

**System Operator Reports**  
**April 2009**

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Performance Report**

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# System Operator Monthly Operational Performance Report to the Electricity Commission

For the month ended 30 April 2009

*This report summarises the results of the System Operator self review of its performance for the above month, as required under Regulation 45 of the EGR's. An additional Operational Update is also provided for the information of the Commission.*

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# 1 Compliance with Rule Book, Part C and Regulations:

## 1.1 Principal Performance Obligations (PPOs)

The Principal Performance Obligations (PPOs) of the System Operator are to act as a reasonable and prudent operator with the objective of meeting certain PPO outcomes. The System Operator's performance against the PPO outcomes, during the month was as follows:

PPO No	Description	PPO Outcome
2.1	Avoid cascade failure	Met
2.2.1	Maintain frequency in the normal band	Met
2.2.2	Manage frequency during momentary fluctuation	Met
2.2.3	Limit rate of occurrences of momentary fluctuations	Met
2.2.4	Recover quickly from a fluctuation	Met
2.2.5	Manage time error	Met
2.2.6	Eliminate time error once a day	Met
2.3	Maintain other standards	Met
5.0	Restoration objective	Met

## Grid Emergencies

There were eight (8) grid emergencies reported in the period.

Date	Time	Summary Details	Island
8 April 2009	07:07	A Grid Emergency was declared following the tripping of Gore-Roxburgh 1 circuit during switching to split Gore 100 kV bus. Load was removed at Gore to restore voltage at Gore to within EGR limits and Balclutha-Berwick-Halfway Bush 1 circuit to below its offered capability.	South
18 April 2009	06:29	A Grid Emergency was declared for the restoration of supply to Hangatiki, Ongarue, National Park, Ohakune, Mataroa, and Waipawa following multiple circuit and interconnecting transformer trippings in the Bunnythorpe region.	North
20 April 2009	17:58	A Grid Emergency was declared for a grid reconfiguration in Nelson-Marlborough region to manage a contingency of Cobb-Upper Takaka 1 circuit which would cause offload time violations on Stoke-Upper Takaka 1 circuit.	South
21 April 2009	06:24	A Grid Emergency was declared for a grid reconfiguration in West Coast region to manage a contingency of Atarau-Inangahua 1 circuit which would cause offload time violations on Kumara-Otira 1 circuit.	South
21 April 2009	07:23	A Grid Emergency was declared for a grid reconfiguration in Nelson-Marlborough region to manage a contingency of Cobb-Upper Takaka 1 circuit which would cause offload time violations on Stoke-Upper Takaka 1 circuit.	South
22 April 2009	07:02	A Grid Emergency was declared for a grid reconfiguration in Nelson-Marlborough region to manage a contingency of Cobb-Upper Takaka 1 circuit which would cause offload time violations on Stoke-Upper Takaka 1 circuit.	South
22 April 2009	07:46	A Grid Emergency was declared at Balclutha following an unplanned outage of Balclutha T2 supply transformer to manage Balclutha T1 supply transformer loading.	South
28 April 2009	07:33	A Grid Emergency was declared for a grid reconfiguration at Mangamaire due to overloading of Wilton T8 interconnecting transformer and to manage a contingency of Haywards-Linton 1 circuit which would cause offload time violations on Mangamaire-Woodville 1 circuit.	North

## 1.2 System Events

There were eight (8) system events (frequency excursions) during the reporting period:

Significant Frequency excursions				
Date	Time	Summary Details	Island	Freq (Hz)
7 April 2009	09:15	Huntly Unit 2 tripped causing an under frequency excursion in the North Island	North	49.24
15 April 2009	09:50	Huntly Unit 3 tripped causing an under frequency excursion in North and South Islands	North South	49.21 49.47
20 April 2009	22:26	Manapouri Unit 3 tripped causing an under frequency excursion in the South Island.	South	49.5
22 April 2009	14:15	Huntly Unit 2 tripped causing an under frequency excursion in the North Island.	North	49.4
27 April 2009	22:32	HVDC Pole 2 tripped causing momentary frequency fluctuations in both North and South Islands.	North South	48.6 to 50.4 53.0
27 April 2009	23:06	Manapouri Unit 5 tripped causing momentary frequency fluctuations in the South Island.	South	48.9 to 51.1
29 April 2009	15:13	A Tiwai potline tripped causing a momentary frequency fluctuation in the South Island.	South	51.3
29 April 2009	15:17	A Tiwai potline operation caused a momentary frequency fluctuation in the South Island.	South	49.48

## 1.3 Connection Point Events

There were two (2) connection point incidents during the reporting period.

Connection Point Events				
Date	Time	Summary Details	Generation /Load interrupted (MW)	Restoration time (minutes)
18 April 2009	06:25	A fault in the Bunnythorpe 110kV network caused multiple circuit trippings and all interconnecting transformers at Bunnythorpe, resulting in loss of load at Hangatiki, Ongarue, National Park, Ohakune, Mataroa, and Waipawa.	Approx. 43MW	Between 33 – 313 minutes with load gradually restored
28 April 2009	16:55	A fault in the Tangiwai 11 kV bus resulting in loss of load at Tangiwai.	Approx. 3 MW	217

## 1.4 System Operator Compliance with Rule Book: Part C

The System Operator self-notified four (4) Part C breaches in April 2009 for the following:

- Incorrect provision of the total allocable costs for voltage support for Contact Energy;
- Failing to select and dispatch the lowest frequency keeping offer;
- Failing to apply the correct temporary security constraint.
- Incorrect application of the DCPole1Max temporary constraint (noting that the System Operator has requested withdrawal of this breach)

## **1.5 Participant Compliance**

The System Operator notified one alleged Part C breach by another participant in April 2009 for failing to have the correct protection settings in place to support the System Operator with their PPOs.

## **1.6 Applications for Dispensations**

Nil

## **1.7 Ancillary Services**

In preparing the draft procurement plan for the period 2009/10 the System Operator invited all Participants to comment on the draft plan. The invitation to comment closes on the 15<sup>th</sup> May before being submitted to the Commission by 1 June. In preparing the draft plan the System Operator met with several of the currently contracted ancillary service agents. The invitation to comment is not the only opportunity Participants will have to comment on the draft plan as the Electricity Commission process for review of the plan will invite submissions as per the Rules (Part C Section IV: Process for procurement plan review).

The System Operator entered into a contract for the provision of black start services from Clyde Power Station.

# **2 Compliance with Rule Book: Part G**

## **2.1 System Operator Compliance**

The System Operator notified nine (9) Part G breaches during April 2009.

# **3 Recommendations for Change to EGRs and Related Matters:**

## **3.1. Rule change proposals**

The System Operator has identified an issue within Part C of the rules in relation to non-compliance during commissioning and testing. Rule 6.4 of Section III of Part C requires participants to pay any identifiable and quantifiable cost during any period of non-compliance when commissioning or testing. Such costs include the purchase of any additional ancillary services as a result.

However, there appears to be no mechanism in the rules for the Clearing Manager to be notified of the amounts or to invoice the Participant. There also appears to be no ability to exclude this amount from the allocable costs, which are paid by participants. The effect of this anomaly is that even though costs associated with non-compliance may be identified, the invoicing of such costs separately from the total ancillary services costs cannot be achieved under the current rules.

The System Operator has suggested that rule 11.1.4 of Section CIV be amended to include costs identified under rule 6.4 of section III in the allocable cost allocation and that rule 11.7.1 is also amended to provide for the Clearing Manager invoicing such amounts. The Electricity Commission has agreed to look into this matter.

