Commerce Act (Electricity Distribution Thresholds) Notice 2004

Threshold Compliance Statement

Section 2 - Quality Threshold

23 May 2007

Quality threshold assessment as at 31 March 2007

Contents

EXECUTIVE SUMMARY

INTRODUCTION

1 This part of Vector's compliance statement relates to the two criteria of the quality threshold: reliability and consumer engagement.

2 This executive summary is only provided to give a general overview and, therefore, by necessity, does not contain all relevant information related to Vector's performance against the quality threshold. Vector's compliance against the threshold should be assessed on the basis of this complete document, including all supporting information.

Vector's commitment to service quality

3 Vector continually strives to meet the quality threshold target as determined by the Commerce Commission. To do this, Vector has developed and implemented industry - leading business systems and practices such as:

- ensuring a company wide focus on driving improvement in quality of service by linking staff bonuses to company performance, as well as ensuring all staff have access to up–to-date detailed quality-related information on the intranet;

- ensuring Vector's maintenance business partners focus on quality by linking the payments received from Vector directly to specific zone-based quality targets;

- ensuring world-class health and safety processes are in place by providing training to all staff; having zero tolerance for working unsafely and work place accidents; ensuring a company-wide focus on safety through assessing staff and service provider performance with respect to specific Key Performance Indicators (KPIs) related to safety;

- Vector has invested significantly in cutting edge technology to ensure that its assets are managed efficiently (continuously improving both quality and cost efficiency), to make better business decisions and create business solutions tailored specifically to Vector's staff, service provider and customer needs. Vector's Information Delivery unit – a dedicated team undertaking data collection, data quality management, information analysis, data visualisation and spatial analysis in a way that, to Vector's best knowledge, no other network company in New Zealand currently does – plays a key role in achieving this.

Reliability criterion

4 Lines businesses are required to demonstrate that their system average interruption duration index (SAIDI) and system average interruption frequency index (SAIFI) for the assessment year do not exceed the five year average to 31 March 2003 for those respective reliability measures. Due to a number of extreme weather events throughout the assessment year, Vector exceeds both reliability targets, as summarised in the table below.

Notice Requirement	Result for assessment year	Five year average to 31 March 2003		Target exceeded by	Target exceeded by (%)
6(1)(a) - SAIDI	*115.6*	*>*	*85.5*	*30.1*	*35%*
6(1)(b) - SAIFI	*1.420*	*>*	*1.313*	*0.107*	*8%*

Exclusion of extreme events

5 The Commission has made it clear that, in the event of any breaches of the reliability criterion, it will consider the exclusion of extreme events, such as storms, although the Commission has yet to define extreme event. Having exceeded the reliability measures, Vector has demonstrated in this compliance statement that, with such events excluded, Vector would not have exceeded the benchmarks set by the reliability criterion. In Vector's view, the analysis it has presented to this effect is sufficient for the Commission to take no further action based on Vector's reliability performance.

6 Specifically, Vector has analysed its reliability data across the assessment year and explained why a number of periods need to be exempt, across all or selected geographic areas of Vector's network depending on the periods in question. The basis for this is an unusually large number of HV faults occurring in those periods as a result of extreme weather events, with those events also impairing Vector's ability to repair faults (whether caused directly by extreme weather or not) due to high winds and other adverse weather conditions.

7 Vector has had to consider how a 'storm' or 'extreme weather event' should be defined. As the Commission is yet to finalise its approach to defining and adjusting for extreme events, Vector has again proposed an extreme weather event criteria. Although the criteria for exclusion remain the same, the method of calculation adopted for the 2006/07 regulation year has been improved from the method employed in previous year's compliance statements. Reasons for this improvement are found below. Vector employs a method whereby outlier data points can be separated from normal periods on the basis that they:

- were the outcome of grade 7 (near gale-force) or higher winds (as defined on the Beaufort wind scale, 50 km/h or higher) sustained on average over a period of one hour (noting that wind speeds of this level not only cause faults, but also make repair of the network difficult given safety concerns); and

- resulted in network interruptions eight or more times the average number of interruptions, which is consistent with the approach used by the UK regulator Ofgem, when defining extreme weather events; and

- included individual faults, at least 50% of which were the result of uncontrollable events, such as tree contact, branches on lines, lines clashing, broken cross-arms, poles, binders, insulators and jumpers, and lines on the ground, as recorded in Vector's fault classification; 50% of faults for which the cause is unknown[1] were also assumed to be the result of uncontrollable events.

[1] In Vector's view it is a reasonable and conservative assumption to make that there is a 50% chance of an "unknown" fault to have been caused, in the presence of a storm, by weather related events, such as, lines clash which was not observed or the fault cause (branches, bark, etc) being blown clear of the site before the

Where the calculation method used for 2006/07 differs from previous years is in its handling of time periods. The previous method was restricted to testing storm criteria by calendar day. This was susceptible to overlooking storms which spanned two calendar days. The revised approach employed for 2006/07 works on rolling 24-hour periods and is considered to be a more realistic match to real-world conditions. The network does not revert to normal simply because the clock ticks past midnight. The 24-hour approach is also used by the UK regulator Ofgem.

8 In order to normalise the SAIDI and SAIFI figures for extreme event periods, the relevant data-points were replaced with the average SAIDI and SAIFI figures for non-extreme periods in the assessment year. The normalised SAIDI and SAIFI results (shown below) demonstrate that Vector, with the impact of the extreme weather events removed, complies with the SAIDI and SAIFI targets.

