TRANSPOWER

Keeping the energy flowing

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Regulation Branch
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Normalisation Application under clause 20.3 of the Transpower Individual Price-Quality Path Determination 2020 (IPP 2020)

On 7 December 2019, nine transmission towers on the Roxburgh-Islington (ROX-ISL) A line were catastrophically damaged due to the flooding of the Rangitata River following a severe weather event. Of the nine towers, one was unrecoverable while the remaining eight suffered significant structural damage.

Transpower constructed a temporary pole line as an interim solution that returned the ROX-ISL A line to service at a reduced capacity on 27 March 2020. This was re-rated on 15 April 2020 to increase its operational capacity prior to higher winter loads.

On 28 August 2020, the ROX-ISL A line was returned to service at full capacity when new permanent structures were connected. Swapping over the temporary pole line to the permanent structures required an outage of 103.27 hours (6196 mins), from 24 August. This outage is the subject of this normalisation application.

The outage occurred in the first disclosure year of Regulatory Control Period 3 and was directly connected to the severe weather and subsequent flooding event. The flooding that caused the damage to the original towers was the reason for the outage that enabled Transpower to commission the permanent structures. In our view, the outage therefore qualifies as a normalisation event.

Please find **attached** our application in accordance with clause 20.3 of the IPP 2020. We have provided several supporting documents. These are listed at the end of our application. Please note, we consider some of these documents to be confidential and have denoted them as such. If the Commission wishes to make any of this information publicly available, we would appreciate a discussion with you prior to publication.

Yours sincerely,

Mark Ryall
General Manager, Grid Delivery

ATTACHMENT - APPLICATION TO THE COMMERCE COMMISSION UNDER CLAUSE 20.3 OF THE TRANSPOWER INDIVIDUAL PRICE-QUALITY PATH DETERMINATION 2020

The Outage

The ROX-ISL A line was out of service for a 103.27 hour period between 24-28 August 2020. The outage was required to swap over a temporary pole line to permanent structures on the ROX-ISL A line following significant damage caused by a severe weather event and flooding of the Rangitata River on 7 December 2019.

Clause 20.3.1 – be made no later than 42 working days after the end of the disclosure year

This application is made prior to the end of disclosure year 2020/21.

Clause 20.3.2 – reasons why Transpower considers a normalisation event has occurred

A normalisation event is defined at clause 20.2 of the IPP 2020. To fit the definition, the event must satisfy four limbs at clauses 20.2.1 to 20.2.4.

Table 1: Definition of normalisation event

Clause	Requirement	Our response
20.2.1	The outage was beyond our reasonable control.	Refer section (a) below.
20.2.2	We did not cause, or materially contribute to the outage, by any failure to exercise good electricity industry practice (GEIP).	Refer section (c) below.
20.2.3	The duration of the outage was 24 hours or more, in circumstances where the duration was beyond our reasonable control; and not caused, or materially contributed to, by our failure to exercise GEIP.	The outage was 103.27 hours, exceeding the minimum duration that is required. Please also refer sections (b) and (c) below.
20.2.4	The outage was the result of, amongst other things, a natural disaster. A natural disaster is defined in the IPP 2020 and includes floods; and severe weather events, including lightning, storms, wind and rain.[1]	The damage to the original structures on 7 December 2019 occurred because of a severe weather event and flooding of the Rangitata River (further referred to as the **natural disaster**). The outage required to swap over the temporary pole line to the permanent structures was a direct result of a natural disaster.

[1] IPP 2020, clause 7, natural disaster - paragraphs (c) and (d).

Why we consider:

(a) the outage was beyond Transpower's reasonable control

The outage occurred as a result of damage caused to the ROX-ISL A line by the natural disaster.[2] Both the natural disaster, and the outage required to swap over the temporary pole line to permanent structures, were beyond our reasonable control.

