SECURITY OF SUPPLY

PARTICIPANT OUTAGE PLAN

NATIONAL SYSTEM OPERATOR

IMPOSED LOAD REDUCTION

DOCUMENTATION CONTROL

Distribution List

DOCUMENT NAME	Type	Location
Security of Supply Participant Outage Plan	Electronic Copy	Intranet Server

The following people are to be informed either by written memo or email when any amendment is made to this plan.

B Quinn
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Disclaimer

This participant outage plan has been prepared by EA networks to provide guidance on operating procedures, for use by persons operating EA networks distribution network

Although this plan is recommended as good practice for operating EA networks network, it should not be relied on as a substitute for any legislative requirements or best industry practice as set out in the various national electrical industry publications. .

It needs to be understood that owing to the variable nature of loadings on the network load savings on feeders as indicated are estimations only and further considerations may be required at the time to fulfil actual requirements.

This plan can only be modified with the approval of the Electricity Commission. The most current version is available on EA networks intranet system with one hard copy held by the Operations Manager.

NOTE: Discretionary hard copy publications must be viewed as only being accurate on the day they are published.

DOCUMENTATION REVISION CONTROL:

Document Version	Description	Date
Version 001	Initial document	20/1/10
Version 002	Update High Impact Consumers	4/2/10
Version 003	Insert indicative plans section 16. Minor terminology and typo changes	10/3/10
Version 004	Alterations to Grid Emergency flo chart. Insert Weekly MWh saving. Emphasise criteria for high impact consumers. AUFLS clarification % load reduction	22/3/10
Version 005	Reference to Appendix P EA networks Operation Manual "Feeder Rolling Shutdown Sequence" added. Feeder outage duration times clarified	28/3/10
Version 006	Minor changes to clarify wording	22/4/10
Version 007	Change company name	31/5/13

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1. INTRODUCTION

This plan is provided to comply with the Electricity Commission's Security of Supply Outage Plan (SOSOP).

The procedures outlined are in response to major generation shortages and/or significant transmission constraints. Typical scenarios include unusually low inflows into hydro-generation facilities, loss of multiple thermal generating stations or multiple transmission failures.

How an event is declared and how the Electricity Commission should communicate its requests are detailed.

The main energy saving measure listed is rolling outages and how these are structured and implemented is discussed.

NOTE: This plan refers to EA networks Operating Manual for particular operational responses

2. PURPOSE

Under the regulations, participant outage plans (POP) are required to specify the actions that would be taken to;

• Reduce electricity consumption when requested by the Electricity Commission

• Comply with requirements of the Electricity Commission's Security of Supply Outage Plan (SOSOP)

• Comply with Electricity Governance (Security of Supply) Regulations 2008 and Electricity Governance (Security of Supply) Amendment Regulations 2009

• Supplement the Electricity Commission's Security of Supply Outage Plan

Reducing demand by disconnecting supply to customers must be viewed as a last resort after all other forms of savings including voluntary savings had been exhausted. EA networks will apply best endeavours in providing continuous supply to consumers connected to the network.

3. DEFINITIONS

AUFLS	Automatic under Frequency Load Shedding
Commission	Electricity Commission
Feeder	A high voltage supply line typically supplying between 100 and 2000 customers.
GXP	Transpower Grid Exit Point
GEN	Grid Emergency Notice
Network Controller	An EA networks employee who is responsible for the Day to Day control and operation of EA networks distribution network

Operations Manager	An EA networks employee who is responsible for the operational management of EA networks distribution network and compliance to the participant outage plan
POP	Participant Outage Plan (this plan)
Regulations	Electricity Governance (Security of Supply) Regulations 2008 and Electricity Governance (Security of Supply) Amendment Regulations 2009
Rolling Outages	Planned electricity disconnections spread over different parts of the network at differing times to avoid prolonged outages at any one location
SOSOP	Security of Supply Outage Plan
Supply Shortage	Declaration made by the Electricity Commission under regulation 9.
National System Operator	Operator of the national electricity transmission grid

4. BACKGROUND

4.1 Electricity Commission

The Electricity Commission is a Crown entity set up under the Electricity Act to oversee New Zealand's electricity industry and markets.

