

Security of Supply Participant Outage Plan



Electricity Network Contingency Plan May 2013

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1. Introduction

This Participant Outage Plan (POP) is prepared by Horizon Energy Distribution Limited (Horizon) to comply with the participant's obligation in clause 9.6 of the Electricity Industry Participation Code (Code) to prepare and publish a participant rolling outage plan.

Under the section 9.8 of the regulations, this plan is required to describe the actions that would:

- a) be consistent with the system operator rolling outage plan; and
- b) comply with the requirements specified in the notice sent under clause 9.6(2)(a); and
- c) specify the actions that the specified participant will take to achieve, or contribute to achieving, reductions in the consumption of electricity (including any target level of reduction of consumption of electricity in accordance with criteria, methodologies, and principles specified in the system operator rolling outage plan) to comply with a direction from the system operator given under clause 9.15.

Rolling outages would be a last resort for managing severe energy shortages after all other forms of savings, including voluntary savings, have been achieved. Under normal conditions, they should not be necessary, but it is prudent to plan for contingencies where they may be required. Horizon Energy will always endeavour to provide a reliable supply to all customers.

The procedures outlined would be actioned in response to major generation shortage and/or significant transmission constraints. Typical events include unusual low inflows into hydro generation facilities, loss of multiple power generating stations or transmission lines.

How an event is declared and how the Electricity Authority should communicate its requests are detailed. The main energy saving measure described is rolling outages and how these are structured and implemented is also discussed.

2. Terms & Definitions

Term	Definition
AUFLS	Automatic Under Frequency Load Shedding
Feeder	A High voltage supply line typically supplying between 50 and 2000 customers
GEN	Grid emergency notice
GXP	Transpower Grid Exit Point
POP	Participation Outage Plan
Rolling Outages	Planned electricity disconnections spread over different areas of the Network at differing times to avoid prolonged outages at any one location
SOROP	System Operator Rolling Outage Plan
Supply Shortage Declaration	Declaration made by the Electricity commission under regulation 9.

3. Background

Part 9 Sub part 2 of the Code sets out how supply shortage situations will be managed. Under the provisions of the Code the system operator has powers to direct outages following a supply shortage declaration. As a specified participant Horizon Energy must comply with any direction given to it following the declaration by the system operator following a supply shortage declaration. A supply shortage declaration may apply to:

- a) All of New Zealand; or
- b) Regions specified in the declaration

2.1 Electricity Authority (The Authority)

The Electricity Authority (Authority) is an independent Crown entity responsible for the efficient operation of the New Zealand electricity market. The Authority's purpose is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

The core functions of the Authority are to:

- a) make and administer the Electricity Industry Participation Code 2010 (Code) governing the New Zealand electricity market;
- b) undertake market-facilitation measures (such as providing education, guidelines, information, and model arrangements) and monitor the operation and effectiveness of market-facilitation measures;
- c) monitor and enforce compliance with the Code, various regulations, and the Act;
- d) proactively monitor the performance of the electricity industry in regard to competition, reliable supply and efficient operation; and
- e) contract service providers to operate the New Zealand electricity system and market in accordance with the Code.

2.2 Transpower NZ Limited (Transpower or System Operator)

Transpower NZ Limited, as a State Owned Enterprise, is the owner and operator of New Zealand's National Grid – the network of high voltage transmission lines and substations that transport electricity from the generation sites to a number of direct customers and distribution line companies, such as Horizon Energy. As the System Operator, It also manages the real-time operation to keep the right amount of energy flow to meet the required demand.

2.3 Horizon Energy Distribution Limited (Horizon Energy)

Horizon Energy is the electricity network company that owns and maintains the distribution network including overhead lines, cables and substations that deliver electricity from the Grid Exit Point (GXP) to consumers in the Eastern Bay of Plenty.

4. Range of Events

In general, events that could lead the Authority to declare a supply shortage can be categorized as:

- **Developing Event** – Events that evolve over time, for example low hydro lake or fuel levels.
- **Immediate Event** – Events that occur with little or no warning, usually as a result of a transmission line or major generation failure.

The main distinction between developing event and immediate event is that the time does not generally allow emergency shutdowns to be advertised or customers notified prior to the work being undertaken. Every effort must be made to advise the affected energy retailers so that they can make arrangements to advise their customers.

Either a developing event or an immediate event will be classed by Horizon Energy as a major incident and the network manager and associated staff will follow the appropriate contingency plan to manage the incident accordingly. This also includes providing for a situation which has elements of both events at the same time.

