



TRANSPOWER

Keeping the energy flowing

Transpower House
96 The Terrace
PO Box 1021
Wellington 6140
New Zealand
P 64 4 495 7000
F 64 4 495 7100
www.transpower.co.nz

30 September 2013

Alex Sim
Manager – Regulation
Commerce Commission
P O Box 2351
Wellington

Dear Alex

Application for Amendment of Outputs for the Bombay 110 kV Bus Security Investment Proposal

In August 2009 the Electricity Commission approved our Grid Upgrade Plan (GUP) 2008, Instalment 3, Part VII, for a reliability investment to secure supply at the Bombay substation through work on the Bombay 110 kV substation bus.

We are seeking a grid output amendment for two of the grid outputs specified in the GUP, namely:

- i. "Install a low impedance bus zone scheme"
- ii. "relocate the compressor house."

Following approval of the GUP, whilst completing the detailed design, we found we could not implement the proposed solution without breaching our clearance violation policy. An alternative solution was developed which included bringing forward planned replacement of bulk oil circuit breakers and trialling new dead tank disconnecting circuit breakers.

Consequently, a low impedance bus zone scheme was no longer necessary and a high impedance bus zone scheme was installed. The high impedance scheme is a change in technology and resulted in a lower cost solution overall.

Additionally, the change in circuit breaker technology resulted in the compressor house no longer being required which allowed its removal at a lower cost than would have been the case, had we relocated it. This new technology, which will be deployed elsewhere, enables us to provide modern safety clearances without the need to extend the yard.

This application is made under clause 3.3.4(1)(d) of the Transpower Capital Expenditure Input Methodology Determination 2012 (the **Capex IM**). We believe this application (together with the enclosures) satisfies the applicable requirements of the Capex IM, including under clause 7.4.2.

We note that the amendments made to the original proposal did not increase the cost, and we have completed the project within the expected budget.

Please let me know if you have any queries.

Yours sincerely



Siobhan Procter
Strategy and Investment Manager

Enc: Supporting information for the application
Chief Executive Certification

Enclosure: Supporting Information for Application for Amendment of Outputs for the Bombay 110 kV Bus Security Investment Proposal

This is an application for amendment of the approved major capex project outputs for the investment proposal. The amendment is sought pursuant to the Commission's powers under clause 3.3.4(1)(d) of the Capex IM. No other amendments pursuant to clause 3.3.4(1) of the Capex IM are sought under this application.

All clause references in the remainder of this enclosure are to clauses of the Capex IM.

This application is made in respect of two grid output elements of the approved Grid Upgrade Plan 2008, Instalment 3, Part VII for a reliability investment to secure supply at the Bombay substation through work on the Bombay 110 kV substation bus, that being to:

- i. Install a low impedance bus zone scheme; and*
- ii. Relocate compressor house*

We have not included any information in relation to any other aspects of the Bombay 110 kV Bus Security Grid Upgrade Plan as they are not relevant to this application.

Compliance with clause 7.4.2

As required by clause 3.3.4(2)(a), this application complies with the requirements of clause 7.4.2:

- (1) Application must be received by the Commission by the last working day of the September after the disclosure year in which the project in question is first commissioned*

This major project was completed and commissioned in 2013. We consider that this application has therefore been made within the required timeframe.

- (3)(c) Application must contain the information specified in Schedule H Division 3*

The required information is set out in this enclosure. We have restricted the information to the specific grid outputs which we are seeking to amend, therefore other information about the wider Grid Upgrade Plan is not considered relevant.

- (4) Application must contain certificates specified in clause 9.3.1*

The required certificate is enclosed with this application.

Schedule H Division 3 information

H14 Project identification and specifications

The relevant project is the Grid Upgrade Plan 2008, Instalment 3, Part VII: Bombay 110 kV Bus Security Investment Proposal, as approved by the Electricity Commission in August 2009.

The relevant approved outputs are to install a low impedance bus zone scheme, and to relocate compressor house.

H15 Amendment sought

(1) Proposed amendment

The proposed amendments are:

- i. To install a high impedance bus zone scheme rather than a low impedance bus zone scheme; and
- ii. To remove rather than relocate the compressor house.

(2) Explanation as to how each proposed amendment was arrived at

Following approval of the GUP, whilst completing the detailed design, we found we could not implement the proposed solution without breaching our clearance policy¹.

An alternative solution was developed which included bringing forward planned replacement of bulk oil circuit breakers and trialling new dead tank disconnecting circuit breakers².

The GUP assumed that five old bulk oil circuit breakers on site were retained, requiring the associated compressor house to be relocated as part of the project.

