Upper North Island Security

Summer 10/11 Planning Update

10th December 2010

SYSTEM OPERATOR

UNI Forum

- Purpose
  - Update UNI participants on information and studies completed to date for Summer 10/11.
- Approach
  - Gathered information about summer security issues for Upper North Island.
  - Assumptions made for peak load, power factor, and regional generation availability.
  - Voltage stability limits reviewed across a range of scenarios with currently available information, limits indicative only.
  - Determine whether a contingency plan is required.

Summer 10/11 – Scenarios Studied

- Potential scenarios considered for Summer 10/11:
  - All equipment in service
  - Outage of a Huntly 250 MW Unit
  - Outage of Huntly Unit 5
  - Outage of Otahuhu B
  - Outage of Otahuhu B and a Huntly 250 MW Unit

Scenario	Huntly Units 2, 4 and 6	Huntly Unit 5	Otahuhu B
1	2 x 250 MW @ 121 MVAr 1 x 50 MW @ 38 MVAr	1 x 405 MW @ 200 MVAr	1 x 395 MW @ 202 MVAr
2	1 x 250 MW @ 121 MVAr 1 x 50 MW @ 38 MVAr	1 x 405 MW @ 200 MVAr	1 x 395 MW @ 202 MVAr
3	2 x 250 MW @ 121 MVAr 1 x 50 MW @ 38 MVAr	Out	1 x 395 MW @ 202 MVAr
4	2 x 250 MW @ 121 MVAr 1 x 50 MW @ 38 MVAr	1 x 405 MW @ 200 MVAr	Out
5	1 x 250 MW @ 121 MVAr 1 x 50 MW @ 38 MVAr	1 x 405 MW @ 200 MVAr	Out

Summer 10/11 – Assumptions

- Generation:
  - Southdown = 120 MW from 3 units.
  - Glenbrook = 55 MW.
  - Ngawha = 15 MW.
  - Waikato Block = 600 MW.

Summer 10/11 – Assumptions

- Load:

	2010	2011	*%growth*	2011	*%growth*
	Peak Actual* (MW)	Expected (MW)	*from 2010 Actual*	Prudent (MW)	*from 2010 Actual*
Counties Power	44.8	76.0	*69.6%*	78.9	*76.1%*
WEL Networks	6.3	8.1	*28.6%*	8.9	*41.3%*
Northpower	125.3	150.0	*19.7%*	155.0	*23.7%*
NZ Steel	131.5	137.0	*4.2%*	137.0	*4.2%*
Top Energy	47.7	52.8	*10.7%*	59.3	*24.3%*
Vector	1262.1	1295.0	*2.6%*	1355.0	*7.4%*
Total Zone 1	**1617.7**	**1718.9**	*6.3%*	**1794.1**	*10.9%*

- No load control assumed.
- 2010 UNI Peak recorded on 25 February at 09:30.
- 2011 Expected/Prudent network loads supplied by distributors.
- * Actual peaks as recorded concurrent to the Zone 1 2010 peak – individual peaks for network companies is likely to be higher.

Summer 10/11 – Assumptions

- Zone 1 peak power factor of 0.970
- Albany dynamic reactive support
  - SVC: -100/+100 MVAr capacity
- Otahuhu Syn. Condensers
  - SC 1: -29/+52 MVAr capacity
  - SC 5: -29/+33 MVAr capacity
  - SC 6: -29/+33 MVAr capacity
- HVDC = 200 MW North
- Rest of the North Island modelled for GZ loads as per summer peak

Summer 10/11 – Outages

- Notified generator outages (as per POCP 10/12/10)

POCP Gener

starting:

Outage Block	MW Loss	Dec-2010																													Jan-2011																										
		Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
HLY4	243																																																								
OTC_Stn	365																																																									
HLY3	243																																																								
HLY6	50																																																								
HLY4	243																																																								
HLY3	243																																																								
HLY1	243																																																								
OTC_Stn	365																																																								

POCP Gener

starting:

Outage Block	MW Loss	Feb-2011																													Mar-2011																										
		Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
HLY3	243																																																								
HLY1	243																																																								
TCC_1	350																																																								

Summer 10/11 – Outages

- Notified transmission outages (as per POCP 10/12/10) to be managed through the normal outage planning process.