Notice Requirement	Normalised result for assessment year	Five year average to 31 March 2003		Discrepancy from target	Discrepancy as percentage of target
6(1)(a) - SAIDI	83.8	<	85.5	-1.6	-2%
6(1)(b) - SAIFI	1.154	<	1.313	-0.159	-12%

Consumer engagement criterion

9 Vector has chosen, as provided for by the Notice, not to demonstrate compliance with the consumer engagement criterion at this time. Instead, Vector will demonstrate compliance as at the next assessment date (31 March 2008). However, Vector continues to engage with customers at all levels and continues to seek feedback from customers via monthly satisfaction surveys.

repair crew arrives. Vector believes that this chance is, in reality, much higher, but has adopted a conservative approach for the purpose of this analysis.

STRUCTURE OF THE DOCUMENT

10 The summary below sets out the structure of the document, along with short summaries of the individual sections:

The Commission's Requirements

- sets out and discusses the Commission's threshold requirements;

Vector's Commitment to Quality

- sets out Vector's commitment to meet the quality threshold target as determined by the Commission;
- outlines Vector's systems and processes aimed at achieving that commitment.

Reliability Criteria of the Quality Threshold – Clauses 6(1)(a)&(b)

- sets out Vector's performance with respect to the reliability measures established by the Commission (Vector has exceeded the targets set by this criterion);
- explains that extreme uncontrollable events have occurred in Vector's network areas during the assessment period; and
- provides evidence that with the effect of the extreme weather events removed, Vector would have complied with the reliability criterion.

Consumer Engagement (Customer Communication) [2] Criterion of the Quality Threshold - clause 6(1)(c)

- Vector has chosen, as provided for by the Notice, not to demonstrate compliance with the consumer engagement criterion at this time.

[2] Whilst the Commission's decision papers refer to the "consumer engagement" criterion, section 6(1)(c) Gazette Notice refers to "customer communication". For the avoidance of doubt, the words "customer" and "consumer" (used interchangeably in this document) mean "customer" as defined in the Gazette Notice.

THE COMMISSION'S REQUIREMENTS

11 The Commission's quality threshold, as set out in the final decision paper of 1 April 2004 and the Commerce Act (Electricity Distribution Thresholds) Notice 2004 (the Notice), provides for two criteria, related to reliability and consumer engagement. The section below discusses these criteria in more detail.

Reliability criterion

12 In broad terms, the Reliability Criterion of the quality threshold seeks to ensure (in order to comply) that there is no material deterioration in quality (as measured by reliability statistics). Sections 6(1)(a) and 6(1)(b) set out the Reliability Criteria, viz:

> "(a) *interruption duration:* the SAIDI of a distribution business for each assessment period *is not to exceed* the five-year average SAIDI of the distribution business to 31 March 2003 (calculated in accordance with the right-hand side of the following expression):
>
> $$SAIDI_j \leq \left(\frac{SAIDI_{1999} + SAIDI_{2000} + SAIDI_{2001} + SAIDI_{2002} + SAIDI_{2003}}{5} \right)$$
>
> where:
>
> *j* denotes the calendar year in which the assessment date occurs;
>
> *SAIDI* year is the sum of SAIDI class B and SAIDI class C, for that year, where SAIDI for a particular class is calculated by dividing the sum obtained by adding together the interruption duration factors for all interruptions within that particular interruption class for the period of 12 months ending on 31 March in that year by the average of the total number of network connection points at the beginning of that year and the total number of network connection points at the end of that year;
>
> (b) *interruption frequency:* the SAIFI of the distribution business for each assessment period *is not to exceed* the five-year average SAIFI of the distribution business to 31 March 2003 (calculated in accordance with the right-hand side of the following expression):
>
> $$SAIFI_j \leq \left(\frac{SAIFI_{1999} + SAIFI_{2000} + SAIFI_{2001} + SAIFI_{2002} + SAIFI_{2003}}{5} \right)$$ where:
>
> *j* denotes the calendar year in which the assessment date occurs;
>
> *SAIFI* year is the sum of SAIFI class B and SAIFI class C, for that year, where SAIFI for a particular class is calculated by dividing the sum obtained by adding together the number of network connection points affected by each interruption within that particular interruption class for the period of 12 months ending on 31 March in that year by the average of the total number of network connection points at the beginning of that year and the total number of network connection points at the end of that year"

Consumer Engagement Criterion

13 In broad terms, the Consumer Engagement Criterion seeks to ensure (in order to comply) that lines businesses are meaningfully engaging with their consumers. Section 6(1)(c) of the Notice sets out the Consumer Engagement Criterion, which places a number of requirements on lines businesses, viz:

> "(c) *customer communication:* at least once during the period of 2 years ending 31 March 2006 and at least once during the period of 2 years ending 31 March 2008, a distribution business is to—
>
> (i) properly advise (or ensure that another person properly advises on its behalf) its customers (or another person that accurately reflects the interests of those customers) about the price-quality trade offs available to them in relation to the goods and services provided by the distribution business; and
>
> (ii) consult (or ensure that another person consults on its behalf) with its customers (or another person that accurately reflects the interests of those customers) about the quality of goods and services that they require, with reference to the prices of those goods and services; and
>
> (iii) properly consider the views expressed by customers during and after that consultation; and
>
> (iv) adequately take these views into account when making its asset management decisions."

VECTOR'S COMMITMENT TO QUALITY

Introduction

14 Vector continues to strive to meet the quality threshold target as determined by the Commission. Vector has systems and processes in place to do this. As discussed below, Vector considers the four main aspects of the quality of distribution goods and services to be safety, customer satisfaction, reliability and power quality.