The flooding of the Rangitata River involved flood waters over 35 times its usual current, with flow peaking at 2300 cumecs on 7 December 2019.[3] Damage was exacerbated by the failure of flood protection banks upstream which caused excessive flooding into the southern branches of the river. Environment Canterbury Regional Council's flood protection scheme was only designed to withstand around 1500 cumecs.[4]

We considered several options to return the ROX-ISL A line to service. Two key factors led us to our preferred solutions:[5]

1. Although there was no interruption, the Upper South Island supply was at a reduced level of security.
2. A solution was required prior to the higher winter loads.

A temporary pole line allowed the ROX-ISL A line to operate at a reduced capacity over the winter period until permanent structures could be installed and commissioned in August 2020. This is described in more detail under point (c) below.

Swapping over the temporary line to the permanent structures was the last of a series of steps required to return the ROX-ISL A line back to its full operational capacity. This required an outage of 103.27 hours.

The outage was beyond our reasonable control as it was directly connected to the natural disaster, and the solution implemented was in line with GEIP.

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2 See Document 1 '*Transpower Media Release*'; and Document 2 '*System Fault and Interruption Report*'.

3 https://www.ecan.govt.nz/get-involved/news-and-events/2019/rangitata-river-why-did-it-flood-and-what-happens-now/.

4 ibid.

5 [redacted]

Why we consider:

(b) the effect of the outage on the grid, including managing to a shorter duration than that which actually occurred was beyond Transpower's reasonable control

The effect of the outage on the grid was that the ROX-ISL A Line was out of service for 103.27 hours between 24-28 August 2020. Prior to this (from Dec 2019 – Aug 2020), remediation plans were developed and executed. This included building new foundations and towers along the permanent ROX-ISL A section that crosses the Rangitata River.

The outage was required in order to dismantle 11 poles, remove the temporary line connections, and to string conductors on the new permanent structures over the 3km section that crosses the river. The outage also involved several pre-commissioning inspections and function checks.[6]

The commissioning of the ISL-LIV-1 circuit (on the ROX-ISL A line) was completed one hour earlier than originally planned. We consider that this demonstrates that, where possible, we optimised the time available. We do not consider that we could have safely achieved a shorter duration outage than what occurred.

Table 2: Timeline of key events

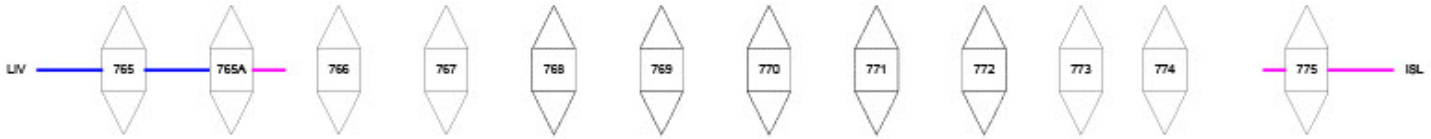
Date	Description of events
07 Dec 2019	Natural disaster causes damage to nine towers on the ROX-ISL A line
27 Mar 2020	Temporary line commissioned at reduced capacity
15 Apr 2020	Temporary line re-rated to increase operational capacity
Dec 2019 – Aug 2020	Planning, design and construction activities on the permanent line solution are undertaken.
24 Aug 2020	Outage start The temporary line is dismantled, and permanent structures connected
28 Aug 2020	Outage end ROX-ISL A line returned to full operational capacity

The diagram below illustrates the three key stages of this project. The top row shows the original impact of the natural disaster – the damage to nine towers. The middle row shows how the temporary bypass solution was developed so that remediation works could occur on the permanent structures in parallel. The bottom row shows the final steps involved in swapping over the temporary pole line to the permanent structures.

