System Performance Report
To the Electricity Commission
September 2010

Purpose

This System Performance Report summarises power system performance each month. The detailed reporting of system events is intended to provide an understanding of the nature of system events that occur in the normal course of the real time co-ordination of security and to identify emerging issues in system operation.

SYSTEM OPERATOR

TRANSPOWER

Keeping the energy flowing

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1. Summary of System Performance

This system performance report covers the month of September 2010.

Principal Performance Obligations

- The System Operator met the Principal Performance Obligations during the reporting period.

Operational Management

A very busy month in NCC. This is the time of the year when planned outages are at their lowest but weather can play its hand in maintaining co-ordination workloads. September presented many and almost continuous challenges.

- The first amongst them was the Canterbury earthquake on 4th September. This was managed without great difficulty, given the fact few Transpower assets were badly affected and service restored well ahead of the ability of Orion and Main Power to restore within their distribution networks. Transpower lost approximately 200MW initially and a subsequent 36MW when ISL_PAP was removed from service to allow an urgent repair. The Operational Emergency Room was manned, though mainly to enable support to be arranged should the need have arisen (it did not) and to assist with asset restoration. Use of the OER assisted management of communications during the event, but was wound down before 9.00am the morning of the quake.

- NCC faced continuing problems from the very high lake and river levels affecting the Waikato generator chain. Regular, sustained and ongoing real time and contingency concerns regularly arose on the HAM-WKM and KIN-TRK circuits. Low energy prices (arising from the need to generate in the Waikato) affected generation offers north of Hamilton resulting, at times, in low levels of offered as well as dispatched generation in the Auckland region. More particularly, in both real and study times contingency analysis has been showing that a contingency of the HAM-WKM circuit would overload the KIN-TRK circuit. This contingency was resolved from time to time by limiting the generation out of ARI (an undesirable result) and by declaring Grid Emergencies on a regular basis to allow grid reconfiguration to manage the risk.

- A further consequence of the high NI water levels and abundant, low priced overnight generation offers was the need to constrain wind generation off or down on several occasions. On at least two occasions all NI wind was dispatched off entirely, in order to keep Huntly U5 on (for morning peak availability). Wind generation was constrained back on two occasions.

- On the 17th and 18th a significant storm event affected transmission assets across the NI and the West Coast of the SI with numerous trippings.

System Events

On 4th September at 04:36 a magnitude 7.1 earthquake with a focal depth of 10 km occurred centred near Darfield in Canterbury. Multiple feeder and transformer trippings occurred with approximately 266 MW of load being lost in a 60 sec period. The South Island frequency experienced a momentary rise to 50.93 Hz as a result.

Stratford generation tripped on 6th September resulting in a momentary drop in frequency in the North Island to 49.41 Hz.

50 kV Te Kaha – Waiotahi Circuit 1 tripped on 17th September at 06:01 resulting in a loss of supply to Te Kaha. Supply was restored after 560 minutes.

50 kV Te Kaha – Waiotahi Circuit 1 tripped on 17th September at 20:36 resulting in a loss of supply to Te Kaha. Supply was restored after 1390 minutes.

Other noteworthy events occurring during the reporting period:

- Wairakei generator G4 and Ohaaki generator G2 tripped on 1st September;
- Wairakei generator G1 tripped on 2nd September;