A function of the Electricity Commission under the Electricity Act is to use reasonable endeavours to ensure the security of electricity supply. The Commission's activities include forecasting supply and demand, developing and publishing guideline hydro levels for security of supply, contracting for reserve energy, and improving the ability of consumers to manage price risks in the market.

4.2 Transpower

Transpower is a State Owned Enterprise, tasked with owning and operating New Zealand's National Grid - the network of high voltage transmission lines and substations that transports bulk electricity from where it is generated to distribution line companies such as EA networks.

As System Operator, Transpower manages the real-time operation of New Zealand's electricity transmission system. It keeps the right amount of energy flowing to match generated supply with demand.

4.3 EA networks

EA networks is the electricity network (Lines) company that owns, operates and maintains the lines, cables and substations delivering electricity to the Ashburton District.

5. RANGE OF EVENTS

Events that could lead the Commission to make a supply shortage declaration can in general terms be categorized as;

• Developing Events – Events that evolve over time, for example low hydro lake or fuel levels.

• Immediate Events – Events that occur with little or no warning, usually as a result of a transmission line or major generation failure.

Communication with retailers, civil defence and other stakeholders will be as per notification procedures described in EA networks Operations Manual.

6. EA NETWORKS STAFF RESPONSIBILITIES

The Operations Manager is responsible for application of this plan; however Initial communications from the National System Operator calling for possible participant outages will be the duty of the Network Controller. The Network Controller must notify the Operations Manager as soon as possible and prior to any operations affecting supply to consumers. For some emergencies operating measures may be required immediately. Imposed supply interruptions to consumers shall where possible be applied on a fair and equitable basis. For after normal working hours or where the Operations manager is not available the duty Network Controller shall notify company management in accordance with Section 6 of EA networks Operating Manual

7. HEALTH AND SAFETY

EA networks uphold a policy of social responsibility in respect to consumer's welfare. Should imposed supply cuts affect this aim reasonable assistance subject to the nature and duration of the emergency will be offered to affected consumers.

8. COMMUNICATION WITH THE COMMISSION

The Commission can contact EA networks using the following details:

EA networks Ltd

FAX +64 3 3079801 PH +64 3 3079800

Private Bag 802, Ashburton 7700 18 Kermode St, Ashburton 7700

EA networks will contact the Commission's Emergency Response Project Manager for administration purposes including reporting performance against targets using the following details:

Electricity Commission

FAX: 04 460 8879 PH: 04 460 8860

PO Box 10041

Level 7, ASB Bank Building, 2 Hunter Street

WELLINGTON

9. ACTIONS FOR IMMEDIATE EVENTS

9.1 System Stability

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

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

To recover from immediate events electricity consumption can be reduced by;

9.2 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 numbers of frequency capable relays installed and the likely revenue stream from the market less the compliance costs of participating in the reserve market. EA networks does not presently participate in this market.

9.2.1 Disconnecting Customers

9.2.1.1 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 will be initiated directly by Transpower at their Transpower ASB GXP.

Note: All EA networks 33kV feeders are ring connected. Transpower have approved that EA networks supply will not be interrupted for Zone 1 shedding. However the entire 33kV supply will be interrupted for Zone 2 shedding. Sufficient load reduction within the 33kV network will be available at all times to meet AUFULS requirements (refer below). As the 66kV supply has embedded generation (Highbank and Montalto) this supply remains unaffected by the AUFLS control unless the national operator directly requests EA networks to shed feeders connected to its 66kV sub transmission network.

9.2.1.2 AUFLS Zone 1

If system frequency fails to recover after Reserve Market load shed, AUFLS Zone 1 shedding is implemented. Currently Zone 1 operation does not disconnect EA networks consumers. Please note this arrangement is approved by Transpower as above.