6 [redacted]

ROX-ISL A
Rangitata River Section ISL-LIV-1

Current

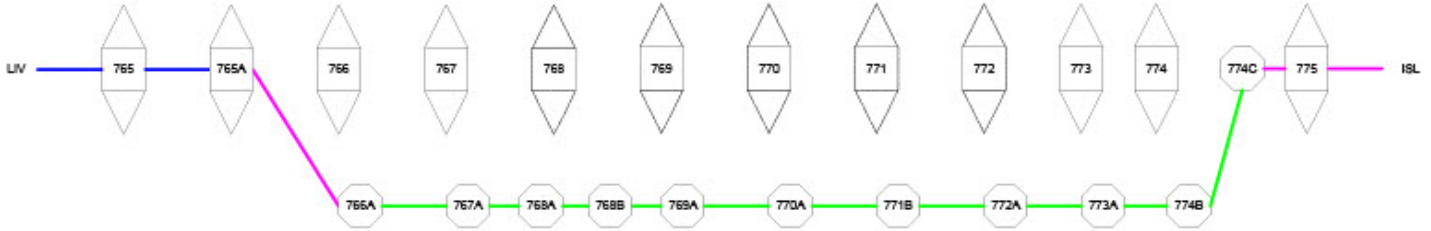


Existing

Section: LIV to 765A
Cond Type: Goat
Configuration: Duplex
Temperature: 75C

Section: 775 to ISL
Cond Type: Goat
Configuration: Duplex
Temperature: 50C

Temporary Deviation

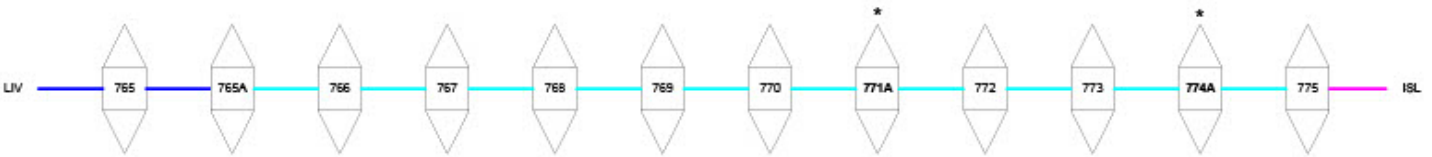


Temporary Section

Section: 765A to 768A
774C to 775
Cond Type: Goat
Configuration: Duplex
Temperature: 50C
Distance: 0.2 km

Section: 768A to 775
Cond Type: Zebra
Configuration: Simplex
Temperature: 50C
Distance: 3 km

Final



New Section

Section: 765A to 775
Cond Type: Goat
Configuration: Duplex
Temperature: 50C
Distance: 3 km

* Structures renamed as the new location is distant from the original position

Why we consider:

(c) we exercised good electricity industry practice in relation to the cause and effects of the outage.

The condition of our assets

Nine transmission towers on the ROX-ISL A line were severely damaged during the natural disaster. The damage originated from the collapse of tower A0771 anchored in the river which was swept away by flood waters. This significantly increased the tension on surrounding towers, resulting in another three towers falling and a further five being damaged.

We exercised GEIP in relation to the maintenance of our structures along the ROX-ISL A Line. Tower A0771's foundations were assessed two years prior to the flood and had a condition score of 81-90 for each leg of the tower. This is a good condition. A new structure would score 100, while below 20 would indicate a significant loss in strength. The structure's age was 63 years. The other towers that were pulled down or damaged by the flooding were in similar (good) condition. The condition of the towers is inspected every eight years in accordance with our grid maintenance policies and procedures.

As a result, we do not consider that we caused or materially contributed to the collapse of tower A0771 and the consequent damage to the surrounding towers.

Customer and stakeholder engagement

We exercised GEIP by ensuring our customers and stakeholders were kept informed. This was achieved by publishing regular Customer Advice Notices regarding the damage to the line and remediation plans.[7] These notices, along with a series of conference calls with customers, provided indicative timeframes to customers and stakeholders while we developed both temporary and permanent solutions.[8]

We also notified the Commission of the potential breach of the AP2 measure due to the damaged ISL-LIV-1 circuit.[9]

Decision to commission a temporary pole line

As this was not a 'lights out' case,[10] the design process took a conservative approach to ensure an optimal outcome. A business case was prepared for the temporary pole line solution.[11] This confirmed the following:

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7 Customer Advice Notices dated 8 Dec 2019 – 28 Aug 2020 can be viewed at https://www.transpower.co.nz/system-operator/operational-information/customer-advice-notices?year=2019 and https://www.transpower.co.nz/system-operator/operational-information/customer-advice-notices?year=2020.