### 3.2. Policy Statement Review

The draft Policy Statement is currently with the Commission for consultation.

### 3.3 Exemption applications

There were no exemption applications submitted by the System Operator in April 2009.

## 4 Operational Update:

### 4.1 Commissioning of generation assets

The following table is a summary of active, publicly disclosed commissioning projects where the System Operator is involved:

Summary of generator commissioning			
Generator name	Asset Owner	Description	Status
Nga Awa Purua	Mighty River Power	A second geothermal power station at Rotokawa	Commissioning planning.
Te Rere Hau	NZ Windfarms	A new wind farm development located in the Tararua Ranges	Commissioning activities commenced and will continue in 2009 as new turbines are connected.
West Wind	Meridian Energy	A new wind farm development located close to Wellington	First turbines were connected in early March 09. Commissioning is ongoing.
Stratford peaking plant	Contact Energy	Two 100MW gas fired peaking units to be located close to the existing Stratford power plant.	Commissioning planning.

The System Operator is also assisting with commissioning 4 queries relating to uncommitted, non-publicly disclosed new generation developments.

## 5 Conflict of Interest

Nil

## 6 Development and Resources:

### 6.1 Resources

During April, in addition to routine operations, System Operator resources were applied to:

- Continued work on market system project including shadow operations.
- Procurement Plan review.
- Security policy review - developing the scope and methodology that will be used for this review.

We expect these tasks to use all available resources until the end of May.

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## 6.2 Market Systems Project (MSP)

The System Operators expectation is now for the new systems to go-live in late June.

While we have been active in parallel running of the new and old systems, there are some performance as well as some software matters that are not acceptable to us at present and more time is required to resolve these hence the delay.

Major MSP achievements in April included:

- continued instructor-led training of the system operator staff
- delivery and deployment of new code release from AREVA
- continued data and interface setup
- testing the code release

Planned work for May includes:

- continue shadow operations
- continue testing in final go live configuration
- continue training
- gain confidence in the new system running as a shadow of the existing system

## 7 Regulation 50 (4) Statement:

In performing its role as System Operator, Transpower New Zealand Limited (Transpower) has not been materially affected by any other role or capacity Transpower has under the Electricity Governance Regulations 2003 or the Rules or under any agreement.



# System Performance Report

April 2009

## 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.

TRANSPower



SYSTEM OPERATOR

*Keeping the energy flowing*

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## Summary of System Performance

This system performance report covers the month of April 2009.

### Principal Performance Obligations

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

### Operational Management

An industry teleconference was held on 1 April the planned outage of HVDC Pole 2 on 4 April.

A HVDC Pole 1 test was successfully carried out between 28 and 29 April. The test commenced at 15:00 on 28 April and ran for approximately 24 hours, with northward transfers up to 200MW at times.

An industry briefing was held on 30 April to discuss aspects of HVDC Pole 1 operation for the coming winter. Following discussions between Transpower and its insurers, Pole 1 will be made available for Grid Emergency and Extended modes. The testing of Pole 1 will also be carried out monthly.

Industry meetings for the Upper North Island and Upper South Island were held on 30 April and 28 April respectively to review the situation over the summer period and initiate work on the coming winter. Information on demand forecast was sought from network companies to allow reviews of credible scenarios and transfer limits to be carried out.

### System Events

A tripping of HVDC Pole 2 on 27 April resulted in momentary fluctuations in frequency nationwide. The tripping was caused by a fault in the secondary wiring associated with the transformer bushing. After the replacement of the secondary wiring, Pole 2 was returned to service on 29 April. During the outage, HVDC Pole 1 ran in test mode for 24 hours and allowed limited North Island energy needs to be met by South Island generation.

A fault in the Bunnythorpe 110kV network on 18 April caused multiple circuit trippings and all interconnecting transformers at Bunnythorpe, resulting in loss of load at Hanganatiki, Ongarue, National Park, Ohakune, Mataroa, and Waipawa.

Other noteworthy events occurring during the reporting period include:

- A bus fault at Clyde on 4 April resulting in tripping of Clyde-Roxburgh 1 circuit and Clyde T7 supply transformer as well as the loss of Clyde Unit 1;
- The tripping of Huntly Unit 2 on 7 April and 22 April;
- The tripping of Gore-Roxburgh 1 circuit on 8 April during a planned switching required load management at Gore to restore voltage at Gore to within EGR limits and Balclutha-Berwick-Halfway Bush 1 circuit to below its offered capability;
- The tripping of Huntly Unit 3 on 15 April;
- The tripping of Manapouri Unit 3 on 20 April;
- The tripping of Manapouri Unit 5 on 27 April;
- A fault in the Tangiwai 11 kV bus on 28 April resulting in loss of load at Tangiwai; and
- The tripping of a Tiwai potline on 29 April.

# 1 Principal Performance Obligations

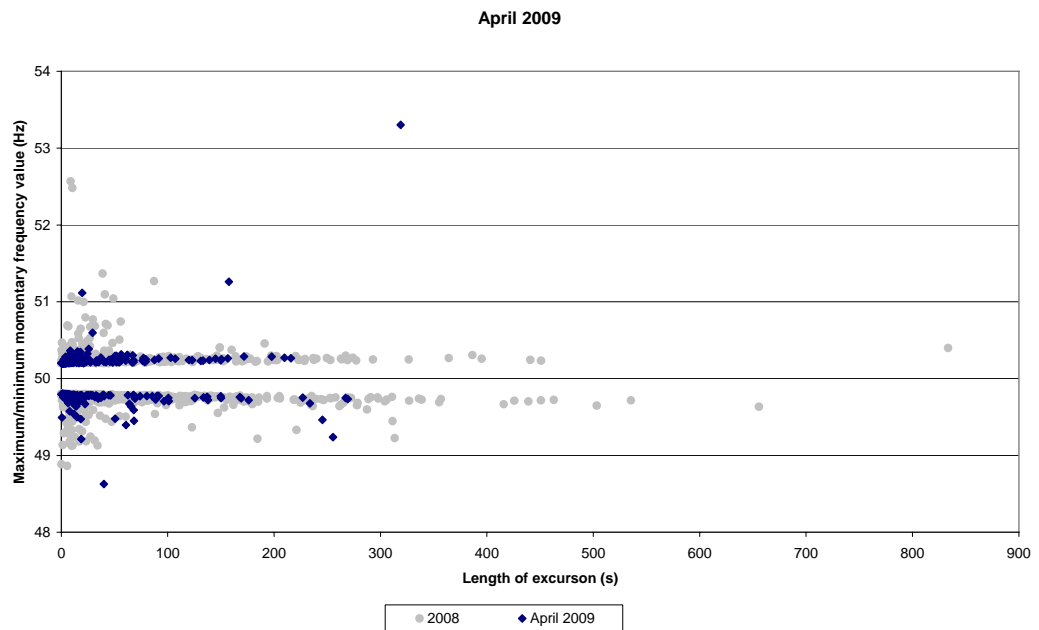
## 1.1 Avoid Cascade Failure

No instances of cascade failure resulting in loss of demand arising from frequency or voltage balances or supply and demand imbalances occurred during the reporting period.