As these bulk oil circuit breakers would be replaced, the compressor house was no longer required and could be completely removed from the site. New circuit breakers would also allow the installation of a high impedance bus zone protection scheme.

(3) Description of the extent to which each proposed amendment reflects a change to the:

¹ Clearances and Conductor Spacings policy (TP.DS.62.01)

² Dead tank disconnecting circuit breakers are smaller than live tank circuit breakers and do not require separate disconnectors.

(a) *assets to be commissioned*

- i. The amendment is for the installation of a high impedance bus zone scheme not a low impedance scheme as approved in the GUP.
- ii. The amendment is for the removal of the compressor house not the relocation as approved in the GUP.

(b) *functional capability of the grid*

Neither the change in bus zone schemes, nor the removal of the compressor house will change the functional capability of the grid.

(c) *quantum of electricity market benefit or cost elements directly related to the supply of electricity transmission services that are likely to be achieved as result of undertaking the project*

- i. The amendment will not result in an increase in market cost elements. The high impedance bus zone protection will deliver the same benefit as a low impedance bus zone protection.

Dead tank disconnecting circuit breakers (maintenance every 10 years) have a positive maintenance benefit due to less maintenance outages compared with their live tank circuit breaker (and associated disconnect and earth switch) peers (maintenance every 2 years). As such the 110kV bus is more reliable for consumers as it will be taken out of service for less time and less often for maintenance.

Because of the clearance violations, which were unconfirmed at the time of submission, the approved option would have required all circuits to be moved by a bay. This would have involved extending the bus by a bay length, installing two new bays and moving the circuits. The building of new bays and the requirements to reconnect all the equipment, obtain easements for the realignment of incoming transmission lines would have added significant cost to this option. In addition, the earthworks required to extend the 110 kV yard would also have added to the cost as the yard is built on the side of a hill.

- ii. The amendment will not result in an increase in market cost elements.

(d) *in the case of a non-transmission solution, description of the extent to which each proposed amendment reflects a change to any relevant service provided by a third party*

Not applicable.

H16 Progress of project

The Bombay 110 kV Bus Security Investment Proposal was completed in 2013.

(a) *Planning processes undertaken*

The project was implemented using our standard project delivery procedures and processes.

(b) Resource management consents, other regulatory consents, and property rights and access rights obtained

Building consent was required for change to substation fence and was resolved with council. All other work was undertaken within existing consents the Bombay substation. The Bombay substation is designated as an 'Electricity Substation' in the Franklin District Plan. There are no conditions attached to the designation.

(c) Construction and labour contracts and arrangements made

All contracts were executed in accordance with our standard project delivery procedures and processes.

(d) Construction completed

This project delivered the following outputs:

- a bus coupler circuit breaker on the Bombay 110kV bus
- back up line protection to five circuits and replace main line protection on another four circuits
- replacement of four adjacent bulk oil circuit breakers (9 in total were replaced when including additional 5 from other project)
- relocation of voltage transformer No. 2
- removal of the compressor house
- installation of a high impedance bus zone scheme.

(e) Testing undertaken

Testing was carried out under our standard asset commissioning procedures and processes.

H17 Current and forecast expenditure

We delivered this project within the approved budget.

Actual Costs	\$4.4 million
Expected (P50)	\$4.5 million
Approved (P90)	\$4.7 million

(2) In case of a non-transmission solution:

Not applicable.

(a) *total costs incurred proposed to be classified as recoverable costs*

Not applicable.

(b) *total costs incurred in relation to assets to be commissioned in relation to the non-transmission*

Not applicable.

(c) *forecast remaining costs to be classified as recoverable costs*

There are no remaining costs to be incurred on the project.

(d) *forecast remaining costs incurred in relation to assets to be commissioned in relation to the non-transmission solution*

Not applicable.

H18 Reasons for making the application

(1) *Reason for applying, including:*

(a) *description of key factors leading to the application*

- i. The key factor leading to this application was the discovery, in the detailed design phase, that the implementation of the approved option would result in clearance violations on the 110kV circuit breakers. Their replacement with modern disconnecting circuit breakers allowed the installation of a lower cost, simpler and more robust high impedance bus zone protection scheme³ that was not otherwise possible. This resulted in a change to the approved outputs of the project.

This new technology, which will be deployed elsewhere, enables us to provide modern safety clearances without the need to extend the yard.

- ii. The modern circuit breakers resulted in the compressor house no longer being required, so rather than moving it to an alternative location on site, it was removed from the site completely.

³ A low impedance scheme was originally required because of the retention of the old bulk oil circuit breaker with incompatible current transformer.