Ensuring company-wide focus on quality

15 In order to continually drive improvement in the quality of service, Vector has continued to ensure that a company-wide focus on quality is maintained. As an example, Vector's Corporate Incentive Scheme (CIS) is structured so that staff bonuses are dependant on company performance, including quality targets, such as reliability, safety and customer satisfaction. Also, a large scale project to identify, document and review all key processes which contribute to company-wide quality and performance was established.

16 To keep staff updated and focused on quality performance, Vector provides staff with access to various interactive reports (through the Vector-Connect intranet). Staff with direct network performance influence and accountability are also provided with daily reports via automated email.

17 A new performance dashboard report has been developed to aid in communicating performance on a regular basis to Vector's business partners following feedback that various previous formats did not target the intended audiences effectively. The dashboard report is generated at two levels to inform management and field workers.

18 Vector has developed a field supervisor up-skilling programme which targets the service providers' team leaders. The programme consists of psychometric testing of hardwired behaviours with a follow-up full day workshop focused on quality, safety and ownership. The aim is to instil a leadership quality into this group and provide them with the tools required to lead a team and deliver a quality and safe product which they are "proud to own". Whilst individual test results are confidential, the programme does provide the service providers and Vector with a solid profile of what a great field leader looks like.

19 To support this up-skilling initiative a proactive "Issues" process has been developed and implemented which provides a pathway to capture issues faced day to day by field staff. The identified issues can then be resolved though improved behaviours, engineering, equipment and strategy before they become quality or safety problems.

Safety

20 Vector employs health and safety practices across all parts of the business with a vision to be the safest place to work in New Zealand. Our safe work practice requirements and training extend to anyone who works on any of the Vector

networks, including all staff, service providers, and third parties (council streetlight contractors, utility arborists, Electricity Retailer agents etc.).

21 Vector maintains its zero tolerance philosophy for working unsafely and workplace accidents, believing that every individual who works on or around our network deserves to return home safety at the end of each day.

22 To ensure Vector's expectations are maintained to a high standard, senior management of Vector and all service providers meet monthly in Auckland and Wellington to ensure a consistent approach is taken to managing safety. This forum also ensures that if there are any lessons learnt, that learning is shared and adopted by the entire work force.

23 Vector's "Stay Safe" schools education programme on electrical safety aimed at 7-11 year olds in the schools within Vector's three network areas continues to be a success, with schools now proactively requesting return visits each year. This programme is ongoing and includes interactive presentations, a video, workbooks and an Electrical Safety World website (http://www.vectorsafety.co.nz).

24 To help raise awareness of safety issues for those working near Vector's network assets, Vector publishes and distributes a booklet entitled "A guide for working safely". This booklet was revised this year to ensure the content was up to date and a 2nd edition has now been printed.

25 Vector has also introduced a radio safety campaign which targets residential home owners. This programme provides various scenarios where a home owner may put themselves at risk and advises the best way to contact Vector to provide assistance where necessary.

26 Vector also ensures a focus on environmental safety, by prioritising jobs that are related to faults on the network, which cause safety concerns (including with respect to the natural environment, such as oil leaks). Such jobs continue to be put ahead of the normal schedule and are carried out as soon as possible.

27 To further improve environmental performance, Vector engaged the services of environmental consultants Pattle Delamore Ltd in 2005 who reviewed Vector's entire environmental management systems and practices, including those of our service providers. The resulting improvement programme is nearing completion and has raised both the awareness of our impact on the environment and our performance in managing that impact.

28 Vector records and investigates injury or "near miss" incidents, both safety and environmental, that occur on the network to manage the events and learn from them to ensure that the likelihood of reoccurrences is minimised.

29 As a result of this dedicated approach, Vector and its service providers have an overall lost time injury frequency rate (LTIFR) per million man person-hours worked of 0.34 for the last 12 months. Vector has been invited to present at the 2007 National Health and Safety Conference in May hosted by Safeguard, following being awarded the Safeguard annual "Best Health and Safety Management System Implementation" award in 2005.

Information Delivery unit

30 Vector has invested significantly in cutting edge technology to ensure that its assets are managed efficiently (continuously improving both quality and cost efficiency), to make better business decisions and create business solutions tailored specifically to Vector's staff, service provider and customer needs. Vector's Information Delivery unit – a dedicated team undertaking data collection, data quality management, information analysis, data visualisation and spatial analysis in a way that, to Vector's best knowledge, no other network company in New Zealand currently does – plays a key role in achieving this.

31 Vector invests heavily in maintenance and capital works to ensure its network is running at acceptable levels and can cater for future growth. The company generates extremely large volumes of multi-dimensional information – including asset, customer, financial and operational data – which all relate to each other, or are interlinked, to varying degrees. The Information Delivery team plays a crucial role in terms of:

- The collection of this data from various sources;
- Cleansing, conforming and integrating this data into a meaningful format; and
- Presenting high quality, meaningful information back to the business in an effective form, to enable them to make informed business decisions. For example, where it is best to target expenditure on the network in order to improve reliability and, ultimately, provide ongoing benefits to customers.

32 Through the use of graphs, spatial analysis and other data visualisations, service quality can be better understood, both in terms of reporting events, as well as proactive network maintenance and investment in targeted areas.

33 Flexibility is one of the key capabilities of the systems, something that was identified at the design stage as an imperative given the company's ever changing structure and focus. Through the use of such tools, Vector is able to better understand fault causes and restoration times. This enables Vector to focus on those areas that will improve its quality performance and benefit customers most.