- On 3rd September at 17:39, 110 kV Central Park – West Wind – Wilton Circuit 3 tripped and auto-reclosed resulting in the loss of approximately 38 MW of West Wind generation;
- On 4th September at 08:49, 66 kV Cobb – Upper Takaka Circuit 1 tripped causing the operation of the Cobb Runback Scheme. Cobb generation reduced from approximately 32 MW to 19 MW as a result;
- Waipori generation and Rotokawa generation tripped on 5th September;
- Ohaaki generators G1 and G2 tripped on 7th September;
- On 8th September at 07:49 a magnitude 5.1 earthquake with a focal depth of 6 km occurred, centred south of Christchurch in Canterbury. Multiple feeder trippings occurred with approximately 97 MW of load being lost. The South Island frequency experienced a momentary rise to 50.38 Hz as a result;
- Huntly generator U6 tripped on 8th September;
- On 9th September at 23:24, 50 kV Te Kaha – Waiotahi Circuit 1 tripped on resulting in a loss of supply to Te Kaha. Supply was restored after 12 minutes.
- Wairakei generator G1 tripped on 10th September;
- On 12th September at 18:19, HVDC Pole 2 experienced a line protection operation resulting in momentary frequency and voltage fluctuations in both islands;
- Wheo generation tripped on 13th September;
- On 16th September at 13:07, 13:19, 13:31, and 13: 41, 50 kV Te Kaha – Waiotahi Circuit 1 tripped and auto-reclosed resulting in a momentary loss of supply to Te Kaha;
- On 16th September at 13:55, 50 kV Te Kaha – Waiotahi Circuit 1 tripped on resulting in a loss of supply to Te Kaha. Supply was restored after 200 minutes.
- A major storm system hit New Zealand on 17th September resulting in over fifty trippings on Transpower and Distribution companies networks in a two day period;
- Wheo generation tripped on 17th September;
- On 17th September at 15:51, 220 kV Bunnythorpe – Haywards Circuit 1 tripped and auto-reclosed. Approximately 58 MW of Tararua Wind Farm generation tripped simultaneously;
- On 18th September at 00:20, 66 kV Kumara – Otira Circuit 1 and Hokitika – Otira Circuit 2 tripped. A system split had been put in place on 66 kV Dobson – Greymouth circuit on the West Coast due to the earlier tripping of 110 kV Inangahua - Kikiwa Circuit 2, so this tripping resulted in a loss of supply to Greymouth, Hokitika, and Kumara. Supply was restored to Hokitika after 19 minutes, and Greymouth and Kumara after 23 minutes;
- On 18th September at 17:43, 66 kV Dobson – Greymouth Circuit 1 tripped, Atarau – Reefton – Inangahua Circuit 1 tripped, and auto-reclosed, and Dobson 66 / 33 kV supply transformers T1 and T1 tripped, resulting in a loss of supply to Dobson. Supply was restored after 41 minutes;
- On 20th September at 07:07, 50 kV Te Kaha – Waiotahi Circuit 1 tripped and auto-reclosed resulting in a momentary loss of supply to Te Kaha;
- On 20th September at 17:49, 110 kV Masterton – Greytown – Upper Hutt Circuit 2 tripped and auto-reclosed. The resultant voltage depression caused a commutation failure on HVDC Pole 2 and Pole 1 Valve Group 4, resulting in a widespread voltage disturbance being experienced;

- Ohaaki generators G1 and G2 tripped on 21st September;
- Waipori generation tripped on 21st September;
- On 22nd September at 11:14, 50 kV Te Kaha – Waiotahi Circuit 1 tripped and auto-reclosed resulting in a momentary loss of supply to Te Kaha;
- Kumara generation tripped on 22nd September;
- On 25th September at 00:36, Stratford generation ran back resulting in a momentary drop in North Island Frequency to 49.65 Hz;
- On 26th September at 06:16, 66 kV Dobson – Greymouth Circuit 1 and Atarau – Reefton – Dobson Circuit 1 tripped causing a loss of supply to Dobson. Supply was restored after 50 minutes;