## 1.2 Frequency

### 1.2.1 Maintain frequency in normal band and recover quickly from a fluctuation

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



### 1.2.2 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	Month												Annual rate	PPO target
	May-08	June-08	July-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	April-09		
55.00 >= Freq > 52.00												1		
52.00 >= Freq > 51.25						1	1					1	<b>3</b>	<b>7</b>
51.25 >= Freq > 50.50		3			7	1	3	1	1	1		2	<b>19</b>	<b>50</b>
50.50 >= Freq > 50.20	205	147	104	82	128	210	182	132	167	152	241	380	<b>2130</b>	
50.20 >= Freq > 49.80														
49.80 >= Freq > 49.50	200	136	122	91	138	153	170	100	144	129	114	221	<b>1718</b>	
49.50 >= Freq > 48.75	2			2	1	3	7	2	4	5	4	9	<b>39</b>	<b>60</b>
48.75 >= Freq > 48.00												1	<b>1</b>	<b>6</b>
48.00 >= Freq > 47.00													<b>0</b>	<b>0.2</b>
47.00 >= Freq > 45.00													<b>0</b>	<b>0.2</b>

Summary of number of momentary fluctuations outside the frequency normal band

### 1.2.3 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.

Time Error Compliance Table		Month											
		May-08	June-08	July-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09
Time Error Management	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
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

Summary of compliance against time error criteria over the last 12 months

## 2 Operational Management

### 2.1 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	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09
Demand Allocation Notice												
Grid Emergency Notice	3	2	1						1	1	4	8
Warning Notice	4				1	2						4
Customer Advice Notice	8		8	9	11	11	3	4	2		3	19

### 2.2 Grid Emergencies

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

Date	Time	Summary Details	Island
8 April 2009	07:07	A Grid Emergency was declared following the tripping of Gore-Roxburgh 1 circuit during switching to split Gore 100 kV bus. Load was removed at Gore to restore voltage at Gore to within EGR limits and Balclutha-Berwick-Halfway Bush 1 circuit to below its offered capability.	South
18 April 2009	06:29	A Grid Emergency was declared for the restoration of supply to Hangatiki, Ongarue, National Park, Ohakune, Mataroa, and Waipawa following multiple circuit and interconnecting transformer trippings in the Bunnythorpe region.	North
20 April 2009	17:58	A Grid Emergency was declared for a grid reconfiguration in Nelson-Marlborough region to manage a contingency of Cobb-Upper Takaka 1 circuit which would cause offload time violations on Stoke-Upper Takaka 1 circuit.	South
21 April 2009	06:24	A Grid Emergency was declared for a grid reconfiguration in West Coast region to manage a contingency of Atarau-Inangahua 1 circuit which would cause offload time violations on Kumara-Otira 1 circuit.	South
21 April 2009	07:23	A Grid Emergency was declared for a grid reconfiguration in Nelson-Marlborough region to manage a contingency of Cobb-Upper Takaka 1 circuit which would cause offload time violations on Stoke-Upper Takaka 1 circuit.	South
22 April 2009	07:02	A Grid Emergency was declared for a grid reconfiguration in Nelson-Marlborough region to manage a contingency of Cobb-Upper Takaka 1 circuit which would cause offload time violations on Stoke-Upper Takaka 1 circuit.	South
22 April 2009	07:46	A Grid Emergency was declared at Balclutha following an unplanned outage of Balclutha T2 supply transformer to manage Balclutha T1 supply transformer loading.	South
28 April 2009	07:33	A Grid Emergency was declared for a grid reconfiguration at Mangamaire due to overloading of Wilton T8 interconnecting transformer and to manage a	North

Date	Time	Summary Details	Island
		contingency of Haywards-Linton 1 circuit which would cause offload time violations on Mangamaire-Woodville 1 circuit.	

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

Island	Region	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	Total
North Island	Northland													0
	Auckland	1	1								1			3
	Zone 1													0
	Waikato													0
	Bay of Plenty											1		1
	Hawkes Bay													0
	Taranaki													0
	Bunnythorpe											1	1	2
	Wellington									1			1	2
	North Island (all)													0
	South Island & HVDC	Nelson Marlborough		1									1	3
West Coast		1											1	2
Christchurch														0
Canterbury		1		1								1		3
Zone 3														0
Otago														0
Southland													2	2
South Island (all)														0
HVDC														0

### 2.3 Customer Advice Notices (CANs)

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

- eleven advising of the unplanned outage on HVDC Pole 2 on 27 April 2009;
- two advising of the planned outage on Invercargill-Manapouri 2 and Manapouri-North Makarewa 3 circuits on 27 April 2009;
- two advising that HVDC pole 1 would be available for operation during Grid Emergencies, and inviting stakeholders to a meeting on 30 April 2009 to discuss aspects of its operation; and
- four advising of the planned outage on HVDC Pole 2 on 4 April 2009

### 2.4 Standby Residual Check (SRC) notices

Thirty five SRC notices were issued during the reporting period. SRC notices reported here are those issued based on the SDS (System Operator's own load forecasting tool). Other SRC notices were issued based on the PDS (based on participants demand bids), these notices are not summarised below.

The SRC notices applied to trading periods on the following days: 7, 16, 19, 21, 22, 23, 29 and 30 April. The SRC notices identified energy and capacity shortfalls in the North Island. A Capacity Shortfall indicates that there would be insufficient generation and reserve offers remaining after the tripping of the largest risk

(Generator or HVDC Pole) to restore reserves for a subsequent event within 30 minutes. An Energy Shortfall indicates that there would be insufficient generation remaining after the tripping of the largest risk (Generator or HVDC Pole) to release reserves after the event and that the unplanned disconnection of demand would likely be required following the loss of the largest risk.

## 2.5 Voltage Management

Grid voltages did not exceed the EGR voltage ranges during the reporting period. There were some occasions when post contingency voltages could have exceeded the grid voltage range (had the contingency occurred) but these were managed through re-dispatch of generation and reactive devices.

Generation at Cobb was constrained on to meet voltage quality targets this month.

No contracted voltage support ancillary services were called upon during the reporting period. This is expected for this time of year.

## 2.6 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	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	Total
North Island	Northland	4	7	6	8	11	36
	Auckland	4	6	7	10	3	30
	Waikato	2	0	5	3	3	13
	Bay of Plenty	3	2	1	1	5	12
	Hawkes Bay	0	6	3	1	5	15
	Taranaki	0	5	1	1	2	9
	Bunnythorpe	8	1	5	4	10	28
	Wellington	6	6	9	3	2	26
Total		27	33	37	31	41	169
South Island	Nelson Marlborough	3	4	6	6	4	23
	West Coast	3	5	2	6	2	18
	Christchurch	2	0	4	1	5	12
	Canterbury	1	0	0	1	4	6
	Otago	2	9	7	3	2	23
	Southland	3	7	5	7	5	27
Total		14	25	24	24	22	109

*Outages where operational measures were required to allow the outage to proceed – data will be filled in over time*