RELIABILITY CRITERIA OF THE QUALITY THRESHOLD - CLAUSES 6(1)(A) AND 6(1)(B)

First reliability requirement (s6(1)(a) of the Notice) (SAIDI)

34 Vector does not comply with s6(1)(a) of the Notice, due to the effects of extreme weather events beyond Vector's control, as described below.

35 As required by s6(1)(a), lines businesses are required to demonstrate that their SAIDI for the assessment year does not exceed their five year average SAIDI to 31 March 2003. As summarised in the tables below, Vector does not comply with this requirement.[3] However, this is due to uncontrollable circumstances (extreme weather events) which if removed, would allow Vector to comply with the requirement.

Notice Requirement	SAIDI for the assessment year	Is not to exceed	The five-year average SAIDI to 31 March 2003
Notice expression	$SAIDI_{2007}$	≤	$\frac{SAIDI_{1999}+SAIDI_{2000}+SAIDI_{2001}+SAIDI_{2002}+SAIDI_{2003}}{5}$
Vector Result	**115.6**	**<**	**85.5**

Target exceeded by	**30.1 SAIDI minutes**	**35%**

Second reliability requirement (s6(1)(b) of the Notice) (SAIFI)

36 Vector does not comply with s6(1)(b) of the Notice, due to the effects of extreme weather events beyond Vector's control, as described below.

37 S6(1)(b) requires lines businesses to demonstrate that their SAIFI for the assessment year does not exceed their five year average SAIFI to 31 March 2003. As summarised in the tables below, Vector does not comply with this requirement.[4] However, this is due to uncontrollable circumstances (extreme weather events) which if removed, would allow Vector to comply with the requirement.

Notice Requirement	SAIFI for the assessment year	Is not to exceed	The five-year average SAIFI to 31 March 2003
Notice expression	$SAIFI_{2007}$	≤	$\frac{SAIFI_{1999}+SAIFI_{2000}+SAIFI_{2001}+SAIFI_{2002}+SAIFI_{2003}}{5}$
Vector Result	**1.420**	**>**	**1.313**

Target exceeded by	**0.107 SAIFI**	**8%**

[3] Detailed information is attached in the Appendices

[4] Detailed information is attached in the Appendices

Explanation of breach of the reliability criteria

38 Vector submits that the targets set by the reliability criteria of the quality threshold were exceeded due to circumstances outside Vector's reasonable control, including extreme weather conditions that affected a number of Vector network areas:

Scope for post-breach exclusion of 'extreme events'

39 The Commission has made it clear that, post any breaches of the reliability criterion, it will consider the exclusion of extreme events, such as storms. Specifically, the Commission has said:

> "Any distribution business breaching the reliability criterion may provide the Commission with an explanation supported by evidence of mitigating circumstances. The Commission will consider such explanatory information and will not investigate further if it is satisfied the breach was due to uncontrollable circumstances."[5]

> "As explained in its draft Assessment and Inquiry Guidelines, and summarised in its 20 February media release, the Commission will take into account the impact of relevant extreme and rare events when assessing lines businesses against the quality threshold."[6]

40 In this compliance statement, Vector has provided analysis to demonstrate that the targets set by the reliability criterion were exceeded due to uncontrollable circumstances (extreme weather events). The degree to which such events affected the following Vector network areas is set out in the following tables:

[5] Regulation of Electricity Lines Businesses Targeted Control Regime: Threshold Decisions (Regulatory Period Beginning 2004), 1 April 2004, page 24, paragraph 88

[6] Letter from Calum Gunn re Impact of storms on quality threshold, dated 26 February 2004, paragraph 3

Northern Network Area					
Start Date/Time	End Date/Time	Hours	Faults	SAIDI	SAIFI
11/06/2006 18:00	13/06/2006 14:00	44	42	6.8	0.05
8/11/2006 21:00	10/11/2006 20:00	47	49	3.5	0.04
12/03/2007 23:00	15/03/2007 18:00	67	54	4.8	0.05
28/03/2007 7:00	30/03/2007 13:00	54	42	2.1	0.03
			Total Impact	17.2	0.17