2. PRINCIPAL PERFORMANCE OBLIGATIONS

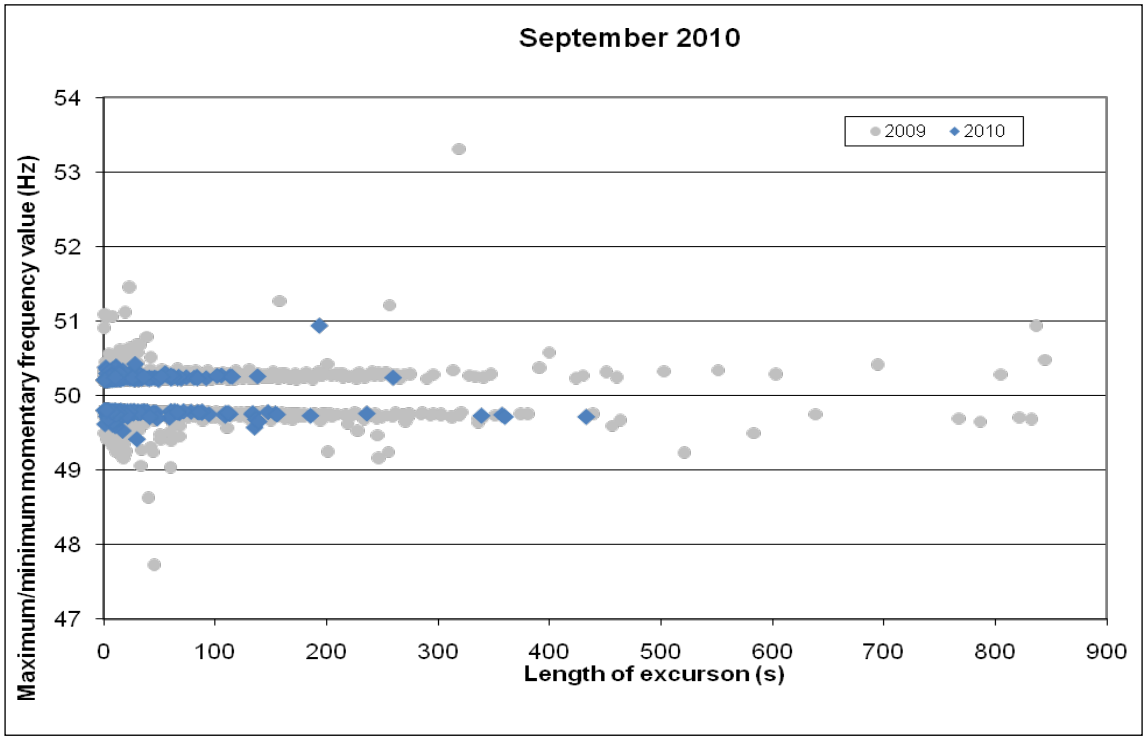
2.1 AVOID CASCADE FAILURE

No instances of cascade failure occurred during the reporting period.

2.2 FREQUENCY

Maintain frequency in normal band and recover quickly from a fluctuation

The chart below shows the maximum or minimum frequency reached and length of each frequency excursion outside the normal band (49.8 to 50.2 Hz) during the reporting period. The majority of excursions are within 0.4 Hz of the normal band and frequency typically returns to within the normal band within 2 minutes.



Manage Frequency and limit rate of occurrences during momentary fluctuations

The table below shows the total number of momentary fluctuations outside the frequency normal band, recorded in both Islands, over the last 12 months. The 12

month cumulative totals, grouped by frequency band, are compared to the frequency performance objective (PPO).

Frequency Band	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Annual rate	PPO target
55.00 >= Freq > 52.00													0	
52.00 >= Freq > 51.25	1			1						1			3	7
51.25 >= Freq > 50.50	4	1	1		2	1	2	1	1	1		1	15	50
50.50 >= Freq > 50.20	228	85	148	140	279	348	351	286	376	382	337	71	3031	
50.20 >= Freq > 49.80														
49.80 >= Freq > 49.50	152	98	134	109	278	268	367	253	281	368	291	61	2667	
49.50 >= Freq > 48.75	2		2	2	5	5	3	1	6	4	1	1	32	60
48.75 >= Freq > 48.00													0	6
48.00 >= Freq > 47.00													0	0.2
47.00 >= Freq > 45.00													0	0.2

Manage time error and eliminate time error once per day

The time error performance criteria are:

- Time error must be managed within +/- 5 seconds.
- Time error must be eliminated at least once every day.
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Time Error Compliance Table		Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
Time Error Management	NI	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
	SI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Time Error Elimination	NI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3. Operational Management

3.1 Security Notices

The following table shows the number of Warning Notices, Grid Emergency Notices, Customer Advice Notices and Demand Allocation Notices issued over the last 12 months.

