Upper North Island Summer Security

Close-out Report – 2006

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1. Summary

(a) Planning

This report summarises the work of the Industry Response Group in managing the operational response to Upper North Island Summer Security in 2006. This was the seventh year that the System Operator formally called together Upper North Island stakeholders to facilitate a co-ordinated response to managing electricity security of supply issues into the Upper North Island.

The objective of the workgroup was to be able to maintain an N-G-1 security standard, to meet the prudent planning load forecast.

Planning to meet this level of security into the Upper NI region is further complicated by the potential for adverse summer weather conditions to cause a reduction in generator output at times of peak afternoon load.

Four separate workstreams were tasked with roles to aid the operational management over the summer. These were: scenario development, options, contingency planning and communications.

A new scenario was introduced (scenario 6) to reflect observed events from 9 February 2005 where with Otahuhu B running, Huntly was constrained to one unit on 60 MW due to river heating. It was possible to meet the prudent planning load forecast for the three of the seven scenarios, without the need for pre event interruption to end use consumers. Additional initiatives employed to deliver this outcome for summer 2006 included contracting Marsden and Otahuhu condensers as well as re-establishment of a SCADA based load intertrip arrangement.

This summer, two demand forecasts were used, “expected” level of load forecast and a “prudent planning” level of load forecast. Expected demand was defined as the best estimate of the “business-as-usual” scenario for the off-take customer, and the prudent planning demand forecast was defined as a credible “worst-case” scenario for the off-take customer.

Western Road load had also been permanently transferred to TeKowhai, which relieved previous issues of managing post contingent loading on the Bombay-Hamilton 110 KV circuits.

Additional local heat index and metrological forecast information was procured and made available to the working group and participants.

(b) Outcomes

The situation was managed successfully for the duration of the summer risk period, which was from mid January to mid March. The objective of minimising the impact on end use consumers was met without the need for involuntary demand shedding.

The highest peak demand to occur during the risk period, which was defined as weekday afternoons from 12:00 to 20:00 from mid Jan to mid March, was 1604 MW which occurred on Tuesday 31 January 2006 at 13:00 hours (based on 10 minute instantaneous snapshots). This was 16 MW below the expected load forecast of 1620 MW, and 54 MW below the prudent planning load forecast of 1658 MW.

The commissioning of the cooling towers at Huntly in mid January allowed Huntly to maintain higher levels of output than might have otherwise been achieved. Typically Huntly maintained an output of 500 MW during the afternoon risk period. Although the commissioning of the cooling towers lessens the potential for Huntly to be constrained back due to river heating, this could still occur if particular adverse summer weather conditions were to occur.

In planning for additional dynamic reactive support for the UNI region for summer, the SO undertook a needs analysis to provide a longer term view of the dynamic reactive support requirements for the next three years. This analysis resulted in the third Otahuhu condenser being procured for availability until 31 March 2007, with Marsden SC2 being contracted for availability through until 31 October 2008.

The System Operator will reconvene the Industry Response Group in September 2006 to review likely summer 2007 conditions and determine any required operational response.

2. Workstream Reports

The first meeting of the Industry Response Group was held on 21 September 2005. Response group membership comprised of industry participants with operations in the Upper North Island region. The agreed key objective was for the identified credible scenarios, to be able to meet a prudent planning level of load forecast, to an N-G-1 security standard, without the need for interruptions to end user consumers. Other objectives were:

- To have all measures in place by mid December, well ahead of the agreed risk period of mid-January to mid-March.
- For the industry to be seen to be working jointly to manage potential operational regional supply issues.

Four workstreams were established, each to review and plan elements of the response and report back to the Industry Response Group. The workstreams were:

- scenario monitoring, to develop load forecast figures for expected and prudent planning load levels, and to advise, refine and monitor possible supply scenarios
- options, to review and handover options for implementation
- contingency planning, to develop operational contingency plan
- communications to co-ordinate stakeholder communication.

Workstream membership was drawn from across participants within the Industry response Group. The members, activities and outcomes from each workstream are summarised below:

(a) **Scenario Monitoring**

Members

Calvin Whaley	Northpower (Lead)
David Kemshall	Vector
Ben Gussen	Vector
Ajay Anand	Top Energy
Derek Todd	Counties Power
Rob Blackburn	WEL Networks
Rick Liew	Contact Energy
Vince Smart	Genesis Energy
Jon Spiller	Meridian Energy
Bob Simpson	Transpower
Greg Spence	Transpower
Brahan Sivarajan	Transpower

Details

- provided demand information for participants in order to establish, and agree the expected and prudent planning demand forecasts
- reviewed and refined the six scenarios used in previous years and added a new scenario (scenario 6), the seven scenarios were:

1. 250 MW of generation at Huntly, all other plant in service
2. 360 MW of generation at Huntly, Otahuhu CGGT out of service
3. 250 MW of generation at Huntly, large capacitor out of service
4. Low generation at Huntly
5. Low generation at Huntly, Otahuhu CCGT out of service
6. Very low generation at Huntly
7. No generation at Huntly or Otahuhu CCGT

- arranged for additional metrological information including the 'Heat Index' to be made available
- oversaw the publication of weekly summary reports of actual conditions and real time web data.