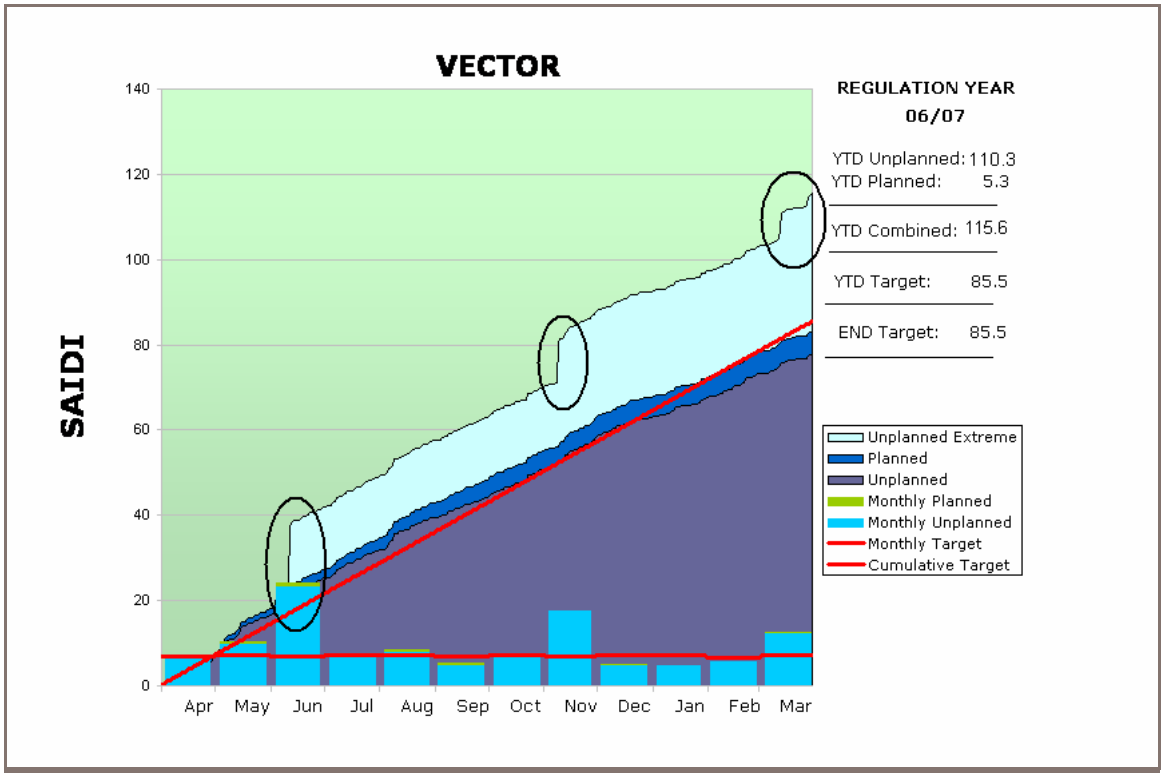
Auckland Network Area					
Start Date/Time	End Date/Time	Hours	Faults	SAIDI	SAIFI
12/06/2006 1:00	13/06/2006 15:00	38	33	7.5	0.04
9/11/2006 2:00	10/11/2006 18:00	40	32	6.2	0.04
14/03/2007 1:00	15/03/2007 3:00	26	9	0.7	0.01
28/03/2007 21:00	29/03/2007 21:00	24	8	0.5	0.00
			Total Impact	14.9	0.10

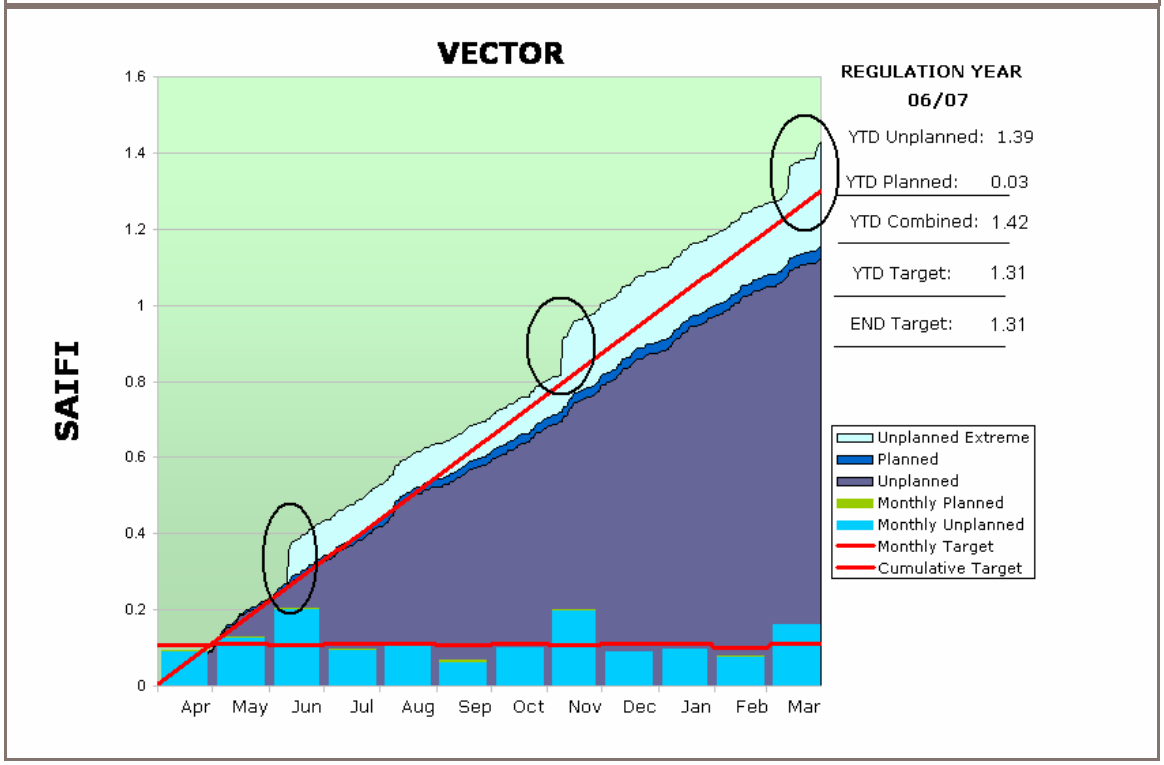
Wellington Network Area					
Start Time	End Time	Hours	Fault Count	SAIDI	SAIFI
11/06/2006 2:00	12/06/2006 23:00	45	7	0.4	0.01
18/06/2006 16:00	19/06/2006 18:00	26	5	0.1	0.00
3/10/2006 15:00	5/10/2006 14:00	47	7	0.3	0.00
23/10/2006 16:00	25/10/2006 14:00	46	7	0.1	0.00
13/11/2006 17:00	15/11/2006 17:00	48	12	0.4	0.01
14/03/2007 8:00	15/03/2007 16:00	32	9	0.1	0.01
			Total Impact	1.4	0.03

41 Vector has provided its own analysis to demonstrate that the weather conditions during the periods and in the areas listed above constitute extreme events. Analysis shows (summarised below[7]) that, had these extreme weather events not occurred, Vector would not have exceeded the SAIDI and SAIFI targets set by the reliability criterion.

