

# Transpower New Zealand Limited

## Dry Year Winter Planning 2006

### Maximising South Transfer Initiatives and Issues

#### Status as at 23 March 2006

Following the 2001 fuel shortages Transpower has put in place several initiatives to enhance the ability of the power system to deliver high levels of southwards transfer through the North Island grid and into the South Island. The following list summarises the various initiatives/limits and their current status

The main transmission issues affecting north to south energy transfer are:

#### 1. Export south from Taranaki

When constraints bind on the 220 kV route from Stratford to Bunnythorpe there is an impact on generation from all major thermal plants in the North Island. A reactor has been installed at Hawera to alleviate this constraint with a back up measure of an auto-change over scheme. Given these two measures and there being only three operational units at New Plymouth it is unlikely that Stratford to Bunnythorpe constraints will bind, at least before e3p is commissioned (expected to occur after the 2006 winter).

#### 2. Transfer from Bunnythorpe to Haywards

Transfer over this route is the critical constraint for south transfer. Transfer on the HVDC link is limited to the amount transferred on the Bunnythorpe to Haywards circuits less the Wellington area load (which varies in winter from 250-600 MW over the day). The default winter transfer limit on these circuits is 800 MW. This limit relies on an auto change-over scheme to relieve a constraint at Managmarie (on a 110 kV route through the Wairarapa that is in parallel with the 220 kV supply).

Since the auto change-over scheme was installed in 2003 there has been an increase in injection into the 110 kV line in the Wairarapa arising from the Te Apiti wind farm. Studies by the System Operator are underway to understand the affects of this additional generation on the 800 MW winter limit. It may be that it is necessary to "split" this 110 kV route to maximise transfer at critical times. Transpower expects there to be an external trigger on which it can rely to bring the scheme into operation. Transpower is reviewing its relevant connection contracts for any issues arising from potential use of this scheme.

Transfer into Wellington over the Bunnythorpe to Haywards route can be pushed to 890 MW overnight, from 2200hr to 0600hr (not 930 MW as used in the Electricity Commission's Minzone calculations). This would be achieved by use of the HVDC runback. This functionality has been added to the HVDC controls and has been tested but not implemented operationally. Implementation will need to include any changes to South Island reserve calculation to account for runback operation. If implemented operationally this runback scheme could be put into service when south transfer from Bunnythorpe to Haywards starts to approach 800 MW limit overnight.

This initiative exposes Transpower to the additional risk of event charges from operation of the runback due to a line tripping on the Bunnythorpe to Haywards 220 kV circuits resulting in an underfrequency event in the South Island. Transpower would require a suitable form of exemption if this capability is to be implemented. In the circumstances, we expect the grant of a suitably worded exemption should be able to be achieved.

Transpower requested funding for an upgrade of two 220 kV circuits on the Bunnythorpe to Haywards route as a reliability investment under the transitional arrangements in Part F to enhance south transfer capability. This was declined by the Electricity Commission. This would have resulted in a firm 890 MW transfer limit all day rather than just overnight and without recourse to the HVDC runback with its attendant risks.

### **3. Wellington load**

In previous years it has been Transpower's practice to switch out the Wilton T8 interconnector to avoid constraining the transfer from Bunnythorpe to Haywards. It has been identified that Wilton T8 may need to be switched back into service at peak times, thereby increasing Wellington peak load. A review of the rating of this transformer and the impact on transfer from Bunnythorpe to Haywards at peak load times should be completed by end of April.

In 2001 and 2003 the option of grid reconfiguration to transfer some of the Wellington regional load out of the region by supplying Paraparaumu using old 110 kV lines direct from Bunnythorpe was reviewed extensively. This option is not feasible.

### **4. HVDC**

The HVDC link has a stability limit for south transfer. That is, the limit is less than the physical limit of the equipment. After a review in 2003 the limit was raised from 520 MW to 626 MW. Note: in 2001 there were only 3 or 4 early morning periods when the then applicable 520 MW limit was reached.

### **5. Reserves in the South Island**

Following 2001 an Automatic Under Frequency Load Shedding (AUFLS) scheme was commissioned in the South Island. This reduced the reserve requirement for high levels of HVDC transfer by 40%. The practical effect of this change is that the reserve risk is now set by the loss of Pole 2 rather than the full HVDC link.

### **6. General**

#### **(a) Summer-winter rating change**

The changeover date from summer ratings to winter ratings occurs on the 9th of May. The current higher south transfer levels are occurring earlier than in previous years. This has meant that transfer levels are being set by the summer day rating levels rather than in previous years the winter rating levels. This reduces the available transfer from Bunnythorpe to Haywards by around 130 MW between 0700 and 2100 each day until 9<sup>th</sup> May.

#### **(b) Outages**

The current transmission outage plan is being reviewed on an ongoing basis to identify possible south transfer restrictions that may impact on North Island thermal generation. These ongoing reviews will consider any possible rescheduling of outages that can be made without cancelling the scheduled

maintenance. Transpower will require an external trigger to justify effecting any significant changes to the outage plan.

(c) Other suggested measures

- purchase of additional IL in the South island
- additional reporting. In 2001 and 2003 the System Operator provided special daily status reports on the Transpower web site. These showed the previous days transfer on key routes against applicable limits. Information on reserve quantities was also provided. Similar reports can be instituted at an appropriate time.

## 7. Summary and status of relevant Transpower actions

- enable Hawera reactor to minimise constraints out of the Taranaki. Trigger- this asset is enabled once the 220kV circuits are being constrained during south transfer. **In service**
- enable Managmarie auto change-over to minimise constraints on Bunnythorpe-Haywards route. Trigger: this scheme is enabled once the 220kV circuits are being constrained during south transfer. **In service**
- revise HVDC stability limit for south transfer. **Done; increased from 520 to 626 MW in 2003**
- reduce South Island reserves requirement through installation of AUFLS in the South Island. **In service**
- Hawera ABSS scheme. Trigger: if transfer out of Taranaki approaches limit with reactor in service, enable auto change-over scheme. **Operational but not currently in service**
- if transfer into Wellington approaches 800 MW limit overnight enable HVDC runback to increase limit to 890 MW. Trigger: not determined. **Needs to be implemented operationally. Requires exemption from exposure to possible event charges and check of South Island reserves requirement to enable the higher transfer**
- review impact of Te Apiti on Managmarie constraint. **Review to be completed by end April**
- if appropriate, bring into operation the physical split at Managmarie. Trigger: not determined. A review of the implications will be completed by mid April 2006. **Operational but not currently in service**
- identify implications of Wellington regional load at peak times of transfer into Wellington and across the HVDC. **Review to be completed by end April**
- review maintenance outage schedule for critical transmission routes. Trigger: not determined. **Ongoing regular process**
- additional reporting. Trigger: not determined. **Some information already available\*; enhanced version can be actioned at short notice.**

Transpower will work collaboratively with both the CEO Forum and Electricity Commission to develop new criteria that specify the steps the Electricity Commission will take to develop the necessary response to a developing security of supply situation. This will also require development of appropriate triggers for any actions that are part of a progression to higher states of alert or signal the need for certain actions when a certain state of alert has been reached.

\*see System Operator website: <http://www.transpower.co.nz/?id=4457>