Outage Block	Start	End	Type	Planning Status
DRY_GLN_1	11/02/2011 07:30	11/02/2011 17:00	daily	Confirmed
DRY_GLN_2	13/01/2011 07:30	13/01/2011 17:00	daily	Confirmed
	16/03/2011 07:00	16/03/2011 21:00	daily	Tentative
	18/03/2011 07:00	18/03/2011 21:00	daily	Tentative
	23/03/2011 07:30	23/03/2011 21:00	daily	Tentative
	25/03/2011 07:00	25/03/2011 21:00	daily	Tentative
DRY_HLY_1	30/03/2011 07:00	30/03/2011 18:00	daily	Tentative
DRY_OTA_1	16/03/2011 07:00	16/03/2011 21:00	daily	Tentative
	18/03/2011 07:00	18/03/2011 18:00	daily	Tentative
	23/03/2011 07:30	23/03/2011 21:00	daily	Tentative
	25/03/2011 07:00	25/03/2011 21:00	daily	Tentative
HAM_OHW_1	10/03/2011 07:00	12/03/2011 18:00	daily	Tentative
HAM_WKM_1	1/02/2011 07:00	3/02/2011 18:00	daily	Tentative
	7/03/2011 07:00	9/03/2011 18:00	daily	Tentative
HLY_OHW_1	2/03/2011 07:00	2/03/2011 18:00	daily	Tentative
HLY_OHW_2	3/03/2011 07:30	3/03/2011 17:30	daily	Tentative
HLY_OTA_2	15/03/2011 07:00	15/03/2011 21:00	daily	Tentative
	22/03/2011 07:00	22/03/2011 21:00	daily	Tentative
	24/03/2011 07:00	24/03/2011 21:00	daily	Tentative
	28/03/2011 07:30	29/03/2011 17:30	daily	Tentative
HLY_SFD_1	15/03/2011 07:00	16/03/2011 18:00	daily	Tentative
HLY_TWH_1	17/03/2011 07:00	17/03/2011 18:00	daily	Tentative
OHW_OTA_1	7/02/2011 08:00	8/02/2011 17:30	daily	Confirmed
OHW_WKM_1	8/01/2011 06:00	9/01/2011 18:00	continuous	Confirmed
	1/03/2011 07:00	2/03/2011 18:00	daily	Tentative
OTA_SWN_1	8/01/2011 07:30	8/01/2011 20:00	daily	Confirmed
	9/01/2011 07:30	13/01/2011 18:00	daily	Confirmed
OTA_WKM_1	20/02/2011 07:00	21/02/2011 18:00	daily	Tentative
OTA_WKM_2	22/02/2011 07:00	25/02/2011 18:00	continuous	Tentative

Summer 10/11 – Stability Limits

- Zone 1 voltage stability limits calculated with currently available information

Scenario	Power Factor	N-1 Stability Limit	
		Contingency	UNI Load Limit (MW)
1	0.970	Otahuhu B	2219
2	0.970	Otahuhu B	2104
3	0.970	Otahuhu B	2064
4	0.970	Huntly Unit 5	2059
5	0.970	Huntly Unit 5	1934

➢ Approximately 35 MW of additional benefit if another OTA SC is run.

Summer 10/11 – Summary

- With currently available information studies show that UNI peak summer demand can be met with all available plant in service

- Based on margins available no current requirements for:
  - NIWA report
  - UNI Contingency plan

- Will be re-assessed if situation changes:
  - Unexpected outages on generators
  - Unexpected outages on transmission plant

- Next update:
  - Reconvene if any generation/transmission issues arise