Notices issued	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
Demand Allocation Notice												
Grid Emergency Notice	6		1	4	3		4	5	5	2		18
Warning Notice	3	1								1		8
Customer Advice Notice	41	16	11	18	31	16	12	20	10	17	11	9

3.2 GRID EMERGENCIES

The following table shows grid emergencies declared by the System Operator in the reporting period.

Grid Emergencies			
Date	**Time**	**Summary Details**	**Island**
04/09/10	04:35	A Grid Emergency was declared after multiple trippings caused by the Canterbury earthquake. This was necessary to prevent overloading in the Canterbury 66 kV network after the loss of all three Islington 220 / 66 kV inter-connecting transformers.	S
18/09/10	00:33	A Grid Emergency was declared to manage restoration of load after an unplanned outage of Hokitika Otira 1 and Kumara Otira 1 during a concurrent emergency outage of Dobson Greymouth 1 caused a loss of connection to Greymouth, Kumara, and Hokitika Substations.	S
06/09/10	17:10	Grid Emergencies were declared for insufficient generation offers in the Upper North Island and insufficient transmission capacity in the Waikato region. The grid was re-configured at KIN to alleviate the situation.	N
18/09/10	08:56		
20/09/10	18:42		
21/09/10	08:37		
22/09/10	07:17		
23/09/10	07:47		
24/09/10	07:54		
25/09/10	09:23		
26/09/10	08:53		
27/09/10	07:43		
28/09/10	07:43		
29/09/10	07:43		
30/09/10	07:43		

A summary of grid emergencies that have occurred in the last 12 months is shown in the following table.

Island	Region	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Total
North Island	Northland								2				1	**3**
	Auckland	1			2	1								**4**
	Zone 1				1					1				**2**
	Waikato	1		1									13	**15**
	Bay of Plenty									2				**2**
	Hawkes Bay													**0**
	Taranaki									1				**1**
	Bunnythorpe													**0**
	Wellington							1			5			**6**
	North Island (all)	4				1			2	1	3			**11**
South Island & HVDC	Nelson Marlborough													**0**
	West Coast					1		1			1		1	**4**
	Christchurch													**0**
	Canterbury												1	**1**
	Zone 3													**0**
	Otago													**0**
	Southland							1						**1**
	South Island (all)								1					**1**
	HVDC							1						**1**

3.3 Customer Advice Notices (CANs)

Nine CANs (Customer Advice Notices) were issued in the reporting period:

- Three related to the Market System auto-dispatch trial;
- One related to a new permanent winter constraint to be applied;
- Two related to potential constraints under investigation;
- Two related to planned generator testing;
- One related to a change in System Operator Policy with regard contingencies on inter-connecting transformers.

3.4 Standby Residual Check (SRC) notices

A total of one hundred and forty-one SRC notices were issued during the reporting period based on the SDS (System Operator's own load forecasting tool). These SRC notices were in respect of trading periods on 2nd – 4th, 6th – 16th, 20th – 23rd, 25th, 27th – 28th, and 30th of September.

3.5 Voltage Management

Grid voltages did not exceed the EGR voltage ranges during the reporting period. No contracted voltage support ancillary services were called upon during the reporting period.

3.6 Outage Management

The following table shows the number of outages over the last 12 months where operational measures (generation agreements, load management agreements or grid re-configurations) were required to allow the outage to proceed. Load agreements generally require the distributor to manage load at one or more grid exit points. Generation agreements are required to ensure that sufficient regional generation is available to provide energy or reactive support during the outage to maintain security standards. Grid re-configurations typically involve splitting the network during the outage to manage post contingency power flows. Security of supply is sometimes reduced by grid re-configuration.