## 2.7 Constraints

### 2.7.1 Summary: Security Constraints Binding During the Month

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

Island	Region	Constraint Name	Description
North Island	Hawkes Bay	FHL_RDF_1&2_S_P_1_z	The effect of this constraint is to manage flows through Fernhill-Redclyffe 2 for a contingency of Fernhill-Redclyffe 1 during low Tuai generation and high Hawkes Bay load.
	Bunynthorpe	FHL_RDF_1&2_S_P_1_z	The effect of this constraint is to manage flows through Fernhill-Redclyffe 2 for a contingency of Fernhill-Redclyffe 1 during low Tuai generation and high Hawkes Bay load.
		FHL_RDF_1&FHL_RDF_2_S_O_1_z	The effect of this constraint is to manage flows through Redclyffe-Tuai 2 for a contingency of Redclyffe-Tuai 1 during low Tuai generation and high Hawkes Bay load when Fernhill-Redclyffe 1 and 2 are out of service.
		FHL_RDF_2_S_O_z	The effect of this constraint is to manage flow through Redclyffe to Fernhill 1 for a contingency of either Redclyffe - Tuai circuit during low Tuai generation when Redclyffe - Fernhill 2 is out of service.
		FHL_RDF_1_S_O_z	The effect of this constraint is to manage flow through Redclyffe to Fernhill 2 for a contingency of either Redclyffe - Tuai circuit during low Tuai generation when Redclyffe - Fernhill 1 is out of service.
Wellington	WIL_T8.T8	The purpose of this constraint is to limit the flow on Wilton T8 interconnecting transformer to the Asset Owner's offered capability	
South Island & HVDC	Nelson Marlborough	ISL_KIK_3_TO_P_SOUTH_ISL_AND_STABILIT_Y_O_1_z	The effect of this constraint is to manage flows through the Islington-Kikiwa-1 and 2 circuits for a contingency of either of the two circuits. This is to ensure that voltage stability limits are not exceeded during periods when the load at the Top of the
		STK_UTK_1_S_P	The effect of this constraint is to manage flows through STK_UTK_1 for a contingency of COB_STK_2 during low COB generation.
	West Coast	WEST_COAST_SPLIT_O_1	The effect of this constraint is manage voltage stability on the West Coast during low West Coast generation and high West Coast load when one of the following is out of service: Greymouth-Kumara, Dobson-Greymouth, Atarau-Dobson or Atarau-Reefton-Inangahu
	Otago	NSY_ROX_1_S_P_z	The effect of this constraint is to manage flows through Naseby-Roxburgh-1 for a contingency of Clyde-Twizel-1 during high Southland generation when all circuits are in service
	Southland	EDN_INV_1_S_P_1	The effect of this constraint is to manage flows through Edendale Invercargill 1 for a contingency of Gore Roxburgh 1 during periods of low Waipori generation when all circuits are in service
		MAN_TWO_220KVCT_S_O_z	The effect of this constraint is to manage flows through Manapouri-North Makarewa 1, 2 & 3 and Invercargill-Manapouri when two 220kV circuits out of Manapouri are out of service.
	HVDC	BEN_HAY1.1	The purpose of this constraint is to limit the flow on HVDC Pole 1 to the Asset Owner's offered capability
BENtoHAY_Transfer_Limit		The purpose of this constraint is to limit the flow on HVDC from Benmore to Haywards to the Assesst Owner offered capability.	

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.

### 2.7.2 Constraints binding during last 12 months

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

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	Hawkes Bay	FHL_RDF_1&2_S_P_1_z	0	0.00%	1	0.01%
	Bunnythorpe	BPE_TKU_1&2_W_P_2 of2	0	0.00%	3	0.02%
		MGM_MST_1_or_MGM_WDV_1_WELLINGTON_STABILITY_O_1_z	4	0.28%	0	0.00%
South Island & HVDC	Nelson Marlborough	STK_UTK_1_S_P	0	0.00%	3	0.02%
	West Coast	WEST_COAST_SPLIT_O_1	0	0.00%	3	0.02%
		West_Coast_Split_S_O_1	0	0.00%	10	0.06%
	Otago	NSY_ROX_1_S_P_z	0	0.00%	37	0.21%
		NSY_ROX_1_W_P_1_z	0	0.00%	126	0.72%
		LIV_WTK_1_W_P_2A	0	0.00%	12	0.07%
		CYD_TWZ_1_S_O_1_z	0	0.00%	1	0.01%
	Southland	BWK_HWB_S_O_z	0	0.00%	6	0.03%
HVDC	BEN_HAY2.1	0	0.00%	12	0.07%	

## 3 System Events

### 3.1 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)
7 April 2009	09:15	Huntly Unit 2 tripped causing an under frequency excursion in the North Island	North	49.24
15 April 2009	09:50	Huntly Unit 3 tripped causing an under frequency excursion in North and South Islands	North South	49.21 49.47
20 April 2009	22:26	Manapouri Unit 3 tripped causing an under frequency excursion in the South Island.	South	49.5
22 April 2009	14:15	Huntly Unit 2 tripped causing an under frequency excursion in the North Island.	North	49.4
27 April 2009	22:32	HVDC Pole 2 tripped causing momentary frequency fluctuations in both North and South Islands.	North South	48.6 to 50.4 53.0
27 April 2009	23:06	Manapouri Unit 5 tripped causing momentary frequency fluctuations in the South Island.	South	48.9 to 51.1
29 April 2009	15:13	A Tiwai potline tripped causing a momentary frequency fluctuation in the South Island.	South	51.3
29 April 2009	15:17	A Tiwai potline operation caused a momentary frequency fluctuation in the South Island.	South	49.48
Connection Point Events				
Date	Time	Summary Details	Generation/ Load interrupted (MW)	Restoration time (minutes)
18 April 2009	06:25	A fault in the Bunnythorpe 110kV network caused multiple circuit trippings and all interconnecting transformers at Bunnythorpe, resulting in loss of load at Hangatiki, Ongarue, National Park, Ohakune, Mataroa, and Waipawa.	Approx. 43MW	Between 33 – 313 minutes with load gradually restored
28 April 2009	16:55	A fault in the Tangiwai 11 kV bus resulting in loss of load at Tangiwai.	Approx. 3 MW	217

### 3.2 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	23	These related to loss of <ul style="list-style-type: none"> <li>• Halfway Bush-Roxburgh 1(Successful Auto Reclose) (x2);</li> <li>• Arapuni-Bombay 1;</li> <li>• Bombay-Otahuhu 2 (Successful Auto Reclose);</li> <li>• Gore-Roxburgh 1;</li> <li>• Woodville-Dannevirke-Waipawa 2;</li> <li>• Hawera-Stratford 1;</li> <li>• Bunnythorpe-Tokaanu 2 (Successful Auto Reclose);</li> <li>• Te Kaha-Waiotahi 1 (x5, 2x Successful Auto Reclose);</li> <li>• Hokitika-Otira 1 (x2);</li> <li>• Gisborne-Tuai 2;</li> <li>• Hokitika-Otira 2 (x4);</li> <li>• Tekapo A-Timaru 1;</li> <li>• Atarau-Reefton-Inangahua 1;</li> <li>• Halfway Bush-Palmerston 1.</li> </ul>
Loss of HVDC pole	1	This related to loss of <ul style="list-style-type: none"> <li>• HVDC Pole 2</li> </ul>

Contingent Events		
Loss of single generation units	8	These related to loss of <ul style="list-style-type: none"> <li>• Manapouri G5;</li> <li>• Huntly U2 (x3);</li> <li>• Manapouri G3;</li> <li>• Huntly U3 (x2);</li> <li>• Poihipi G1.</li> </ul>
Total during reporting period	32	