5. Horizon Energy Staff Responsibility

Table 1. Staff Responsibility

Role	Horizon personnel
Receive communication from the Authority	CEO or Network manager
Receive communication from System Operator	Control Room
Preparation of load shedding schedules	Operations Manager
Implement this plan	Network manager
Weekly saving report	Planning and design engineer
Retailer notification	Control Room
Reporting to the Authority	Network manager
Reporting to media, public agencies	Network and Operations managers

Key contact details of Horizon Energy staff are maintained and published in the Electricity Industry Emergency Contact List compiled by Transpower.

6. Actions for Immediate Events

5.1 System Stability

Transpower is required to keep enough reserve generation to cover the risk of the largest connected generator tripping or HVDC link failure. They are also required to keep the system frequency at 50 Hz. If a large generator trips, it may cause a reduction in frequency which if not rectified can result in other generators tripping and lead to cascade breakdown of the transmission systems.

As the reserve generation cannot immediately pick up the load of a disconnected generator, an immediate load reduction is required until additional generation can pick up the load. Automatic load shedding groups reduce load in stages until the frequency stabilises.

To recover from immediate events, electricity consumption can be reduced by:

- Reserve market;
- Automatic Under Frequency Load Shedding (AUFLS);
- Manual shedding.

5.2 Reserve Market

Generators and load users with interruptible load such as distribution networks may offer in reserve capacity to cover the risk of the largest generating unit or a critical transmission line tripping. The ability to do this is affected by the number of frequency capable relays installed and the likely revenue stream from the market less the compliance costs of participant in the reserve market. Horizon Energy does not presently participate in this market.

5.3 Disconnecting customers

5.3.1 Automatic Under Frequency Load Shedding (AUFLS)

If the load shed by the reserve market tripping is insufficient to stabilise the network, further automatic load reduction is required. Horizon has prepared two blocks of load zone 1 and zone 2, to be dropped by automatic under frequency sensing relays. The AUFLS regime is currently under review by the system operator, the number of blocks and trip settings may change as a result.

5.3.2 AUFLS Zone 1

If the system frequency fails to recover after reserve market load shed, AUFLS zone 1 shedding by Transpower will occur. This will shed 16% of Horizon Energy's load by disconnecting customers' supply. Refer to Appendix A for all the listed AUFLS feeders.

5.3.3 AUFLS Zone 2

If zone 1 tripping fails to restore frequency, zone 2 will activate. This will disconnect a further 16% of Horizon Energy's network load

5.3.4 Manual Shedding

If AUFLS zone 1 and zone 2 tripping fail to stabilise frequency, the System Operator will shed more load manually. Once the frequency has stabilised, the System Operator will advise the Horizon Energy duty controller when the load can be restored.

5.4 Supply Restoration

Restoration of disconnected load must be in conjunction with the System Operator to prevent overloading the transmission network and further instability. Unless agreed with the System Operator, load shedding and restoration shall be no more than 25 MW per five minutes. Horizon's Control Room is responsible for monitoring for overload conditions within the Horizon Network during the restoration process.

5.5 Overlap With Transmission Grid Emergency

The System Operator may request Horizon Energy to reduce load under a Grid Emergency Notice (GEN). Horizon Energy would shed all water heating load from the network, and disconnect the load as per the emergency load shedding feeders listed in the Appendix.

If an immediate event is in place, the grid emergency will take precedence.

5.6 Electricity Authority Declarations

For some immediate events, the Electricity Authority may direct that rolling outages are required to be implemented. In such a situation, the procedures for developing events will need to be implemented as per Section 6.

7. Actions for Developments

If the Authority requests through the System Operator a load reduction for a planned developing event, Horizon Energy would reduce supply to meet the Authority's saving targets. The targets are expected to be a weekly energy saving plan that is reviewed each week. To reduce energy usage, Horizon Energy would disconnect 11 kV feeders in a controlled sequence as shown in Appendix A to enable targets to be reached. There may be financial penalties for not meeting the targets specified by the Authority. In general, water heating load shedding is not a practical choice for these category events.

6.1 Declaration of Developing Event

The Authority will endeavour to provide 9 days prior notice of the requirement for weekly energy savings and any increase in the target on the weekly basis. It is also Horizon Energy's plan to notify the retailers via emails regarding the planned outage.