9.2.1.3 AUFLS Zone 2

If zone 1 tripping fails to restore frequency, the next stage, zone 2 activates. Transpower will disconnect all EA networks consumers connected to the 33kV point of supply at Transpower's Substation ASB.

AUFLS Zone 2 load reduction achieved by disconnecting 33kV Network

Winter	65%
Summer	35%

AUFLS Tripping Flow Chart refer Appendix A

9.2.1.4 Manual Shedding

If AUFLS Zone 1 and Zone 2 tripping fails to stabilize frequency the National System Operator may request more load shedding in the form of shedding load connected to EA networks 66kV sub transmission network.

Once the frequency has stabilised the National System Operator will advise the EA networks Network Controller when load can be restored.

9.3 Supply Restoration

Restoration of disconnected load must be restored in conjunction with the National System Operator. This is to prevent overloading the transmission grid and/or creating further instability.

9.4 Transmission Grid Emergency

The National System Operator may request EA networks to reduce load under a grid emergency notice (GEN). EA networks will shed all water heating load, the National System Operator will be advised and if more shedding is required the National System Operator will instruct EA networks to disconnect load as per the rolling feeder outage sequence schedule. (Refer Appendix P EA networks Operating Manual)

If an Immediate Event is in place, the Grid Emergency will take precedence.

If the Commission declares a supply shortage during a Grid Emergency, then EA networks will immediately respond to the request by planning, implementing and scheduling rolling outages as provided in sections 12 to 16 of this plan and in the rolling feeder outage sequence schedule. (Refer Appendix P EA networks Operating Manual)

10. DEVELOPING EVENTS

If the Commission requests through the National System Operator a load reduction for a developing event, EA networks must reduce supply to meet the Commission's targets. The targets are likely to be in the form of a weekly energy savings target that is reviewed each week. To reduce energy usage EA networks would disconnect feeders or groups of feeders where they belong to a parallel or ring supply (rolling outage feeders) in a controlled manner to enable targets to be reached.

There may be financial penalties for not meeting the targets specified by the Commission.

Water heating load shedding is generally not an option for energy savings.

11. DECLARATION OF DEVELOPING EVENT

The Commission will endeavour to provide 9 days prior notice of the requirement for weekly energy savings and any increase in the weekly energy savings target.

The Commission will communicate directly with EA networks in the event that it makes a supply shortage declaration under regulation 9. However, directions to implement rolling outages and specifying savings targets will be communicated through the National System Operator.

If the Commission has made a supply shortage declaration in response to a Developing Event it may put in place general media advertising covering the need to conserve electricity and advising that rolling outages will be necessary.

If EA networks plans to issue a public message related to rolling outages then this will be sent to the Commission for review before being released. Any such communication will give a time for response from the Commission, so as their feedback can be included before EA networks issues the message to the public.

12. CRITERIA FOR ROLLING OUTAGES

For a planned event (>24hours), to ensure public heath and safety is preserved and costs to economy are minimised, priority consumers (refer Appendix B EA networks Operating Manual) will be notified and where possible arrangements made to satisfy basic requirements.

The priority criteria outlined in section 6.1 of the SOSOP have been applied in developing the strategy for implementing rolling outages within the EA networks supply area. The strategy and methodology is outlined in section 16 of this plan.

13. SHUTDOWN NOTIFICATION

In general, media and consumer notifications will be carried out in accordance with Section 6 of EA networks Operating Manual.

However with the wide scale impact of rolling outages it is not feasible to use the standard planned outage notification process (mainly because retail and postal systems could not process the many outage notifications required).

When implementing an extended rolling outage plan, EA networks will notify outages in a number of ways:

- Public notices - EA networks will place public notice advertisements (see draft in Appendix E) providing a rolling outage timetable showing the times and areas affected by rolling outages. The advertisement will provide details of our website page for Consumers that wish to seek more information.

- EA networks website - a dedicated website page will be set up which shows the rolling outage timetable. A future plan is to allow consumers to register their ICP and request future planned interruption information.