Extended Contingent Events		
Event	Number	Summary
Loss of both HVDC poles	0	

Other Events		
Event	Number	Summary
Loss of multiple AC transmission circuits	2	These related to trippings of <ul style="list-style-type: none"> <li>• Inangahua-Murchison-Kikiwa 1 and Inangahua-Robertson St-Westport 2;</li> <li>• Bunnythorpe-Mataroa 1, Ohakune-Ongarue 1, Arapuni-Hangatiki-Ongarue 1, Arapuni-Hangatiki, Mataroa-Ohakune 1, Bunnythorpe T1, Bunnythorpe T2 and Bunnythorpe T3.</li> </ul>
Loss of bus bar section	2	These events related to bus trippings of <ul style="list-style-type: none"> <li>• Clyde bus A;</li> <li>• Tangiwai 11 kV.</li> </ul>
Loss of interconnecting transformer	0	
Loss of grid reactive plant	9	These events related to trippings of <ul style="list-style-type: none"> <li>• Otahuhu C11 (x2);</li> <li>• Penrose C1 (x3);</li> <li>• Otahuhu GT1;</li> <li>• Islington SVC;</li> <li>• Islington synchronous condensers 4 and 5;</li> <li>• Islington C15.</li> </ul>
Loss of supply transformer	3	These events related to trippings of <ul style="list-style-type: none"> <li>• Motunui T3;</li> <li>• Motueka T5;</li> <li>• Balclutha T2.</li> </ul>
Demand change	4	These events related to trippings of <ul style="list-style-type: none"> <li>• Tiwai potline (x4).</li> </ul>
Loss of multiple generation units	0	
HVDC Start/ Stop	0	
Total during reporting period	20	

Other disturbances		
Event	Number	Summary
Feeder trippings	36	Various locations
Misc.	0	
Total during reporting period	36	

### 3.3 System Events – Trend

	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	Total	Average Events per month
Contingent Event – transmission	26	36	38	6	13	25	26	17	22	19	24	23	275	22.9
Contingent Event – generation	4	4	5	1	8	16	13	5	10	7	7	8	88	7.3
Contingent Event - HVDC	0	0	3	0	1	0	1	6	0	0	0	1	12	1.0
Extended Contingent Event	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Other Event – AC transmission	1	4	2	6	2	1	2	1	3	0	1	2	25	2.1
Other Event – Busbar	2	0	1	0	1	0	3	0	1	0	3	2	13	1.1
Other Event – Demand	0	4	0	0	3	1	3	0	0	0	0	4	15	1.3
Other Event – Generation	0	0	0	1	0	0	0	0	0	1	4	0	6	0.5
Other Event – Interconnecting transformer	0	1	0	1	2	1	1	0	0	0	0	0	6	0.5
Other Event – Reactive plant	1	2	4	10	4	0	4	4	3	6	2	9	49	4.1
Other Event – Supply transformer	6	4	5	11	3	3	4	1	8	8	7	3	63	5.3

# System Operator

## Ancillary Services Procurement Report

### April 2009

#### Purpose

This Ancillary Service Procurement Report is required to be provided to the Board in accordance with the Procurement Plan – Part C Schedule C5. The report is designed to summarise the procurement of ancillary services as follows:

1. Settlement volumes, prices, costs, and administrative costs where appropriate.
2. Any issues arising with respect to cost allocation, liability and disputes.
3. Other general procurement issues to be contained within the System Operator Monthly Report provided in accordance with Regulation 45.

The System Operator expects the ancillary service procurement reporting to evolve and develop to reflect feedback from the Commission and Participants.

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### 1.1 Frequency Keeping (FK)

Frequency Keeping	Cost
Constrained Off	\$85,884.95
Constrained On	\$446,300.07
Market offer	\$2,343,715.34
<b>Total monthly frequency keeping cost</b>	<b>\$2,875,900.36</b>