To make a supply shortage declaration, the Authority would need to request through the System Operator that a specific weekly energy saving target is to be established for a specific region within a particular time frame. A notification system similar to the GEN procedure would be appropriate.

The Authority is expected to manage general media advertising of the need to conserve electricity and implement rolling outages when they are requested.

6.2 Civil Defence

- It is possible that a natural disaster could cause a major transmission or generation outage and could also lead to the declaration of a state of emergency of local emergency under the Civil Defence Emergency Management Act 2002 (CDEM Act). In these circumstances there may also be a substantial reduction in demand in some locations due to the natural disaster. It is possible that a grid emergency will also be in place.
- Section 60 of the CDEM Act provides that it is a duty of lifeline utilities (including generators and lines businesses) to ensure they are able to function to the fullest extent possible, during and after an emergency. It is envisaged that generators and lines businesses will have plans in place to work with groups established under the CDEM Act to recover from any natural disaster that affects their ability to provide services.

- In addition to the provisions within the Code to coordinate supply and demand, the EMP, this SOROP and participant rolling outage plans could provide a useful framework for coordinating reductions in electricity demand during a civil defence emergency.

6.3 Criteria for Rolling Outages

To ensure public health and safety is preserved and costs to the economy are minimised, the Authority has provided a guideline for selecting rolling outage feeders as shown in Table 2. The rolling outage would start from the lower priority load to the higher ones. For example, the residential premises would be the first outage target followed by commercial and industrial customers and so forth.

Table 2. Priority Loads

Priority	Priority Concern	Maintain Supply to:
1	Public health and safety	Major hospitals, air traffic control centres, and emergency operation centres
2	Important public services	Energy control centres, communication networks, water and sewage pumping, fuel delivery systems, major ports, public passenger transport and major supermarket
3	Public health and safety	Minor hospitals, medical centres, schools, and street lighting
4	Animal health and food production/storage	Dairy farms, milk production facilities
5	Domestic production	Commercial and industrial premises
6	Disruption to consumers	Residential premises

Since the rolling outages are generally implemented on a feeder by feeder basis, it is usually not feasible to discriminate between individual consumers. Horizon Energy will generally adopt an approach which leads to fewer and shorter outages for high priority consumers.

6.4 AUFLS Criteria

Currently, the same criteria for rolling outage as shown in Table 2 are also used to select 11 kV feeders for AUFLS tripping. The AUFLS load blocks are predominately from the lower priority load categories. However, some of the rolling feeders may include a number of higher priority customers than the AUFLS tripping blocks. Therefore, an exemption for AUFLS feeders could be available with an advised notice or several hours before the commencement of rolling outages. For future implementations, the AUFLS relays could be installed on the higher priority value load feeders..

6.5 Grid Emergency During Developing Event

If the System Operator declares an emergency during a developing event, the grid emergency will take priority. Horizon Energy would normally have the water heating load available for load reduction when required for the grid emergency. If water heating load is insufficient, further load disconnection will be carried out as per the emergency load shedding feeders listed in Appendix A. Once the grid emergency is over, the rolling outage plan will continue.

In general, a Grid Emergency will prevail in both a developing and an immediate Event.

6.6 Rolling Outage Strategy and Methodology

Rolling outages are a last resort measure for managing severe energy shortages. Under normal conditions, they should not be necessary, but it is prudent to plan for contingencies where they may be required. The network manager, operations manager and planning engineer will review weekly saving target and prepare or modify the plan for the coming week based on the updated saving target required from the Authority.

In general, a daily week-ahead forecast should be provided to the security coordinator at the System Operator and a variation of $\pm 20\%$ in the forecast will need to be notified. The plan will also be forwarded to the retailers for consumer and media notification. Rolling outages will wherever possible disconnect feeders following the priority listed in table 2 in the appendix. The number of feeders and the outage period for every week will depend on the level of saving required to meet target.

If required historical data for the same period of the previous year will be used to update the energy flows on a feeder by feeder basis for future rolling outage schedules. Both the average daily power flow and the power flow between key times per feeder will be analysed to provide a closer prediction on the coming energy saving plan as most of the outage will take place during the daytime for health and safety concerns. However, the time schedule for processing the outage during the week will be approximate and could vary daily due to the network or System Operator's constraint. Horizon Energy will endeavour to keep rolling outages to any consumer no longer than 4 hours per day for a 5% saving target.