- (b) *commentary on the extent to which each key factor is within Transpower's control and actions taken to mitigate it.*

Given we had not progressed to detailed design prior to approval, we did not know with any certainty at the time that there would be such clearance violations preventing the installation of the bus section breaker and line breakers without compromising safety and maintenance clearances.

Combining these replacements with the Bombay 110 kV Bus Security Investment project meant that all clearance violations and access issues were addressed and an overall site solution was developed. This results in a site with less equipment variability, lower maintenance requirements, adequate maintenance clearances and a better technical solution.

Installing a more expensive low impedance scheme and retaining the compressor house after the old circuit breakers were replaced would not have been in the best interests of consumers.

- (c) *commentary on the extent to which each key factor was reasonably foreseeable by Transpower before approval of the major capex proposal*

As described above, we did not know with any certainty at the time of approval that there would be clearance violations preventing the installation of the bus section breaker and line breakers without compromising safety and maintenance clearances.

- (2) *Description and, where relevant, quantum of any current key assumptions different to those relied upon in applying the investment test in the major capex proposal*

There was always the assumption that these circuit breakers would be replaced in the future so this was compatible with the solution. Replacement of the 5 ageing bulk oil breakers was scheduled under our replacement and refurbishment programme and scheduled to happen in 2016. This work was brought forward because of clearance violations and a better overall site solution was developed.

- (3) *Description of the outcome of applying the investment test as it was applied in the major capex proposal modified by the proposed amendments and key assumptions described in subclause (2), including all relevant calculations and justifications for any exercises of judgment*

Whilst the original Grid Investment Test analysis showed the low impedance bus scheme to be the lowest cost option, the detailed design revealed that to meet the modern safety clearances would have required all circuits to be moved by a bay. This would have involved extending the bus by a bay length, installing two new bays and moving the circuits. The building of new bays and the requirements to reconnect all the equipment, obtain easements for the realignments of the incoming lines would have added significant cost to this option. In addition, the earthworks required to extend the 110 kV yard would also have added to the cost as the yard is built on the side of a hill.

To this end, the amended option which we implemented would be the one that minimised the expected net market cost and, therefore would have passed the GIT.

(4) *Explanation as to why making the proposed amendment would promote the long-term benefit of consumers*

The proposed amendment has resulted in all clearance violations and access issues being addressed without incurring additional and unnecessary capital expenditure. The site now has less equipment variability, lower maintenance requirements, adequate maintenance clearances and an improved technical solution.

Had the older breakers not been replaced until 2016, the site would have required higher levels of maintenance and access issues due to retention of the traditional circuit breakers until that time.

Installation of a low impedance scheme and retention of the compressor house after the old circuit breakers were replaced would have resulted in additional cost overall and would not have been in the best interests of consumers.

(5) *Where no application for amendment to the major capex allowance or maximum recoverable costs, as the case may be, is being made concurrently, explanation as to why that allowance or those costs will remain appropriate were the proposed amendment to approved major capex project outputs made*

The proposed amendment has been delivered at a cost below the approved major capex allowance.

Enclosure: Chief Executive Certification

CHIEF EXECUTIVE OFFICER'S CERTIFICATION AS TO MAJOR CAPEX PROJECT AMENDMENT (APPLICATION FOR AMENDMENT OF OUTPUTS FOR BOMBAY 110 kV BUS SECURITY INVESTMENT PROPOSAL)

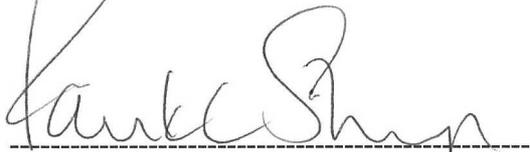
(Transpower Capital Expenditure Input Methodology Determination 2012, clause 9.3.1) (the Capex IM)

I, Patrick Clifford Strange, Chief Executive Officer of Transpower New Zealand Limited (**Transpower**) hereby Certify, in relation to all information provided in accordance with Schedule H to the Capex IM with respect to the Application for Amendment of Outputs for the Bombay 110 kV Bus Security Investment Proposal, that having made all reasonable enquires, it is my belief that:

- (a) the information was derived from and accurately represents, in all material respects, the operations of Transpower; and
- (b) all parts of the major capex project to which the information relates have been approved in accordance with the applicable requirements of Transpower's director and management approval policies; and
- (c) the application for amendment of project outputs complies, in all material respects, with the requirements of clause 7.4.2 of the Capex IM.

DATED:

30.09.2013



PATRICK CLIFFORD STRANGE