[7] The full details of the analysis are provided in the following sections.

42 Before describing the analysis, the impact of the larger events in June 2006, November 2006 and March 2007 in particular can be readily seen on Vector's cumulative SAIDI and SAIFI trend graphs through the assessment year[8] (circled in black).



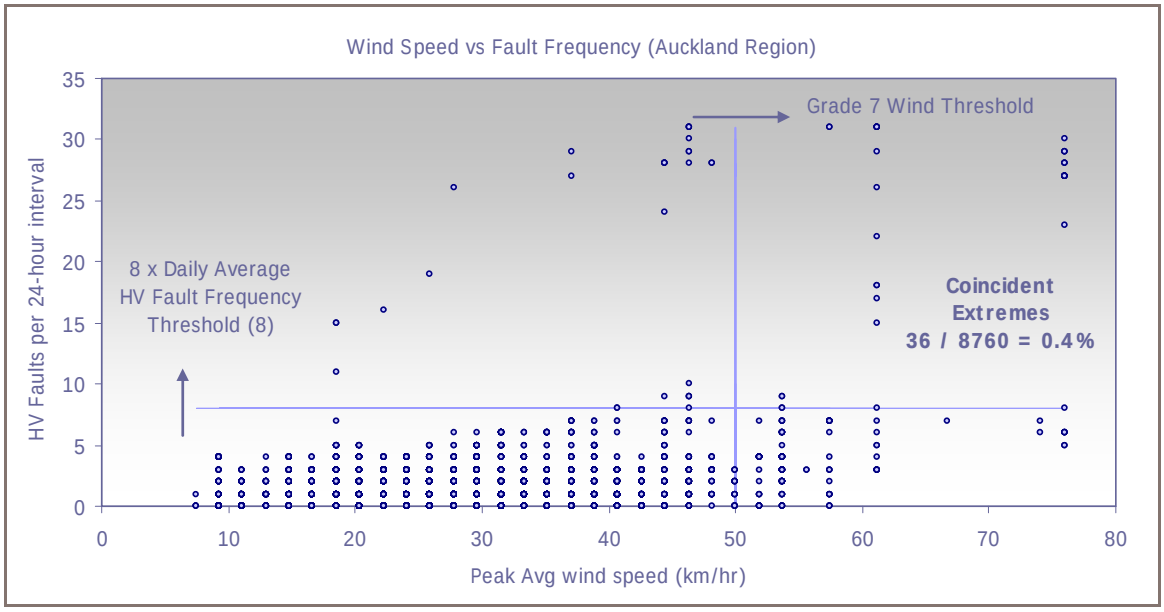


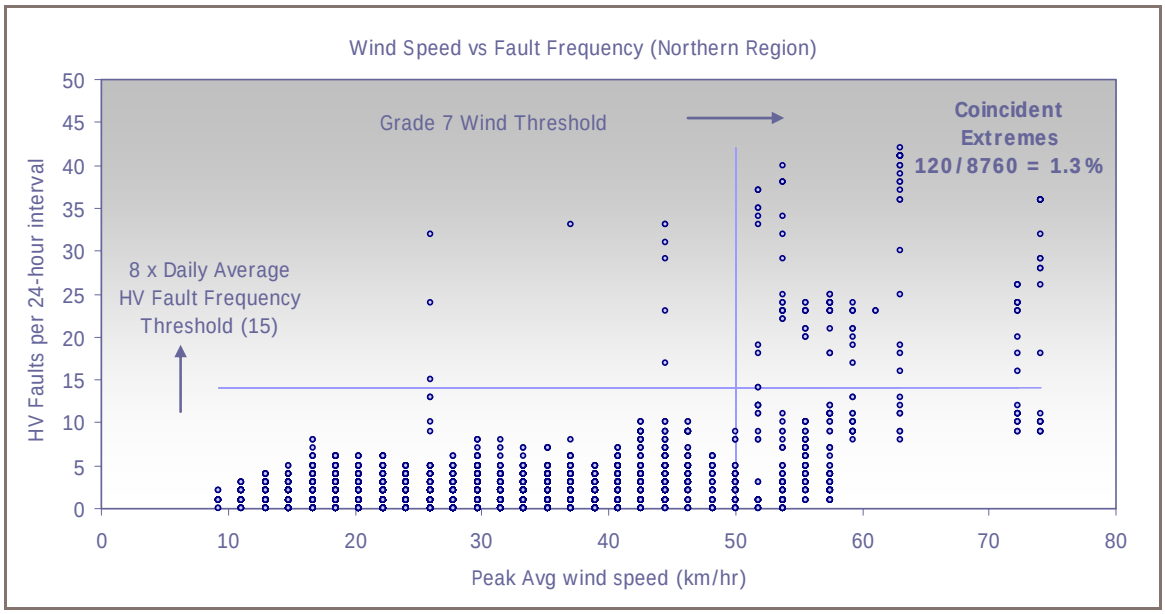
[8] Source: Vector's intranet quality tools