- Retailer notification - EA networks will provide the rolling outage timetable to all electricity retailers together with a schedule showing the rolling outage group for all ICPs (it is not appropriate to filter the schedule for an individual retailer's ICPs as this places switching ICPs at risk).

Where possible EA networks will provide 7 days notice of all rolling outage plans, generally publishing and issuing notifications on a Monday to apply from the following Monday.

14. COMMUNICATION WITH NATIONAL SYSTEM OPERATOR

All communications with the National System Operator will be between EA networks Control Centre and Transpower's Regional Operating Centre (South) using Transpower's TSX telephone or normal communication systems.

Prior to notifying and implementing a rolling outage plan, EA networks will consult with the National System Operator Security Coordinator to establish and agree to a process for shedding and restoration, which may include a MW load cap to operate under during restoration phases.

15. GRID EMERGENCY DURING DEVELOPING EVENT

If the National System Operator declares a Grid Emergency during a Developing Event, the Grid Emergency will take priority. As water heating load generally would not be used to reduce load in a Developing Event, EA networks would make water heating load available for load reduction when required for the grid emergency. This load would be shed, and the National System Operator advised. The National System Operator may then instruct the duty Network Controller to shed load to a predetermined value and time period.

16. ROLLING OUTAGES STRATEGY AND METHODOLOGY

The Operations Manager and Network Controller's will review weekly targets and prepare plans for weekly rolling outages based on savings required.

The methodology is:

- Each distribution feeder exiting a zone substation (or switching station, or group of feeders where they belong to a parallel or ring supply) will be named as a "Rolling outage feeder".

  Rolling outage feeders will each be assigned a priority determined from the mix of customers supplied on each feeder (residential, commercial, industrial, farming, essential services etc) and by applying the priority criteria included in section 6.1 of the SOSOP. Rolling outage feeders will be included in a rolling outage sequence schedule (refer Appendix P EA networks Operating Manual) maintained and updated from time to time as appropriate. Regular reviews of the sequence will be made, taking into account seasonal variations and disruptions to high impact consumers as provided in parts 7 and 12 of this plan.

  NOTE: The feeder rolling shutdown sequence schedule allows for winter and summer seasons owing to loadings and load locations being significantly different. Three different orders of interruptions are provided to allow for rotation of interruption

times to assist in minimising inconvenience to consumers and to provide a sense of fairness to all consumers.

- A set of switching instructions will be prepared for each rolling outage group and a record of the off and on times will be maintained on the supplementary log as illustrated in Appendix D
- Load monitoring and recording of load to ensure compliance with the national operator requirements will be undertaken just it is in normal conditions.
- Feeder rolling outage durations shall be dependant upon the percentage savings level requested. The tables below provide an indication of maximum feeder outage durations.
- Where possible, outages should be programmed to be held during daylight hours, between 8am and 5pm, only extending into the evening where necessary to achieve the required savings level or accommodate switching logistics.
- At all times during a period in which rolling outages are being implemented, the load on the 33kV supply will be maintained such that it is at least 32% of the total load on the EA networks network (in order to meet the requirement for AUFLS).
- Unless advised otherwise by the national system operator, the rolling outages plan must provide sufficient time for switching of load to ensure that EA networks load does not dramatically increase or decrease load in any 5 minute period. The Duty Network Controller's shall monitor activities in relation to this limit.
- Having established the week ahead rolling outage plan and despite significant uncertainty in predicting customer behaviour during these types of events, EA networks will use best endeavours to produce a rolling week ahead half hourly load forecast. This will be updated daily to reflect any adjustments to our plan and forwarded to the National System Operator.
- If EA networks is unable for some reason to meet the load disconnection/restoration ramp rates, or if there is expected to be a material departure (greater than 20%) from the previously provided half hourly GXP load forecast / load profile, then EA networks would communicate directly with the National System Operator.

