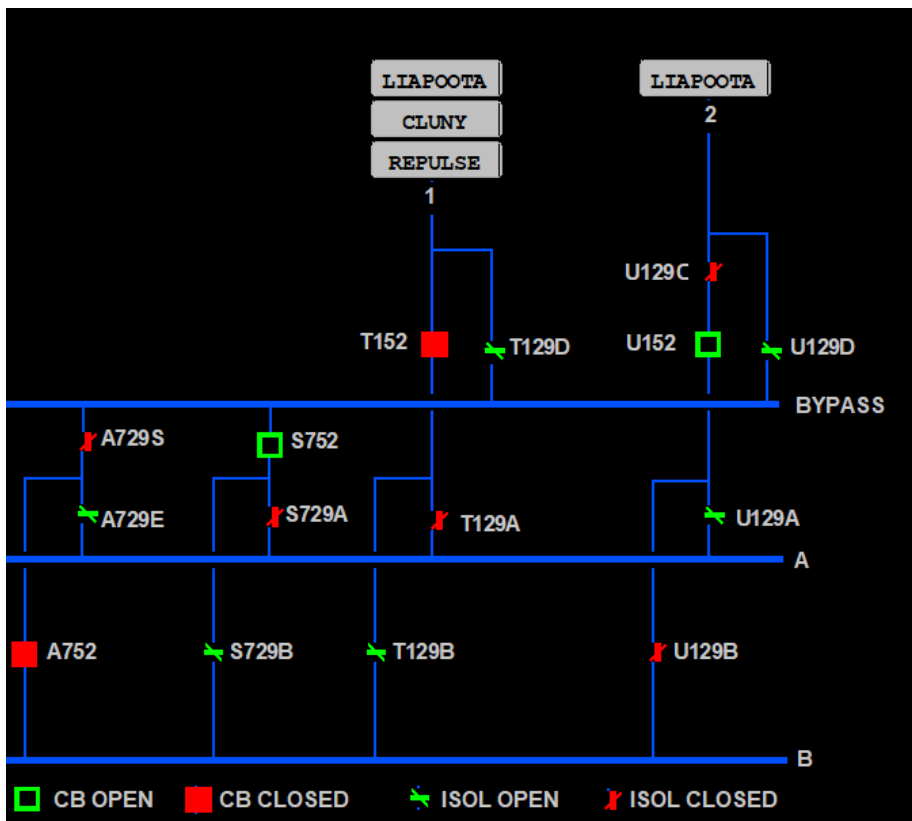
### 2.2.2 Trip of Chapel Street 220 kV CB S752

Coincident with the trip of the Chapel Street Liapootah No.2 220 kV line, CB S752 also tripped. This was not an expected outcome for the fault on the Chapel Street Liapootah No. 2 220 kV line.

A contractor had been engaged by TasNetworks to perform setting modifications on the U187/121B protection relay at Chapel Street Substation on 13 January 2020, as part of the Liapootah 220 kV Bus Zone 'B' Protection upgrade works.

Chapel Street CB U152 connects through isolator U129C from the Chapel Street Liapootah No.2 220 kV line to Chapel Street 220kV bus A and B. Isolator U129D connects to the bypass bus, with CB S752 connecting the bypass bus to the bus A and B – refer Figure 1 below. Relay outputs on the U187/121B Protection Relay (Schweitzer SEL 311L-7) at Chapel Street Substation include latch bits to activate the relay outputs to the appropriate circuit breakers based on whether the line connection is made to bus A/B or the bypass bus (as per U129C and U129D status). It was identified by the contractor and TasNetworks during the site inspection on 17 January that that a copy and paste error had been made when updating the settings of the U187/121B Protection Relay (Schweitzer SEL 311L-7) at Chapel Street Substation on 13 January 2020, resulting in the relay acting as if the line was connected to both bus A/B and the standby bus. This resulted in the opening of the bypass CB S752 at the same time as the line CB U152.

**Figure 1 Chapel Street Liapootah No. 2 220 kV line diagram**



The erroneous settings were corrected by the technician at 1645 hrs on 17 January 2020, with a settings comparison performed between existing settings and the latest as installed settings to confirm the modifications had been made correctly.

TasNetworks advised AEMO at 1900 hrs on 17 January 2020 that the trip settings had been corrected.

The contractor has updated its procedures for internal setting changes to include the following:

- When making simple setting changes in SEL devices, it is advised to modify each individual equation, not to rely on copy and paste from one equation to another.
- Both a visual inspection in the terminal window and a setting comparison directly after every change are required, to confirm only requested modifications were made.

## 3. 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 take all reasonable actions to return the power system to a secure state following a contingency event in accordance with the NER<sup>4</sup>.

The power system was in a secure operating state throughout this incident. No action was required by AEMO in relation to power system security.

### 3.1 Reclassification

AEMO assessed whether or not to reclassify this incident as a credible contingency event<sup>5</sup>.

As TasNetworks could not determine the cause(s) of the incident, AEMO determined that a simultaneous trip of the 2M and 26 lines was likely to reoccur and correctly reclassified the trip of the Chapel Street Liapootah No. 2 220 kV line and the Chapel Street S752 220 kV CB as a credible contingency from 0645 hrs on 16 January 2020.

This reclassification was cancelled at 1900 hrs on 17 January 2020, after TasNetworks advised AEMO that the U187/121B Protection Relay settings were corrected, and the non-credible contingency was unlikely to reoccur.

## 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<sup>6</sup> over the course of this incident.

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<sup>4</sup> 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.

<sup>5</sup> 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).

<sup>6</sup> AEMO generally informs the market about operating incidents as the progress by issuing Market Notices – see <https://www.aemo.com.au/Market-Notices>.

For this incident, AEMO informed the market <sup>7</sup> of the reclassification, details, and cancellation of a non-credible contingency.

- AEMO issued Market Notice 72605 at 0645 hrs on 16 January 2020 to advise that the simultaneous trip of the Chapel Street Liapootah No. 2 220 kV line and the Chapel Street S752 220 kV CB had been reclassified as a credible contingency.
- AEMO issued Market Notices 72663 at 1900 hrs on 17 January 2020 to advise that the reclassification of the Chapel Street Liapootah No. 2 220 kV line and the Chapel Street S752 220 kV CB had been cancelled, because the cause had been identified and a reoccurrence of the incident was unlikely.

## 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. The trip of the Chapel Street Liapootah No. 2 220 kV line was due to a fault caused by lightning, and all protection systems operated as designed and as expected to clear the fault and automatically reclose the line.
2. The trip of the Chapel Street 220 kV CB S752 was due to a protection system setting error. TasNetworks identified and corrected the protection system error and updated procedures to prevent similar errors in future.
3. AEMO correctly reclassified the simultaneous trip of the Chapel Street Liapootah No. 2 220 kV line and the Chapel Street S752 220 kV CB as a credible contingency from 0645 hrs on 16 January 2020.
4. The power system remained in a secure operating state throughout this incident.

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<sup>7</sup> AEMO issued market notice 72599 at 0419 hrs on 16 January 2020, prior to the incident, to reclassify the loss of the Chapel St - Liapootah No.1 220 kV and Chapel St - Liapootah No.2 220 kV lines as credible due to lightning. This was withdrawn in market notice 72612 at 1024 hrs of the same day.