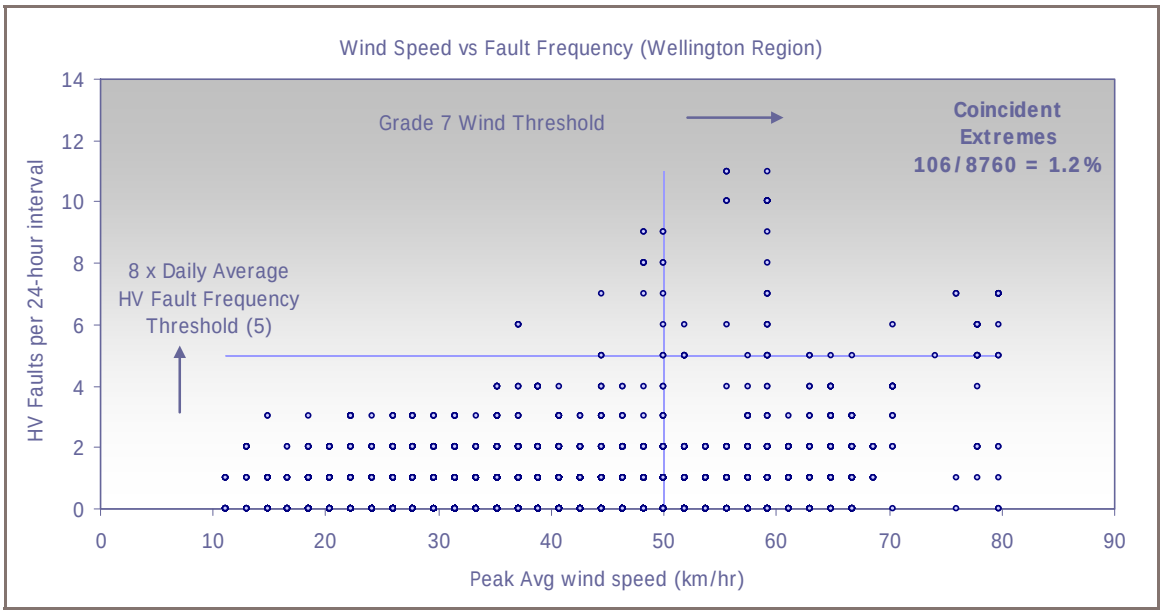
Analysis of extreme weather events

43 The analysis carried out by Vector identifies specific intervals on which Vector's network areas were badly affected by extreme weather conditions.

44 This was achieved by analysing every rolling 24-hour period in the assessment year to identify coincident extremes with respect to unusually high number of faults occurring and unusually high peak average wind speed for that interval. The graphics below show the scatter diagrams used to identify such outliers.







45 More specifically, the graphs were compiled on the following basis:

- every rolling 24-hour period in the year (staggered at hourly intervals) was plotted on a scatter-gram, by peak sustained wind speed (x-axis) and fault frequency (y-axis) (noting that some data points coincide such that 8,760 data points may not appear);

- the vertical blue line is based on grade 7 (near gale-force) or higher winds (as defined on the Beaufort wind scale to be ≥13.9 metres per second (m/s), which is equivalent to ≥50 km/h) sustained on average over a period of one hour, where individual gusts in that hour could be of a much higher speed. It is important to note that wind speeds of this level not only cause faults but also make repair of the network difficult, given safety concerns from (for example) using ladders.

Land Beaufort Wind Scale			
B.No.	**Description**	**m/s**	**How to recognise**
0	Calm	0 – 0.2	Smoke rises vertically
1	Light Air	0.3 – 1.5	Smoke drifts
2	Light Breeze	1.6 – 3.3	Wind felt on face, leaves rustle
3	Gentle Breeze	3.4 – 5.4	Small twigs in constant motion, flags flap
4	Moderate Breeze	5.5 – 7.9	Raises dust, loose paper, small branches move
5	Fresh Breeze	8.0 – 10.7	Small trees in leaf begin to sway
6	Strong Breeze	10.8 – 13.8	Large branches in motion, umbrellas used with difficulty
7	Near Gale	13.9 – 17.1	Whole trees in motion, inconvenience felt walking against the wind
8	Gale	17.2 - 20.7	Gale, breaks twigs off trees, impedes progress
9	Severe gale	20.8 – 24.4	Slight structural damage occurs
10	Storm	24.5 – 28.4	Trees uprooted, considerable damage occurs
11	Violent Storm	28.5 – 32.6	Violent storm, widespread damage
12	Hurricane Force	32.7+	Hurricane, extreme destruction

- the horizontal blue line is based on High Voltage (HV) fault frequency, with the number of HV faults recorded for all 24-hour periods above the line being eight or more times the daily average number of HV faults for the benchmark five–year period. Initially, this was an informed judgement by Vector's reliability experts, as to whether the number of interruptions is outside the ordinary or is extreme. However, Vector has since become aware that this approach is consistent with the approach adopted by the UK regulator Ofgem in defining extreme events[9].

46. From prior discussions with NIWA (National Institute of Water & Atmospheric Research) and the MetService, (both of which are expert meteorological bodies) as well as our own research, the Beaufort wind scale is an internationally accepted standard used by the World Meteorological Organisation (WMO). The above table was sourced from NIWA.[10]

47 Based on the approach described above (8-multiple of average daily HV faults and 50 km/h and above winds) the graphs then identify, in the top right quadrant, a number of candidate data points that may (but are not definitely to) be normalised on the basis that the high SAIDI and SAIFI on those periods are the result of extreme weather events. In other words, near gale force winds and high interruptions are necessary, but not sufficient conditions for a 24-hour period to be normalised. Data points were only normalised after examining Vector's register of HV faults and verifying that at least 50%[11] of the interruptions were the result of weather-related uncontrollable events, such as tree contact, branches on lines, lines clashing, broken cross-arms, poles, binders, insulators and jumpers, and lines on the ground, as recorded in Vector's fault classification; 50% of faults for which the cause is unknown[12] were also assumed to be the result of uncontrollable events.