Using the methodology outlined in this section, EA networks **indicative** plans for achieving 5%-25% savings are outlined in the following tables;

Winter

Savings Target	Number of Feeders Impacted	Number of Outages per Week	Maximum Outage Durations	Approximate Weekly MWh savings for typical winter week
5%	6	5	2hrs	344
10%	12	10	3hrs	688
15%	15	15	4hrs	1032
20%	20	20	6hrs	1377
25%	30	25	6hrs	1721

Summer

Savings Target	Number of Feeders Impacted	Number of Outages per Week	Maximum Outage Durations	Approximate MWh savings for typical summer week reductions given near peak loadings
5%	3	5	2hrs	660
10%	6	10	3hrs	1320
15%	9	15	4hrs	1980
20%	12	20	6hrs	2640
25%	15	25	6hrs	3300

17. TARGET MONITORING

The Network Controller in conjunction with the Operations Manager will monitor actual demand versus the target and report values to the National System Operator at regular intervals or at intervals agreed by both parties.

For load shedding to a weekly target, the Business Analyst will monitor the Electricity Commission report of our savings results to our target and together with the General Manager and Operations Manager, review future load shedding to increase or decrease amount of rolling outages to enable the weekly target to be met. In parallel (as a check) with the Electricity Commission, the Business Analyst will be responsible for daily and weekly reporting of consumption relative to target levels (using our data sources).

In the case of daily or real time limits where the Electricity Commission reporting will be too slow for real time action to be taken, the Business Analyst will monitor our savings and adjust accordingly in the timeframe required.

The Network Controller will also provide regular reports to the Commission (at a frequency notified by the Commission) assessing compliance with this plan and compliance with directions from the Commission.

18. LOG OF ROLLING OUTAGES

Controllers will enter in the Rolling Outage Log, times of disconnection and reconnection of all feeder interruptions. The log supplement sheet to be used by Network Controllers is shown in EA networks Operating Manual Appendix P