The rolling outage feeders are taken from our 11 kV network excludes feeders with large consumers that require run down periods. They are then divided into four zones based on Table 2 for implementing rolling outages when they are required. Each zone labelled from A to D represents 17% of the networks load. In table 3 each zone is broken down showing the feeders affected. The zones shown in the table are created to distribute the outages throughout the network evenly, cutting down the outage times to every feeder affected.

Tables 3.1, 3.2, 3.3, 3.4 and 3.5 represent the days and times that each zone category will be have an outage. The energy saving targets is shown in each table, outage times are increased to meet consumption saving targets.

Table 3.1 Rolling Outage Timetable 5% Savings target

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Outage Periods							
7-9am	A/D	B/C	A/D	B/C	A/D	B/C	A/D
4-6pm	B/C	A/D	B/C	A/D	B/C	A/D	B/C
Estimated saving: 400 MWh/ Week or 5.6% of Network							

Table 3.2 Rolling Outage Timetable 10% Savings target

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Outage Periods							
6:30-10am	A/D	B/C	A/D	B/C	A/D	B/C	A/D
3:30-7pm	B/C	A/D	B/C	A/D	B/C	A/D	B/C
Estimated saving: 700 MWh/ Week or 9.8% of Network							

Table 3.3 Rolling Outage Timetable 15% Savings target

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Outage Periods							
5:30-10am	A/D	B/C	A/D	B/C	A/D	B/C	A/D
3-8:30pm	B/C	A/D	B/C	A/D	B/C	A/D	B/C
Estimated saving: 1100 MWh/ Week or 15.3% of Network							

Table 3.4 Rolling Outage Timetable 20% Savings target

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Outage Periods							
5-12pm	A/D	B/C	A/D	B/C	A/D	B/C	A/D
3-10pm	B/C	A/D	B/C	A/D	B/C	A/D	B/C
Estimated saving: 1400 MWh/ Week or 19.5 % of Network							

Table 3.5 Rolling Outage Timetable 25% Savings target

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Outage Periods							
5-2pm	A/D	B/C	A/D	B/C	A/D	B/C	A/D
2-11pm	B/C	A/D	B/C	A/D	B/C	A/D	B/C
Estimated saving: 1800 MWh/ Week or 25.1 % of Network							

(Note: All MWh/Week values shown above are calculated on the historical data from 01 April 2011 to 31 March 2012. The actual in MWh/Week could vary with season when the rolling outage is required)

6.7 Target Monitoring

As part of the monitoring process Horizon Energy is required to report compliance to the Authority, as well as reporting to the System Operator. The energy saving against the target from our historical data will be reviewed as a parallel check with our saving feedback from the Authority through the System Operator. The planning and design engineer will work with the network manager and operations manager to review and coordinate the status (increase, decrease or no change) of rolling outages for the next seven days based on the updated requirement from the Authority.

Horizon staff may use remote controlled switches to refine their ability to meet the load control requirements.

6.8 Log of Rolling Outages

The control room is required to fill in the rolling outage log sheet, which includes the times of disconnection and reconnection of all feeder interruptions. This will be used to monitor the rolling outage program. The log sheet is shown in Appendix B.

6.9 Contingent Events

If an unplanned event occurs, such as Civil Defence Emergency that could alter the planned rolling outage, the control room will be responsible for communicating with retailers of any changes to the advertised program.

8. Communication

The Electricity Authority can contact Horizon Energy using the following details:

Network Manager
 Horizon Energy Distribution Ltd.
 Level 4, Commerce Plaza, 52 Commerce Street
 P.O. Box 281, Whakatane 3158
 Phone: 07 306 2904
 Fax: 07 306 2907

7.1 Shutdown Notification

Prior to implementing a rolling outage plan, Horizon Energy will notify the outages via public notice, and publish the rolling schedule through local media. The time and extend of advertised outages will be approximate. The retailers will also be advised in advance regarding the pending outages via emails. Horizon Energy will also be in contact with other agencies such as Civil Defence, Local and Regional Councils regarding outages

7.2 Communication with System Operator

All communications with the System Operator will be between Horizon's Control Room and Transpower's Regional Operating Centre through telephone or normal communication systems.

7.3 Consumer Liaison

For major consumers, with dedicated HV feeder supplies, short-term rolling outages may not be appropriate. As an alternative, longer single outages could be offered if that was easier for them to plan for.

Other consumers are advised to contact their retailer for information on the priority of the feeder they are supplied from and outage times.

