

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a notice of requirement issued by **WEL NETWORKS LIMITED** pursuant to section 168(2) of the Act for designations (3) to authorise the implementation of the Western Network Upgrade Project

SUPPLEMENTARY EVIDENCE OF JOHN VAN BRINK

RE SECURITY OF SUPPLY AND OUTAGES

1. INTRODUCTION

- 1.1 Evidence presented by WEL representatives to the Western Network Upgrade Project hearing, on 9 March 2009, stated that one of the reasons the line is required is to improve the security and reliability of supply to the Raglan environs.
- 1.2 WEL was requested to provide some statistical information on outages and detail how the 110 kV line would improve the supply to Raglan.
- 1.3 This document:
 - (a) Provides a summary of outage data for WEL's Western Area (Section 2); and
 - (b) Explains the difference between security of supply and reliability of supply and confirms statements made in WEL's evidence of 9 March 2009 as to the manner in which the WNUP delivers improved security and reliability for that part of WEL's supply area (Section 3).

2. **OUTAGE HISTORY**

2.1 **Attached** is a summary of outages encompassing connections to the network supplied from the Te Uku zone substation. The summary covers the period from 22 September 2007 to 6 March 2009. Data captured became more detailed from July last year, calculating regulatory and company measures as well as individual outage times.

2.2 Outages can be categorised as follows:

- (a) 400 volt outages are associated with the low voltage network, and generally impact on a small number of connections;
- (b) 11 kV outages, covering larger numbers within the region;
- (c) 33 kV outages, which would affect all connections supplied from Te Uku zone substation, the new line would impact on these

2.3 Over the recorded period there were six 33 kV outages, totalling around 6 minutes. There were significantly more 11 kV outages (around 86), affecting a large number of customers in many cases for well over one hour per outage.

2.4 It goes without saying that WEL's long term planning processes seek to anticipate and avoid such outages as far as possible so that such outages confirm the WEL's predictions and only confirm the need for reinforcement, rather than being the catalyst for reinforcement – that need has long been recognised.

3. **SECURITY AND RELIABILITY – SIGNIFICANCE OF THE WESTERN NETWORK UPGRADE PROJECT**

Security of supply versus reliability of supply

3.1 Security of supply is designed into a network, and relates to outage risk mitigation. Given that electricity cannot be stored, distribution networks are designed to provide a cost effective level of security. Planning has to take into consideration the long life of new assets (over 40 years), time to repair (with transformer delivery of around one year), so that there is adequate capacity to meet supply in the case of outage. As the load grows, the impact of outage increases, requiring a more secure supply with built in redundancy (i. e., n-1).

3.2 Reliability relates to the number, and duration, of interruptions encountered by customers. Reliability is a function of built-in redundancy, but also network

configuration (number of customers on each feeder segment), and fault response times.

- 3.3 WEL's network planning balances the security and reliability of a network with investment costs and demand growth.

WNUP improves security and reliability

- 3.4 Against that background, the implementation of the WNUP will improve security of supply and also reliability.
- 3.5 The Te Uku zone substation has two supply transformers, one is rated at 5 MVA and the other 10 MVA. The maximum regional demand is over 6 MVA. This means that in the event of the 10 MVA transformer outage, even today supply cannot be maintained to all customers at all times.
- 3.6 The WNUP will not only improve reliability through in built duplication (for example the six 33 kV outages incurred last year would be avoided through the 10 kV line), but reduce the risk of transformer outage through the construction of a new zone substation at Raglan. Additionally, the 11 kV feeders will be reconfigured, which means less customers per feeder and thus uncontrolled outages (such as lightning or birds) will affect fewer customers.
- 3.7 Given most of the outages experienced were uncontrolled (e.g., 18 due to trees, 36 due to wind and adverse weather, 20 due to birds, and 23 due to defective/failed equipment), then the ability to reconfigure feeders through enhanced supply to two zone substations in the region will improve reliability to the majority of customers in the region.

John van Brink
March 2009