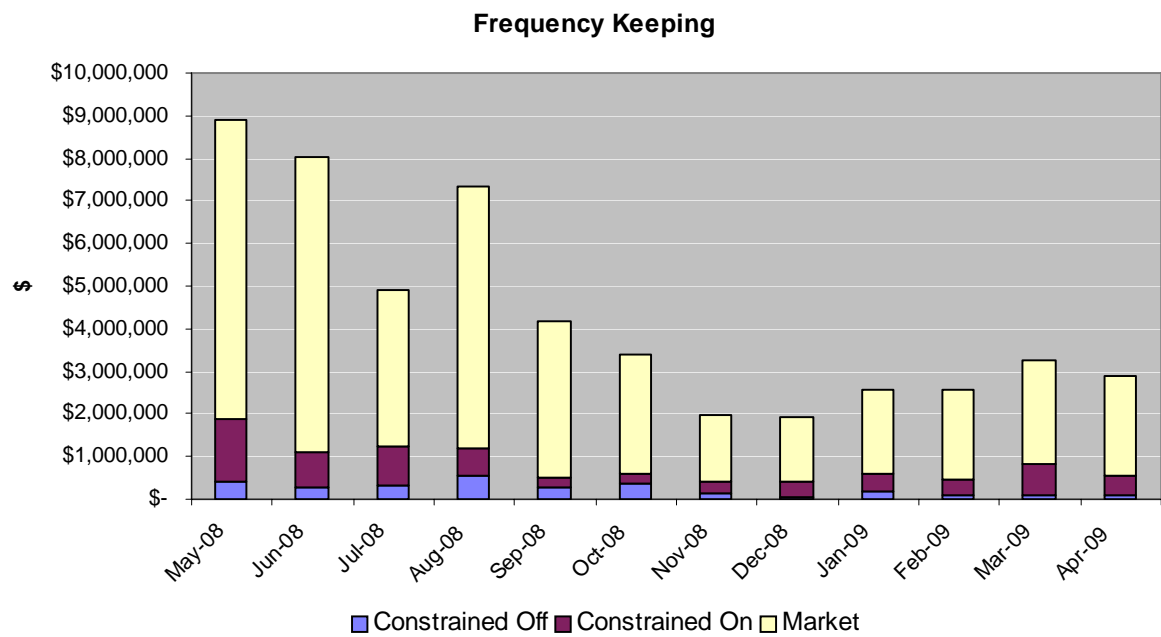


Chart 1.1(a): FK costs – 12 months

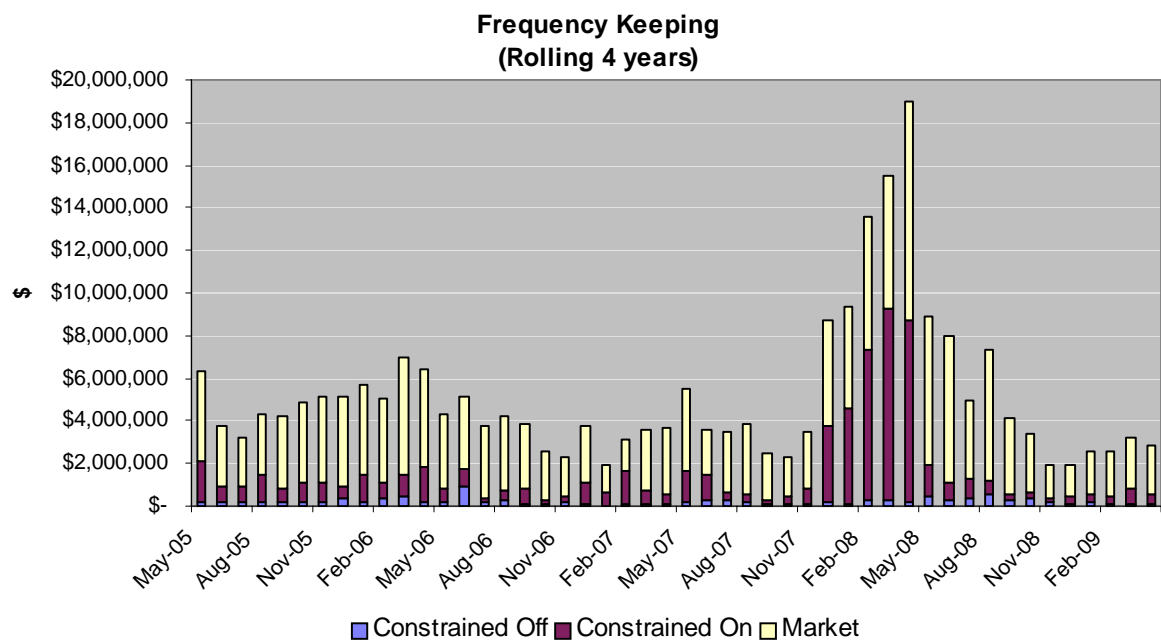


Chart 1.1(b): Historical cost of FK

## 1.2 Instantaneous Reserve (IR)

Instantaneous Reserve	Cost
Spinning reserve	\$1,310,731.25
Interruptible Load	\$999,940.60
<b>Total monthly Instantaneous Reserve cost</b>	<b>\$2,310,671.85</b>

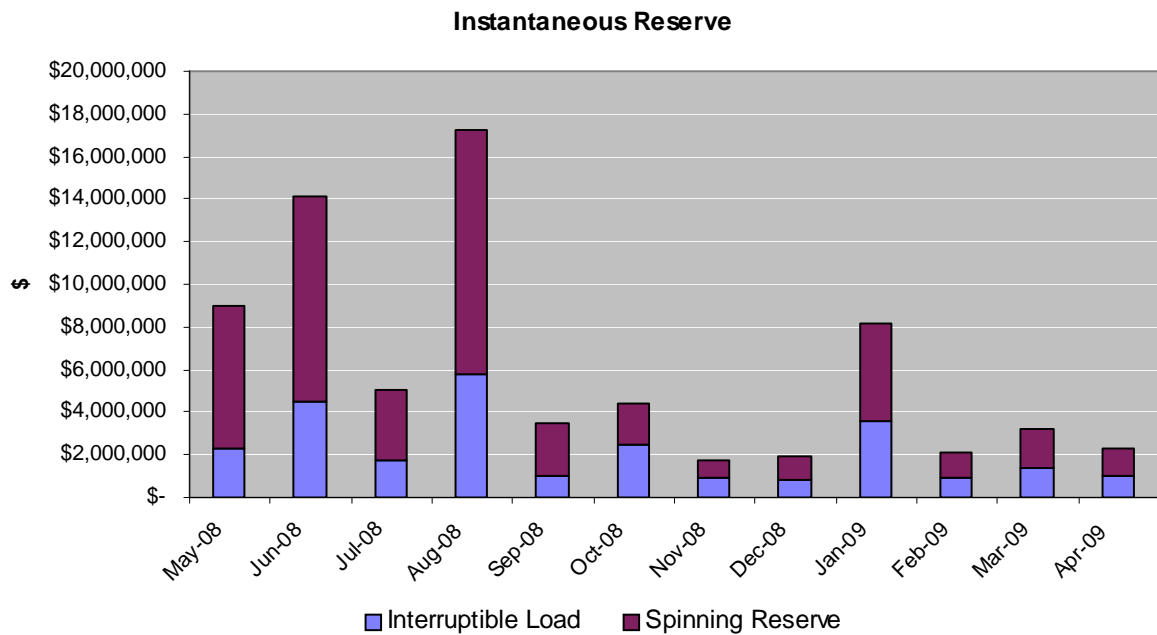


Chart 1.2(a): IR cost – 12 months

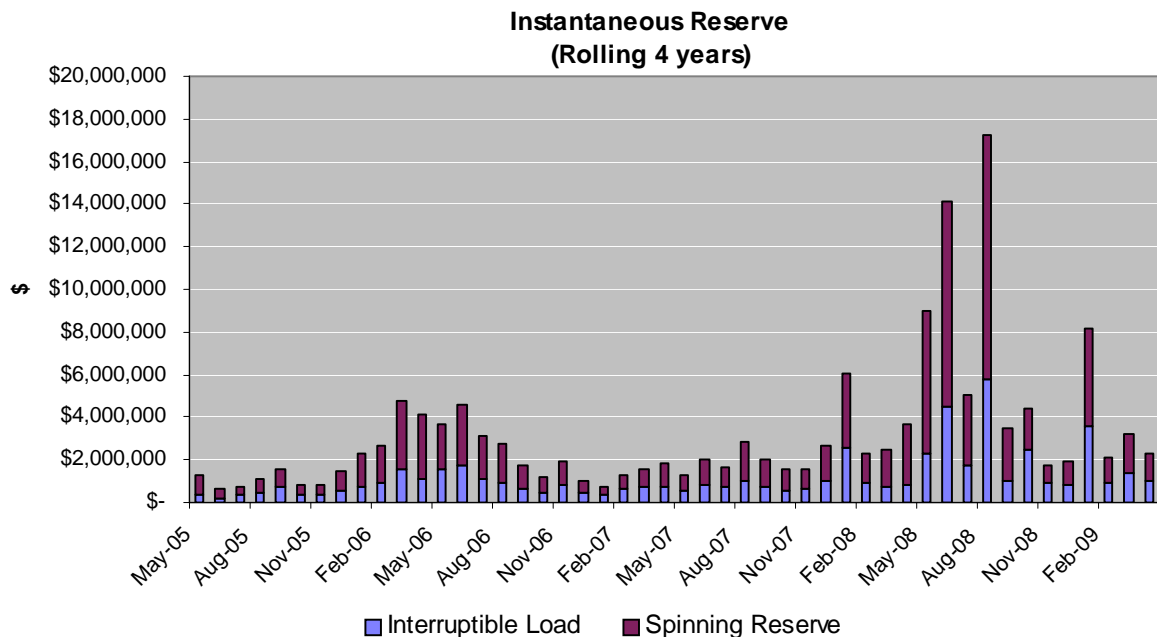


Chart 1.2(b): Historical cost of instantaneous reserves



### 1.3 Over Frequency Reserve (OFR)

Over Frequency Reserve	Cost
<b>Total monthly Over Frequency Reserve cost</b>	<b>\$53,284.86</b>