7.4 Vulnerable Consumers

Retailers maintain lists of consumers with health and safety issues. It is not feasible for Horizon Energy to prevent rolling outages affecting individual vulnerable consumers. During rolling outages, Horizon Energy will notify retailers so that they can in-turn notify vulnerable consumers.

7.5 Communication with the Authority

- Horizon Energy will contact the Authority for administration and reporting purpose using the following details:
Electricity Authority
Level 7, ASB Bank Building, 2 Hunter Street
P.O. Box 10041, Wellington
Phone: 04 460 8860
Fax: 04 460 8879

9. Appendix A-Rolling-Feeder Loads and Customers

APPENDIX A – FEEDER LOADS AND CUSTOMER NUMBERS

Table 1 Feeder Information Table

GXP	SUBSTATION	FEEDER	CB Number	Rolling Priority Zone	AUFLS Blocks	*Number of Rural Customers	*Number of Urban Customers	*Number of General Customers	Number of NMD Customers	Number of Major Customers	Total Number of customers	Average Feeder Current (A)	Average Hourly Load (MWh)
Edgcumbe	Plains	TeTeko	P22	A	1	660	-	210	4	1	875	52	1.00
Edgcumbe	Plains	Manawahe	P32	B	2	520	-	230	1	-	751	38	0.72
Edgcumbe	Plains	Awaiti	P42	C	-	360	-	170	8	-	538	47	0.90
Edgcumbe	Plains	Awakeri	P52	D	-	270	-	160	5	-	435	35	0.67
Edgcumbe	Plains	Anchor 2	P62	-	-	-	-	-	-	-	-	0	0.01
Edgcumbe	Station RD	Angle	S31	A	-	270	-	180	4	-	454	36	0.69
Edgcumbe	Station RD	Taneatua	S33	A	2	340	-	110	2	-	452	27	0.51
Edgcumbe	Station RD	Ruatoki	S35	C	1	470	-	180	2	-	652	41	0.78
Edgcumbe	Station RD	City South	S37	D	-	20	460	80	1	-	561	46	0.88
Edgcumbe	Station RD	Piripai	S38	B	-	220	300	160	12	-	692	60	1.14
Edgcumbe	Station RD	Mokoroa	S29	C	-	60	520	40	2	-	622	38	0.72
Edgcumbe	Ohope	Pohutukawa	78	B	2	20	730	80	1	-	831	31	0.59
Edgcumbe	Ohope	Harbour	79	D	-	150	940	130	1	-	1,221	54	1.02

Edgcumbe	Galatea	Minginui	6	A	-	210	-	80	2	-	292	14	0.27
Edgcumbe	Galatea	Murupara	8	B	-	660	-	120	2	-	782	47	0.90
Edgcumbe	Galatea	Jolly	9	C	1	120	-	120	5	-	245	23	0.44
Edgcumbe	Galatea	Galatea	10	D	2	100	-	110	4	-	214	25	0.49
Edgcumbe	Kaingaroo	Dunn	KA32	C	-	150	-	30	5	-	185	47	0.90
Edgcumbe	Kaingaroo	Kaingaroo	KA31	-	-	-	-	-	-	1	1	29	0.55
Edgcumbe	Eastbank	Anchor 1	2	-	-	-	-	-	-	2	2	20	0.38
Edgcumbe	Eastbank	West Bank	3	D	1	20	640	110	3	1	774	41	0.79
Edgcumbe	Eastbank	Thornton	4	-	-	200	-	140	9	2	351	70	1.34
Edgcumbe	Kope	Strand North	K11	B	-	-	870	240	9	-	1,119	82	1.55
Edgcumbe	Kope	Rex Morpeth	K12	A	2	-	640	190	10	-	840	90	1.71
Edgcumbe	Kope	Victoria	K13	B	1	-	1,340	50	5	-	1,395	63	1.20
Edgcumbe	Kope	King St	K14	C	-	-	950	70	2	-	1,022	45	0.86
Edgcumbe	Kope	Strand South	K15	D	-	-	690	220	7	-	917	67	1.28
Kawerau	Kawerau	Plateau	8	A	-	10	1,050	160	7	-	1,227	72	1.38
Kawerau	Kawerau	Kawerau	11	C	-	-	1,570	100	6	-	1,676	74	1.42
Kawerau	Kawerau	Onepu	12	-	-	30	-	20	6	3	59	105	2.00
Kawerau	Kawerau	Mt Edgcumbe	13	-	-	-	-	10	-	-	10	2	0.03
Kawerau	Kawerau	Paper	14	-	-	-	-	30	3	3	36	59	1.13
Kawerau	Waiotahi	Pulp	15	-	-	-	-	-	-	-	-	-	8.69