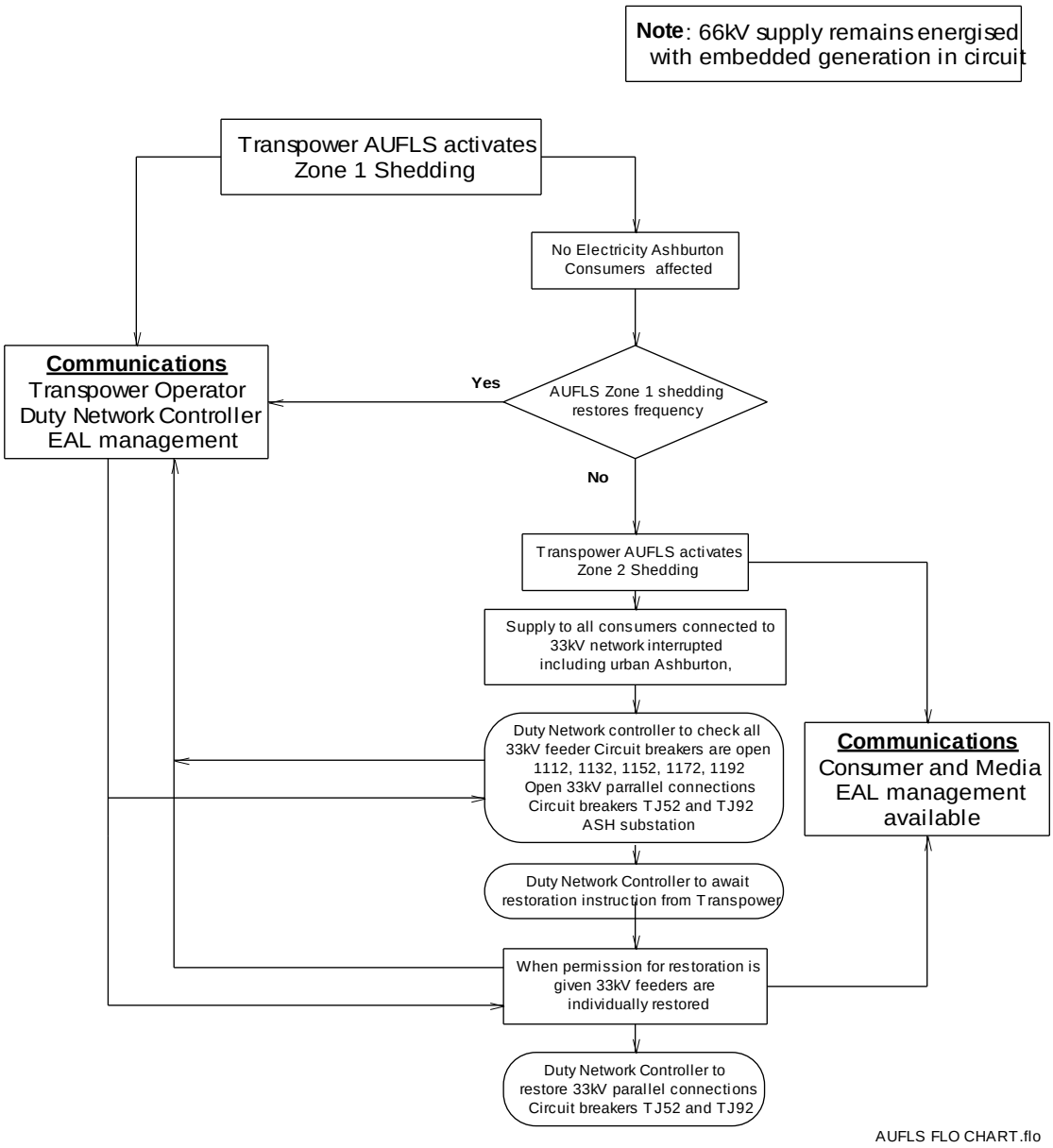
19. CONTINGENT EVENTS

If an unplanned event occurs that will alter planned rolling outages, the decision to alter must be made by the Operations manager, General Manager or a member of network management in accordance with section 6 of EA networks Operating Manual. Where possible, any changes to the planned timetable should be published on EA networks website and communicated to retailers.