8 Transpower Meeting Minutes from Customers conference calls can be viewed at https://www.transpower.co.nz/system-operator/information-industry/rangitata-flooding-event-islington-livingstone-circuit-outage.

9 See Document 6 '*Transpower, Letter to the Commerce Commission*'.

10 The three remaining 220kV circuits including the HVDC circuit continued to supply load to Islington and further north.

11 [redacted]

- Leaving the ISL-LIV-1 circuit out of service until permanent structures could be installed and commissioned was deemed unacceptable by the System Operator due to reduced level of security to the Upper South Island.
- The network would be unable to manage the increased load during the winter months.
- The use of Emergency Restoration Structures was ruled out as the risk of installing guyed structures in a river were considered too high.
- Due to procurement and design constraints, the reinstatement of permanent tower structures could not be completed before high winter loads.
- A temporary bypass would allow the ROX-ISL A line to operate at a reduced capacity over the winter period until a permanent solution could be installed and commissioned in August 2020.
- A temporary bypass was considered relatively quick to install, with materials and resources that were readily available, was adequately located as to not hinder construction of the permanent structures and would be located on ground that was undisturbed by the flood.
- All designs were to be in accordance with appropriate Transpower design standards.[12]

The decision to commission the temporary line was well considered. It was also necessary in order to manage the expected winter load. We exercised GEIP by considering the duration at which the security of the network was at risk (according to the system operator), and the timing to implement the permanent line solution (including the risk of delivery dates being extended, especially weather-related risks).

Swapping over the temporary pole line to a permanent line solution

In order to return the ROX-ISL A line to the level of reliability stipulated in Transpower's Fleet Strategy, and the level of service required by the national grid, a permanent tower solution was required. The permanent solution would replace the temporary pole line.

Our decision to commission the permanent line solution was well considered and in line with GEIP.[13] A business case was prepared for the permanent solution that confirmed the following:

- It was not acceptable to leave the temporary line in service. This did not meet reliability standards and was not a long-term solution for the supply of the Upper South Island.
- The use of the original line route and foundations (where possible) presented the least amount of design and construction challenges resulting in lower overall costs.
- The replacement foundation for tower A0771 would be piled, similar to the original, but designed to ensure capacity even if scouring occurs in the river.
- All designs were to be in accordance with appropriate Transpower design standards.[14]

The actions we took prior, during and after the natural disaster show that we exercised GEIP in relation to the cause and effect of the outage.

12 [redacted]

13

14

Clause 20.3.4 – proposed reassessed values of measures of grid performance and asset performance measures

Should the Commission decide that this outage was a normalisation event, the outage will be excluded from calculations regarding asset performance measures for AP2.

As this application is made before the end of the disclosure year, we cannot provide the actual total duration of all outages in order to calculate the formulae at clauses 18.2 and 19.3.4.

We propose excluding the 103.27 hour outage from our AP2 performance measure. This will increase our final AP2 HVAC availability by 0.02 percentage points.[15]

Clause 20.3.5 – other information that Transpower considers is relevant to this application

The following supporting information is provided with this application:

#	Document	Date	Confidential
1	Transpower Media Release	9 December 2019	No
2	[redacted]	[redacted]	[redacted]
3	[redacted]	[redacted]	[redacted]
4	[redacted]	[redacted]	[redacted]
5	[redacted]	[redacted]	[redacted]
6	Transpower, Letter to the Commerce Commission	18 December 2019	No
7	[redacted]	[redacted]	[redacted]
8	[redacted]	[redacted]	[redacted]

[15] Calculated using the following formula 103.27/(365*71*24). Note that 71 relates to the number of selected HVAC assets.