					-	-	-	-	-	1	1	456	
Waiotahi	Waiotahi	Factory	11	C									1.58
					2	720	-	390	16	-	1,126	83	
Waiotahi	Waiotahi	Opotiki	12	A									1.10
					-	30	840	90	4	-	964	58	
Waiotahi	Waiotahi	Hospital	13	D									1.57
					-	210	800	330	-	-	1,340	82	
Waiotahi	Waiotahi	Waimana	14	B									0.92
					1	560	-	300	2	-	862	48	
TeKaha	TeKaha	Waiohau Bay	1	D									0.36
					-	500	-	120	-	-	620	19	
TeKaha	TeKaha	Te Kaha	2	A									0.24
					-	310	-	100	-	-	410	13	
Total						7,190	12,340	4,860	150	14	24,554	2,241	42.69

*Numbers rounded to the nearest 10

Table 2 Rolling Outage Summary Table

Rolling Priority Zone	GXP	SUBSTATION	FEEDER	AUFLS Blocks	Number of customers	Load per hour (MWh)
A	Edgecumbe	Plains	TeTeko	1	875	1.00
A	Edgecumbe	Station RD	Angle	-	454	0.69
A	Edgecumbe	Galatea	Minginui	-	292	0.27
A	Edgecumbe	Station RD	Taneatua	2	452	0.51
A	Edgecumbe	Kope	Rex Morpeth	2	840	1.71
A	Kawerau	Kawerau	Plateau	-	1227	1.38
A	TeKaha	TeKaha	Te Kaha	-	410	0.24
A	Waiotahi	Waiotahi	Factory	2	1126	1.58
Block A Total					5676	7.39

Rolling Priority Zone	GXP	SUBSTATION	FEEDER	AUFLS Blocks	Number of customers	Load per hour (MWh)
B	Edgecumbe	Plains	Manawahe	2	751	0.72
B	Edgecumbe	Kope	Strand North	-	1119	1.55
B	Edgecumbe	Ohope	Pohutukawa	2	831	0.59
B	Edgecumbe	Galatea	Murupara	-	782	0.90
B	Edgecumbe	Kope	Victoria	1	1395	1.20
B	Edgecumbe	Station RD	Piripai	-	692	1.14
B	Waiotahi	Waiotahi	Waimana	1	862	0.92
Block B Total					6432	7.02

Rolling Priority Zone	GXP	SUBSTATION	FEEDER	AUFLS Blocks	Number of customers	Load per hour (MWh)
C	Edgecumbe	Plains	Awaiti	-	538	0.90
C	Edgecumbe	Station RD	Ruatoki	1	652	0.78
C	Edgecumbe	Galatea	Jolly	1	245	0.44
C	Edgecumbe	Kaingaroa	Dunn	-	185	0.90
C	Edgecumbe	Kope	King St	-	1022	0.86
C	Edgecumbe	Station Rd	Mokoroa	-	622	0.72
C	Waiotahi	Waiotahi	Opotiki	-	964	1.10
C	Kawerau	Kawerau	Kawerau	-	1676	1.42
Block C Total					5904	7.11

Rolling Priority Zone	GXP	SUBSTATION	FEEDER	AUFLS Blocks	Number of customers	Load per hour (MWh)
D	Edgecumbe	Plains	Awakeri	-	435	0.67
D	Edgecumbe	Eastbank	West Bank	1	774	0.79
D	Edgecumbe	Station RD	City South	-	561	0.88
D	Edgecumbe	Ohope	Harbour	-	1221	1.02
D	Edgecumbe	Kope	Strand South	-	917	1.28
D	Edgecumbe	Galatea	Galatea	2	214	0.49
D	TeKaha	TeKaha	Waiohau Bay	-	620	0.36
D	Waiotahi	Waiotahi	Hospital	-	1340	1.57
Block D Total					6082	7.05



8.1 Appendix B-Rolling Outage Log

Saving Target: 5%, 10%, 15%, 20%, 25% (Circle One) **Duty Controller:** _____ **Date:** _____

CB Number	Number of Customers	Rolling Zone	Time On	Time Off	Duration	Notes



Security of Supply Participant Outage Plan