APPENDIX A

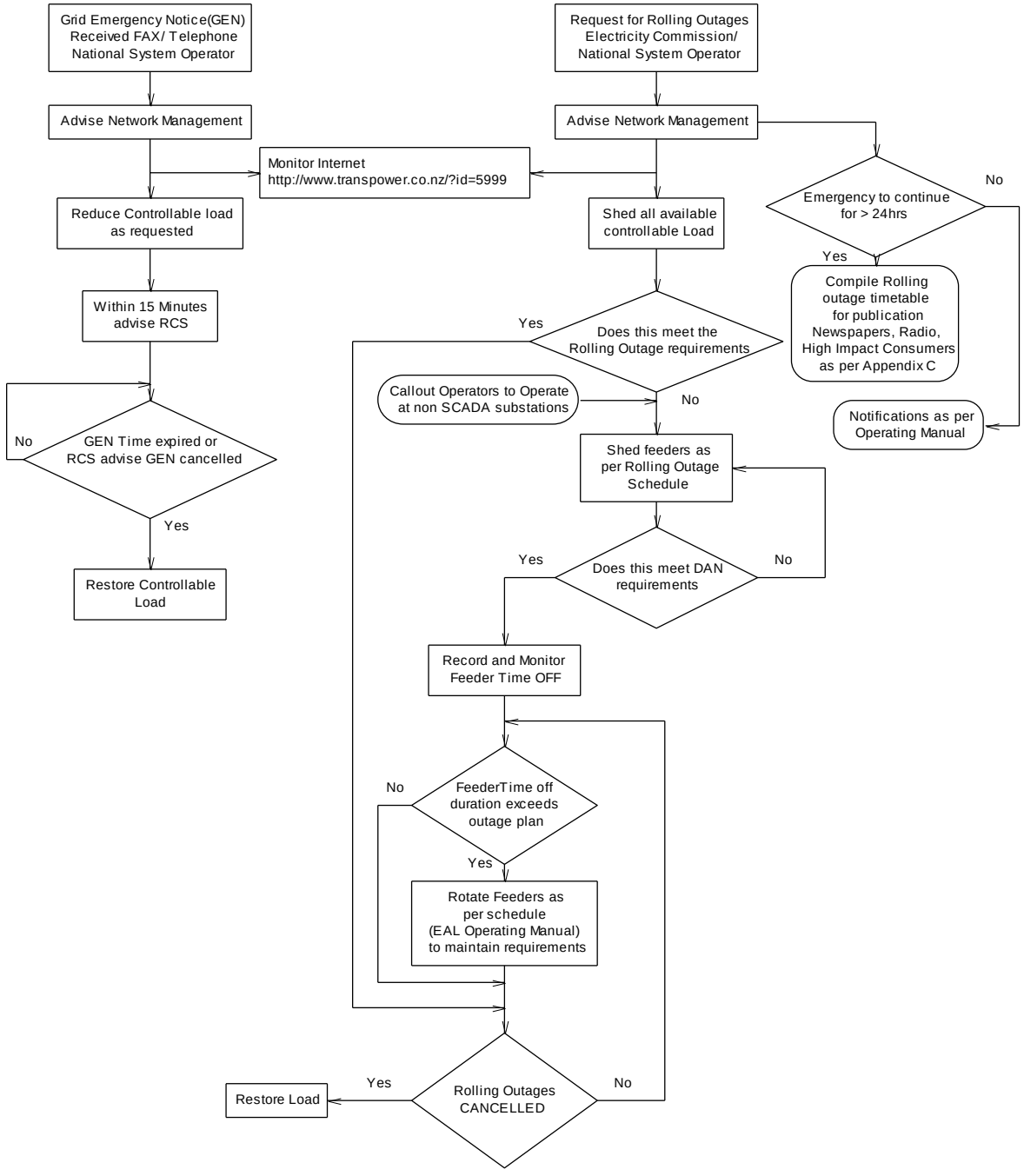
ELECTRICITY ASHBURTON

UNDER FREQUENCY (AUFLS) EMERGENCY FLOW CHART



APPENDIX B **ELECTRICITY ASHBURTON**

GRID EMERGENCY FLOW CHART



Grid Emergency process.flo

APPENDIX C

Log Supplement: National System Operator Imposed Supply Interruptions

Date: _____ **Page_____ off _____**

Zone Substation	Feeder	Switch ID	Off Time	On Time	Duration	Notes

APPENDIX D: DRAFT ROLLING OUTAGE PUBLIC NOTICE

ELECTRICITY SUPPLY INTERRUPTIONS

Please read - your supply may be affected

EA networks is required to reduce electricity consumption with rolling power outages across the Ashburton District to meet a X% savings target set by the Electricity Commission in response to the current energy crisis.

Voluntary savings have already helped us reduce the impact of rolling outages, and further savings may allow us to reduce these planned cuts further.

Outages will occur within the time periods noted in the schedule below. Wherever possible, we will delay cuts and restore power early, so please treat all lines as live.

Within each area we have prioritised individual circuits to minimise the cost and disruption to our community, and timed outages accordingly.

YOUR SAFETY AND PROTECTION

It is important to ensure you keep safe around electricity even when it is off.

• Power may be restored at any time.

• Please leave all appliances off during power cuts, particularly ovens and cook tops.

• To prevent damage to computers and other electrical equipment turn power off at the wall prior to outages.

Are you reliant on power ... If your health may be affected by these outages you will need to make alternative arrangements, or contact your health care provider for assistance. Please note telephones that rely on a mains supply may not operate during outages, so plan in advance.

Traffic lights will be affected by these outages, so please avoid travelling in the affected areas if possible. Avoid using lifts.

Connections in priority groups other than those listed are not expected to be affected.

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