Island	Region	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10		Total
North Island	Northland	8	24	4	1	21	16	19	7	7	2	1	1	**111**
	Auckland	7	13	8	1	2	9	4	4	1	5	3	10	**67**
	Waikato	6	7	5	2	10	12	5	19	9	3	1	3	**82**
	Bay of Plenty	4	5	2	2	11	12	8	12	6	1	10	5	**78**
	Hawkes Bay	2	3	1	3	6	2	1	6	7		2	2	**35**
	Taranaki	1	3	1	1	5	1		8	4	1			**25**
	Bunnythorpe	5	3	1	3	5	9	16	5	5	2	2	3	**59**
	Wellington	4	7	6	2	7	11	6	4	9	5	11		**72**
Total		37	65	28	15	67	72	59	65	48	19	30	24	**529**
South Island	Nelson Marlborough	5	6	2	1	5	6	6	4	4				**39**
	West Coast	2	4			2	3	3	3	3	7	9	5	**41**
	Christchurch	4	3	4	2	1	2		3				1	**20**
	Canterbury	3	3			2	6	4		5	3			**26**
	Otago	5	2		3		2	4		4	6	7		**33**
	Southland	10	4	2	2	6	4	2	3		3	3	1	**40**
Total		29	22	8	8	16	23	19	13	16	19	19	7	**199**

3.7 CONSTRAINTS

SUMMARY: Security constraints binding during the month

The following table shows the binding constraints during the reporting period.

Additional information on security constraints can be found on the following website address: *http://www.transpower.co.nz/?id=5979*. This information includes constraint equations and a brief summary of their purpose.

Island	Region	Constraint Name	Description
North Island	Edgecumbe	KAW_T13_W_P_2	The effect of this constraint is to manage flows through Kawerau-T13 for a contingency of Edgecumbe-Owhata during low Kawerau 110kV load and high Matahina and Kawerau generation and when Edgecumbe T4 & T5 are out of service.
	Hamilton	KIN_TRK_1_W_P_1A_temp	The effect of this constraint is to manage flows through Kinleith Tarukenga 1 for a contingency of Hamilton-Whakamaru 1 when Auckland generation is low with high Auckland and Northland loads.
		KIN_TRK_1_W_P_2A	The effect of this constraint is to manage flows through Kinleith - Tarukenga 1 for a contingency of Kinleith - Tarukenga 2 during low generation at Auckland, Huntly and Arapuni with all circuits in service.
		ARI_HAM_1_and_2_ARI_RUNBACK_ENABLED_W_P_1A	The effect of this constraint is to manage flows through Arapuni-Hamilton 1 and 2 for a contingency of Arapuni-Hamilton 2 or 1 during high ARI generation. Arapuni Runback Scheme enabled.
South Island & HVDC	HVDC	DCNPole1Max	The purpose of this constraint is to limit the flow on HVDC Pole 1 to the Asset Owner's offered capability.
	Nelson	STK_UTK_1_W_O	The effect of this constraint is to manage flows through Cobb-Stoke 2 for a contingency of Motupipi-Upper Takaka when Stoke-Upper Takaka 1 is out of service, and the Cobb runback scheme is disabled.
	Southland	HWB_T4_W_O_1_z	The effect of this constraint is to manage flows through Roxburgh interconnecting transformer T10 for a contingency of Edendale-Invercargill 1 during low Southland 110 kV generation when Halfway Bush interconnecting transformer T4 is out of service whether by itself or concurrent with either a Halfway Bush - Three Mile Hill or Halfway Bush - South Dunedin circuit.
		HWB_ROX_2_W_O_z	The effect of this constraint is to mange flows through Roxburgh_T10 for a contingency of Gore-Roxburgh when Halfway Bush-Roxburgh-2 is out of service.
		ROX_T10_P_1_temp	The effect of this constraint is to manage flows through Roxburgh T10 for a contingency of Gore-Roxburgh 1 during north transfer or high ROX 110kV generation.
		INV_MAN_2_W_O_1	The effect of this constraint is to manage flows through the Invercargill - North Makarewa circuit for a contingency of either North Makarewa - Tiwai 1 or North Makarewa - Tiwai 2 circuit when the Invercargill - Manapouri circuit is out of service.