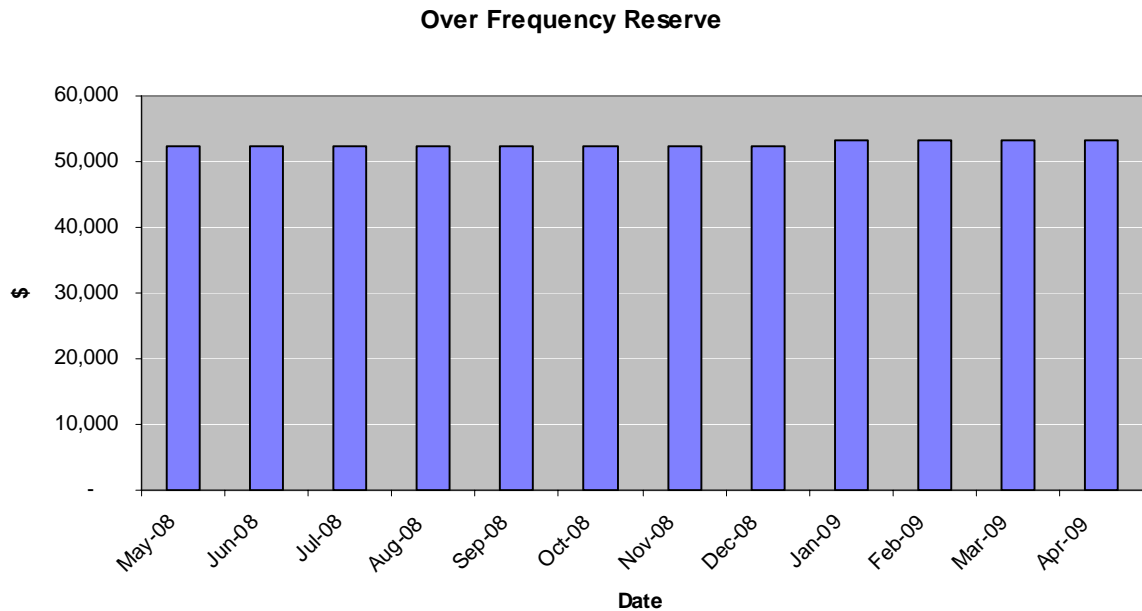


Chart 1.3(a): Monthly OFR cost – 12 months

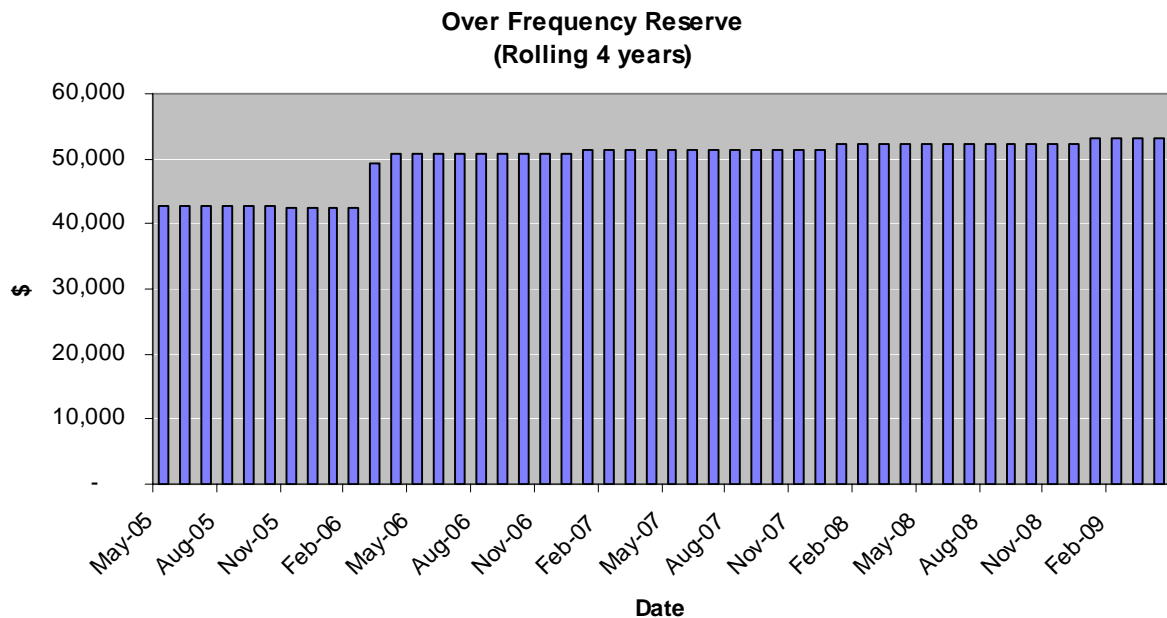


Chart 1.3(b): Historical cost of OFR

### 1.4 Black Start (BS)

Black Start	Cost
<b>Total monthly Black Start cost</b>	<b>\$27,897.43</b>

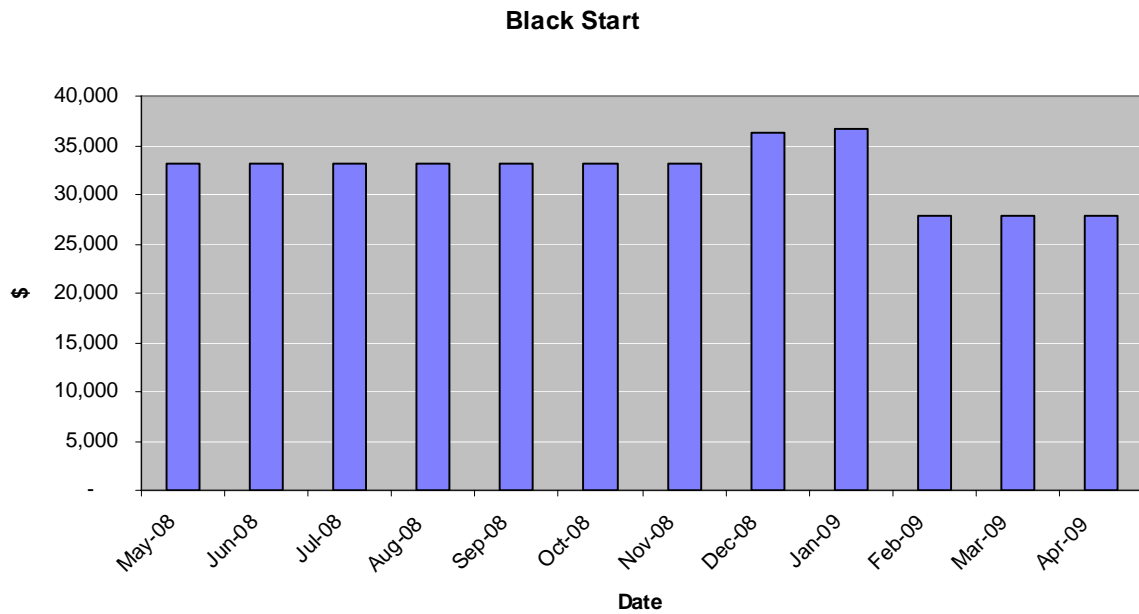


Chart 1.4(a): Monthly BS cost – 12 months

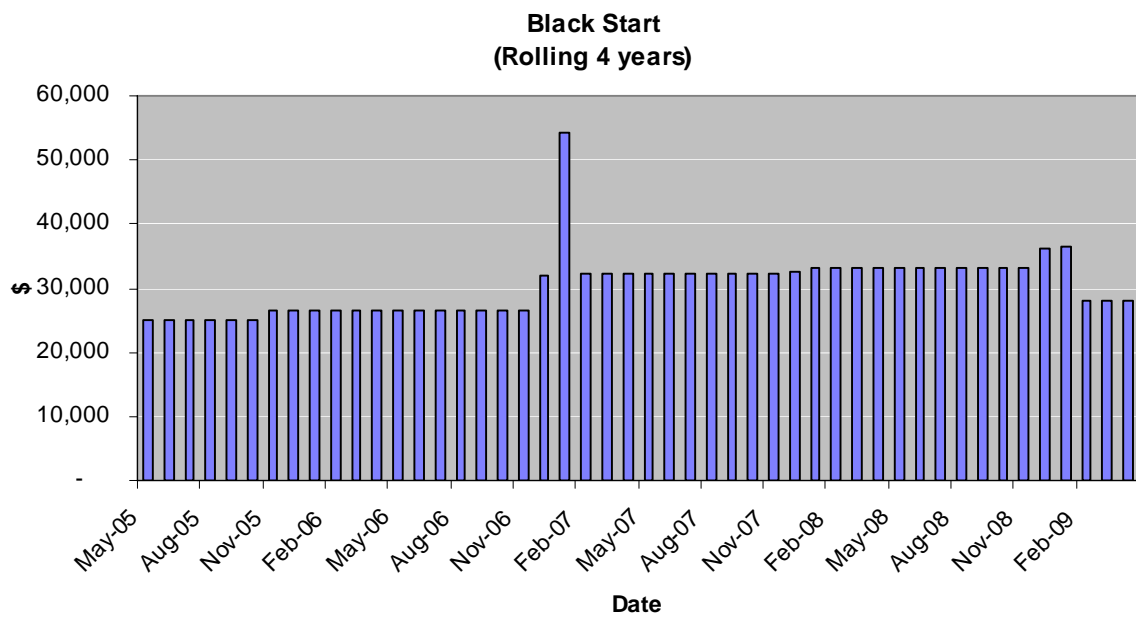


Chart 1.4(b): Historical cost of BS

### 1.5 Voltage Support (VS)

Voltage Support	Cost
Total monthly Voltage Support cost	\$666,864.05

Voltage Support

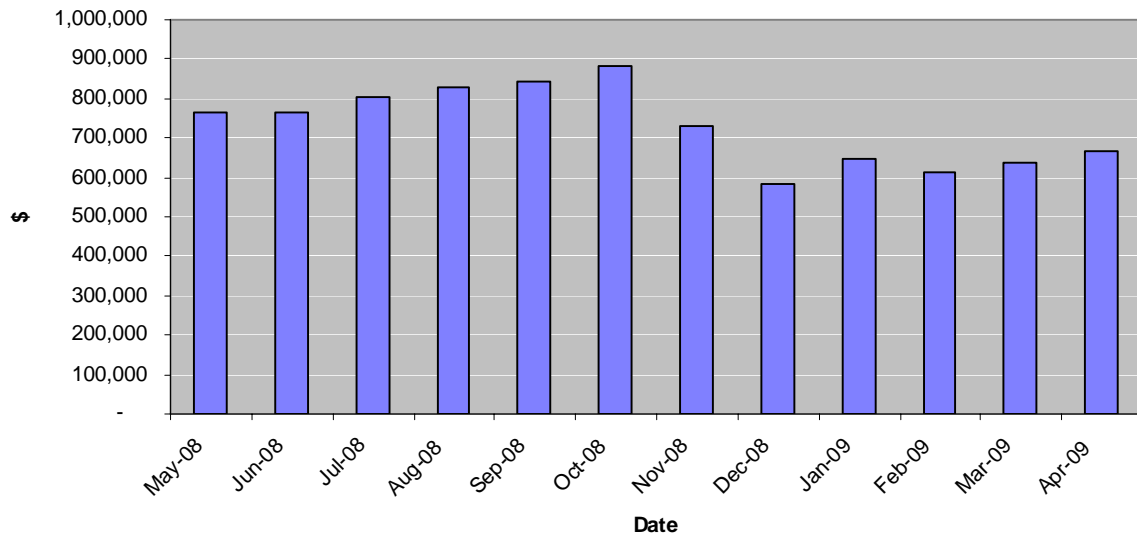


Chart 1.5(a): Monthly VS cost – 12 months

Voltage Support  
(Rolling 4 years)

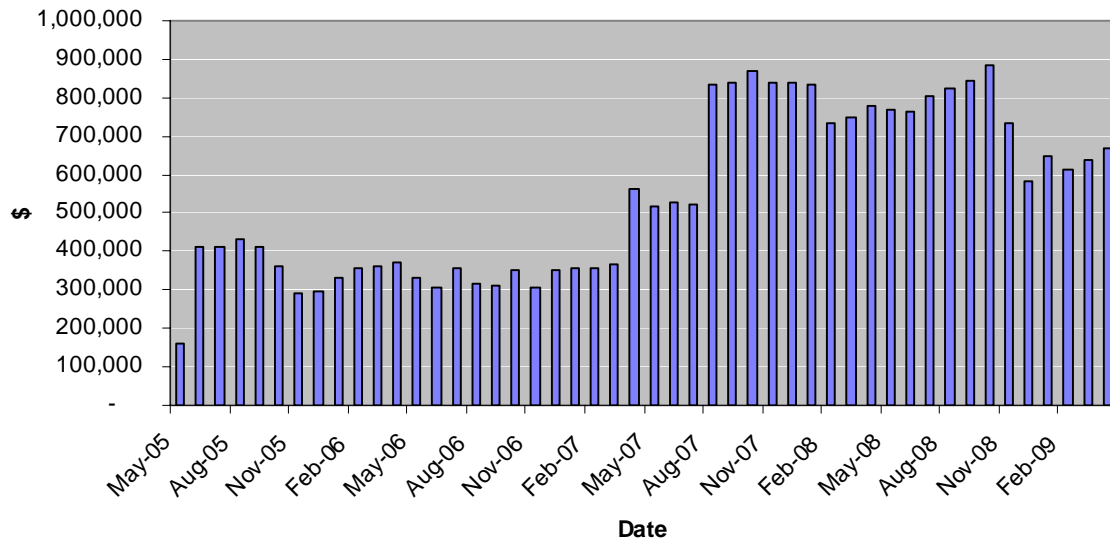


Chart 1.5(b): Historical cost of VS

## **1.6 Administrative Costs**

Nil

## 2 Summary of Contracted Ancillary Services

The table 2.1 below provides a summary of contracted ancillary services as at 30 April 2009.

Table 2.1 Summary of contracted ancillary services

Ancillary Service Agent	(1)FK	(2)IR	(3)OFR	(4)BS	(5)VS
Meridian Energy	√	√	√*	√*	
Contact Energy	√*	√*	√*		√*
Mighty River Power	√	√		√*	√*
Genesis Power	√	√		√	
TrustPower		√*			
Vector		√			
Northpower		√			
Powerco		√*			
Unison		√			
WELNetworks		√			
CountiesPower		√			
NZ Steel		√*			
Pan Pac		√			
Winstone Pulp International		√*			
KCE Mangahao and Todd Mangahao		√*			
Norske Skog		√*			
Energy Response		√			
NZ Aluminium Smelters		√*			

<sup>(1)</sup> FK - Frequency Keeping

<sup>(2)</sup> IR - Instantaneous Reserves

<sup>(3)</sup> OFR - Over Frequency Reserve

<sup>(4)</sup> BS - Black Start

<sup>(5)</sup> VS - Voltage Support

\*Longer term contract

### **3 System Operator Compliance to Procurement Plan 08/09**

The system operator has continued with preparing the draft Procurement Plan for the 2009/10 period. The draft procurement plan was circulated to Participants inviting comment before being submitted to the Commission by 1 June. The invitation to comment is not the only opportunity Participants will have to comment on the draft plan as the Electricity Commission process for review of the plan will invite submissions as per the Rules (Part C Section IV: Process for procurement plan review).

#### **Contract changes**

The System Operator and Contact Energy entered into a contract for the provision of black start services from Clyde. A test of black start capability from Clyde is to be completed within the next 3 months.

Contract changes in April were relatively minor, requiring only adjustments to maximum quantities instantaneous reserves. The System Operator continues to work with several ancillary service providers looking at increasing the quantity of FIR and SIR instantaneous reserves available.

### **4 Events Requiring Further Consideration for Regulation and or Rule Change**

Nil

**Report Ends**