(b) **Options**

Members

Carmen Blackler	Contact Energy (Lead)
Ashley Wall	Genesis
Jon Spiller	Meridian
Peter Yeung	Vector
Steve Batstone	Mighty River Power
John Clarke	Transpower
Dave Boyle	Transpower

Details

- identified possible options to enhance the ability to supply demand without interruption
- developed the list of options and benefits for different limits
- ranked options according to the ability of each to meet the overall objective
- provided a summary recommendation back to the group

(c) **Contingency Planning**

Members

Andrew Twaddle	Transpower (Lead)
Ajay Anand	Top Energy
Boyd Brinsdon	Contact Energy
Bryan Dobson	Mighty River Power
Calvin Whaley	Northpower
Derek Todd	Counties Power
Dick Whitelaw	Bluescope Steel
Graham Petrie	Vector
Jon Spiller	Meridian Energy
Peter Osborne	Genesis Energy
Pieter De Bruin	Transfield
Ray Basher	Transpower
Geoff Wishart	Transpower
James Collinson-Smith	Transpower
Brendan Olsen	Transpower

Details

- developed the notification and management processes for various scenarios
- prepared a contingency plan for the management of each scenario with the necessary alerts
- agreed and tested the plans
- held weekly meetings to review any operational issues in the past week and forecast conditions and asset status for the week ahead.

- **Communications**

  Members

Geoff Wishart	Transpower (Lead)
Charlene White	Vector
Richard Gordon	Genesis
Gary Johnson	Contact
Brian Dobson	Mercury

  Details

  - prepared a communications plan
  - developed contingency alert process (to complement the contingency plan)
  - liaison on key messages during the Waikato River heating issue in February
  - responses to media on Waikato River heating issue.

The Industry Response Group met on five occasions using a combination of face to face and teleconference meetings. The major deliverable achieved was that the planning for all initiatives was in place by 17 December, well ahead of the mid January start of the risk period.

3. Review of Actual Conditions

(a) Plant Availability

Management of the situation during Summer 2006 was assisted by good asset availability. There were no major forced outages of generation, transmission or reactive support equipment.

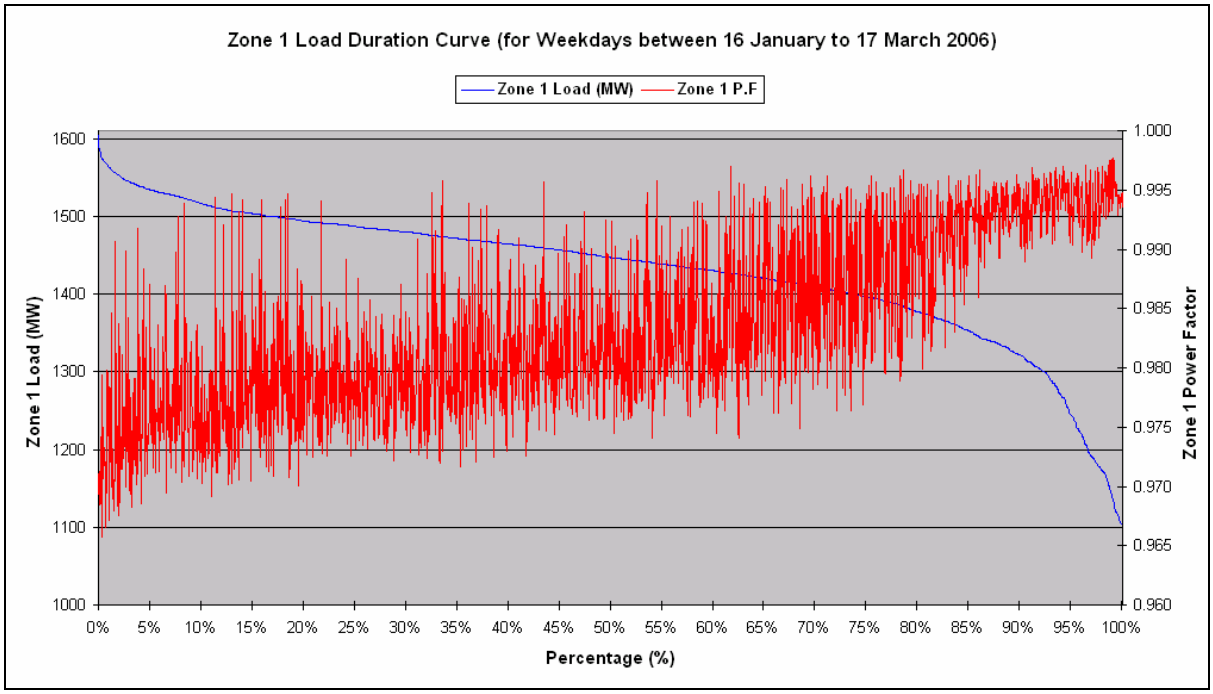
Contact Energy's Otahuhu CCGT plant was successfully returned to service in mid December 2005, following a planned maintenance shutdown. The Marsden A and third Otahuhu condensers had been procured through an ancillary service agreement, and were available for dynamic reactive support if needed.