Constraints binding during last 12 months

The following table shows the binding constraints binding during the reporting period with a duration of more than 4 trading periods and those binding for more than 48 trading periods during the previous 12 months.

Island	Region	Constraint	Reporting period		Previous 12 months	
			Number of trading periods that constraint bound	Percentage of trading periods	Number of trading periods that constraint bound	Percentage of Trading periods
North Island	Edgecumbe	KAW_T13_W_P_2	5	0.35%	17	0.10%
	Hamilton	ARI_HAM_1_and_2_ARI_RUNBACK_DISABLED_S_P_1	0	0.00%	56	0.32%
		ARI_HAM_1_and_2_ARI_RUNBACK_ENABLED_S_P_1	0	0.00%	54	0.31%
		KIN_TRK_1_W_P_1A_temp	5	0.35%	1	0.01%
		ARI_HAM_1_and_2_ARI_RUNBACK_ENABLED_W_P_1A	9	0.63%	7	0.04%
South Island	Nelson	STK_UTK_1_W_O	4	0.28%	0	0.00%
	West Coast	WEST_COAST_SPLIT_O_1	0	0.00%	104	0.59%
	Otago	NSY_ROX_1_S_P_z	0	0.00%	337	1.92%
	Southland	HWB_T4_W_O_1_z	5	0.35%	2	0.01%
		HWB_ROX_2_W_O_z	12	0.83%	0	0.00%
		INV_MAN_2_W_O_1	9	0.63%	0	0.00%
	HVDC	DCNPole1Max	60	4.17%	2979	17.00%
		DCNPole1Min	0	0.00%	2070	11.82%
		BEN_HAYP1max	0	0.00%	68	0.39%

4. System Events

4.1 Significant System Events

The following table shows significant events (frequency excursions and connection point events) which occurred during the reporting period.

Significant frequency excursions

Date	Time	Summary Details	Island	Freq (Hz)
04/09/10	04:36	Magnitude 7.1 earthquake hit the Canterbury region, centred near Darfield, focal depth of 10 km. Multiple feeder and transformer trippings occurred with approximately 266 MW of load being lost in a 60 sec period.	S	50.93 Hz
06/09/10	02:51	Stratford power Limited tripped resulting in a momentary drop in frequency in both Islands.	N S	49.41 Hz 49.52 Hz

Connection point events

Date	Time	Summary Details	Generation/Load interrupted (MW)	Restoration time (minutes)
04/09/10	04:36	HOR T5 & T8 tripped during the Canterbury Earthquake, loss of supply to the HOR 33 kV GXP.	5	227
04/09/10	04:36	SPN T1 & T2 tripped during the Canterbury Earthquake, loss of supply to the SPN 33 kV GXP.	24	193
04/09/10	04:55	PAP Substation was disconnected from the grid to alleviate overloads in the network that resulted from the trippings caused by the Canterbury Earthquake.	35	213
09/09/10	23:24	Te Kaha – Waiotahi 1 tripped causing a loss of connection to Te Kaha.	1	12
16/09/10	13:55	Te Kaha – Waiotahi 1 tripped causing a loss of connection to Te Kaha.	1	200
17/09/10	06:01	Te Kaha – Waiotahi 1 tripped causing a loss of connection to Te Kaha.	1	560
17/09/10	20:36	Te Kaha – Waiotahi 1 tripped causing a loss of connection to Te Kaha.	1	1390
18/09/10	00:20	Kumara – Otira 1 & Hokitika – Otira 2 tripped causing loss of supply to Greymouth, Kumara, and Hokitika as Dobson – Greymouth was out of service.	11 7 0	19 (HKK) 23 (GYM) 23 (KUM)
18/09/10	17:43	Dobson T1, T2 tripped, loss to DOB 33 kV GXP.	5	41
26/09/10	06:16	Dobson – Greymouth 1 and Atarau – Reefton – Inangahua 1 tripped, loss of supply to Dobson.	6	50

4.2 SYSTEM EVENTS DURING REPORTING PERIOD

System events that occurred during the reporting period are summarised below:

Contingent events

Event	Number	Summary
Loss of single AC transmission circuit	31	These related to trippings of - Central Park-West Wind-Wilton 3 (Auto Reclose) - Cobb-Upper Takaka 1 - Coleridge-Otira 2 - Halfway Bush-Palmerston 2 - Halfway Bush-Roxburgh 2 x 3 (Auto Reclose once) - Woodville-Dannevirke-Waipawa 1 - Te Kaha-Waiotahi 1 x 14 (Auto Reclose 6 times) - Bunnythorpe-Haywards 1 (Auto Reclose) x 2 - Inangahua-Kikiwa 2 x 2 - Masterton-Greytown-Upper Hutt 2 (Auto Reclose) - Woodville-Dannevirke-Waipawa 2 - Brydone-Edendale 1 (Auto Reclose) - Inangahua-Robertson St-Westport 1 (Auto Reclose) - Gore-Roxburgh 1 (Auto Reclose)
Loss of HVDC pole	0	-
Loss of single generation units	15	These related to trippings of - Wairakei G4 & G1 x 2 - Ohaaki G2 - Waipori generation x 2 - Rotokawa generation - Huntly U6 - Wheao generation x 2 - Kumara generation x 2 - Stratford Power Limited x 3 (incl 2 x runbacks >150 MW) -
Total during reporting period	**46**	

Extended contingent events

Event	Number	Summary
Loss of both HVDC poles	0	

Other events

Event	Number	Summary
Loss of multiple AC transmission circuits	5	These events related to trippings of: - Edgecumbe-Kawerau 1 & 2 (Cct 2 Auto Reclose) - Kumara-Otira 1 & Hokitika-Otira 2 - Huntly-Te Kowhai & Huntly-Stratford 1 (Auto Reclose) - Atarau-Inangahua 1 (Auto Reclose) & Dobson – Greymouth 1 - Greymouth-Dobson 1 & Atarau-Dobson 1
Loss of bus bar section	0	
Loss of interconnecting transformer	1	These events related to trippings of - Islington Inter-connecting Transformers T3, T6, & T7 (as a result of the Canterbury Earthquake)
Loss of grid reactive plant	1	These events related to trippings of - Henderson C1 -
Loss of supply transformer	5	These events related to trippings of - Hororata T5 & T8, Springston T1, T2 (as a result of the Canterbury Earthquake) - Ashburton T8 - Hamilton T8 x 2 - Dobson T1 & T2
Demand change	2	These events related to trippings of - Multiple trippings in Canterbury region due to earthquakes on 4th and 8th of September.
Loss of multiple generation units	2	- Ohaaki G1 & G2 x 2 -
HVDC Start/ Stop	1	This related to trippings of - HVDC Pole 2 Line protection operation (Auto Reclose)
Total during reporting period	**20**	

Other disturbances

Event	Number	Summary
Feeder trippings	108	Various locations
Total during reporting period	**109**	

4.3 SYSTEM EVENTS – TREND

	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Total	Average Events per month
Contingent Event – transmission	22	4	12	51	20	10	15	23	17	11	13	31	229	17.8
Contingent Event – generation	14	13	15	8	10	13	13	8	14	13	20	15	156	13
Contingent Event - HVDC	15	2	1	4	7	0	0	1	1	2	1	0	34	2.8
Extended Contingent Event	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Other Event – AC transmission	1	0	1	5	0	1	0	0	2	0	2	5	17	1.1
Other Event – Busbar	0	2	1	2	1	2	1	1	1	0	1	0	12	1.1
Other Event – Demand	4	4	1	0	0	1	0	1	1	1	0	2	15	1.25
Other Event – Generation	0	1		1	0	0	2	0	2	2	0	2	10	0.8
Other Event – Interconnecting transformer	0	0	1	1	1	1	0	1	2	0	1	1	9	0.8
Other Event – Reactive plant	10	2	8	5	6	5	3	4	2	3	1	1	50	4.6
Other Event – Supply transformer	3	4	4	3	2	11	1	3	7	3	3	5	49	3.9