(b) System Conditions

The system conditions and plant availability generally matched Scenario 1 throughout the summer period.

(c) Demand and Power factor

The Load Duration Curve below shows the ten minute instantaneous demand peaks for the period 16 Jan to 17 March, between 12:00 and 20:00 for weekdays, and the corresponding power factor. The time and date of the ten highest ten minute instantaneous peaks is in the table below.



Ten Highest Instantaneous Peaks		
Date	*MW*	*Power Factor*
Tue 31-Jan-2006 13:00	1604	0.97
Wed 01-Feb-2006 13:00	1588	0.97
Wed 01-Feb-2006 12:40	1588	0.97
Wed 01-Feb-2006 12:10	1586	0.97
Wed 01-Feb-2006 13:20	1582	0.97
Thu 23-Feb-2006 12:10	1579	0.97
Wed 01-Feb-2006 13:30	1577	0.97
Tue 31-Jan-2006 13:40	1574	0.97
Tue 24-Jan-2006 13:10	1574	0.98
Tue 31-Jan-2006 12:50	1573	0.97

The expected and prudent planning demand forecasts were determined as 1620 MW and 1658 MW respectively. Further details are given in the table below.

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Distributor Load Assessment	2005 Peak Load			Expected Load Growth	2006 Expected Loads			Expected Prudent Load Growth	2006 Expected Prudent Loads		
	MW	MVAr	P.F		MW	MVAr	P.F		MW	MVAr	P.F
Counties	192	47	0.97	1.80%	195	48	0.97	3.6% @ GLN 3.5% @ BOB	199	49	0.97
Northpower	115	40	0.95	5.60%	122	42	0.95	7.60%	124	43	0.95
Top Energy	35	14	0.93	2.50%	36	14	0.93	2.50%	36	14	0.93
Vector (Auckland Network)	856	233	0.96	6%	907	247	0.96	8.70%	930	253	0.96
Vector (Northern Network)	339	95	0.96	6%	360	101	0.96	8.70%	369	103	0.96
Total	**1538**	**429**	**0.96**	**5.30%**	**1620**	**452**	**0.96**	**7.80%**	**1658**	**462**	**0.96**

The observed peak load within the risk period was 1604 MW at a power factor of 0.97, this was 16 MW below the expected peak load of 1620 MW at a power factor of 0.96, and 54 MW below the prudent planning forecast level of 1658 MW at a power factor of 0.96.

(d) Climate and Temperature

In January temperatures were above average in the East and North of the North Island. A mixed pattern of rainfall occurred over New Zealand with relatively high totals in parts of Northland, Bay of Plenty, Taupo and the Hawkes's Bay.

In February rainfall was 25 % of normal or less throughout much of Northland and Auckland. Mean temperatures were above average in parts of Auckland. Normal to above normal hydro catchment inflows occurred across the rest of the North Island.

4. Conclusions

(a) General Comments

The general view of both the Industry Response Group and System Operator is that the objectives and planning approach adopted for summer 2006 were appropriate.

The situation was managed successfully for the duration of the risk period, from mid January to mid March. The commissioning of the Huntly cooling tower played a major role in allowing higher levels of Huntly generation than might have otherwise been achieved.

The objective of minimising the impact on end use consumers was met without the need for involuntary demand shedding**.** The industry-based work stream process worked well. The review of options and the provision of real time web data were both useful initiatives.

Two related issues that would benefit from wider consideration with the industry are:

- how availibility of additional demand response mechanisms that could aid management of tight supply situations can be incorporated into the wholesale market and common quality provisions of the rules

- how to incentivise more commercial and industrial end users in the upper North Island to make standby generation available as a viable initiative to cover short term shortfall and emergency situations.

(b) Outlook for Summer 2007

The new cooling towers at Huntly power station have reduced the number of credible scenarios that need to be considered, as firm generation at Huntly makes the low, and no Huntly generation scenarios very unlikely.

The power factor trend from summer 2006 suggests the assumed power factor in planning for 2007 could be raised from 0.965 to 0.97. This will need to be reviewed as being a mild summer this may have reduced the air conditioning load.

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The commissioning of 200 MVAr's of capacitors on the 110 kV bus at Hepburn Road and Penrose in early 2006 will provide additional reactive support, and some redundancy against reactive plant failure for summer 2007.

The procurement of Marsden condenser and the Otahuhu third condenser on long term ancillary service agreements has reduced the need to make short term procurement arrangements for additional dynamic reactive support over the summer months.

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