48 It is important to note that, although some of the faults occurring on such periods are not directly caused by the extreme event, Vector's ability to repair faults is severely affected by extreme weather (for example, due to safety concerns when using ladders during high winds). Thus, the SAIDI and SAIFI impact of faults on extreme event days the causes of which could not be directly linked to extreme weather, is far higher than it would have been had they occurred on a normal day.

49 In order to normalise Vector's performance over the assessment year, the SAIDI and SAIFI figures for outlier periods were replaced with the average SAIDI and SAIFI figures for non-outlier days in the assessment year.

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[9] Guaranteed Standards: Ofgem Guidance and Proposals on Best Practice – Electricity Distribution, 28 April 2006, Appendix 1; Electricity (Standards of Performance) Regulations 2005, Part II, clauses 4(a)-(c), http://www.opsi.gov.uk/si/si2005/20051019.htm.

[10] Copy of Beaufort Wind Scale as provided by NIWA is included in the supporting information. Previously Vector has sourced the Beaufort Wind Scale from Metservice, however, this year Vector sourced the scale from NIWA for consistency reasons as all wind speed data used for analysis is obtained directly from NIWA. Although we have changed from Metservice to NIWA the source data in the scale has remained the same in both the 2006 and 2007 Quality Threshold Compliance Statements.

[11] As is demonstrated in the detailed analysis, for most data points this percentage was much higher.

[12] In Vector's view it is a reasonable and conservative assumption to make that there is a 50% chance of an "unknown" fault to have been, in the presence of a storm, caused by weather related events, such as, lines clash which was not observed or the fault cause (branches, bark, etc) being blown clear of the site before the repair crew arrives. Vector believes that this chance is, in reality, much higher, but has adopted a conservative approach for the purpose of this analysis.

50 Repeating the calculations set out in s6(1)(a) and s6(1)(b), but using the normalised SAIDI and SAIFI figures (the results are summarised in the table below) shows that Vector would have complied with both reliability criteria, had the extreme weather events not occurred.

Notice Requirement	SAIDI excluding extreme event impact	Is not to exceed	The five-year average SAIDI to 31 March 2003
Notice expression	$SAIDI_{2007}$	≤	$\frac{SAIDI_{1999}+SAIDI_{2000}+SAIDI_{2001}+SAIDI_{2002}+SAIDI_{2003}}{5}$
Vector Normalised Result	**83.8**	**<**	**85.5**

Target outperformed by	**1.6 SAIDI minutes**	**2%**

Notice Requirement	SAIFI excluding extreme event impact	Is not to exceed	*The five-year average SAIFI to 31 March 2003*
Notice expression	$SAIFI_{2007}$	≤	$\frac{SAIFI_{1999}+SAIFI_{2000}+SAIFI_{2001}+SAIFI_{2002}+SAIFI_{2003}}{5}$
Vector Normalised Result	**1.154**	**<**	**1.313**

Target outperformed by	**0.159 SAIFI**	**12%**

CONSUMER ENGAGEMENT (CUSTOMER COMMUNICATION) CRITERION OF THE QUALITY THRESHOLD - CLAUSE 6(1)(C)

51 Vector has chosen, as provided by the Notice, not to demonstrate compliance with the consumer engagement criterion at this time. Instead, Vector will demonstrate compliance as at the next assessment date (31 March 2008). However, Vector continues to engage with customers at all levels and continues to seek feedback from customers via monthly satisfaction surveys.

APPENDICES

Appendix 2-1 Calculation of SAIDI and SAIFI figures for the purposes of S6(1)(A) and 6(1)(B)

Event_CauseResponsibility	Vector

Sum of SumOfEvent_CustMins	Region_Name			
DISCLOSURE_YEAR	Auckland	Northern	Wellington	Grand Total
98/99	20,937,255	36,432,001	5,325,964	62,695,220
99/00	14,944,847	19,358,545	4,374,432	38,677,824
00/01	13,070,886	25,576,088	4,315,737	42,962,711
01/02	14,018,590	26,774,194	3,542,016	44,334,800
02/03	20,035,481	41,183,159	4,493,664	65,712,304
03/04	18,067,518	36,529,672	11,769,009	66,366,199
04/05	18,032,508	29,006,503	6,288,957	53,327,968
05/06	26,509,646	45,946,317	4,980,649	77,436,612
06/07	30,555,223	40,852,313	5,583,921	76,991,457
Grand Total	176,171,954	301,658,792	50,674,349	528,505,095

Event_CauseResponsibility	Vector

Sum of SumOfEvent_CustAffec	Region_Name			
DISCLOSURE_YEAR	Auckland	Northern	Wellington	Grand Total
98/99	309,937	449,658	79,471	839,066
99/00	263,966	357,669	57,094	678,729
00/01	261,162	380,458	59,125	700,745
01/02	217,055	437,458	63,038	717,551
02/03	326,204	582,197	65,195	973,596
03/04	270,208	550,391	99,476	920,075
04/05	247,404	433,458	60,717	741,579
05/06	380,683	533,317	80,085	994,085
06/07	351,821	490,829	103,168	945,818
Grand Total	2,628,440	4,215,435	667,369	7,511,244

BENCHMARK				
Year	CustMins	CustAffec	**SAIDI**	**SAIFI**
98/99	62,695,220	839,066	109.44	1.46
99/00	38,677,824	678,729	66.24	1.16
00/01	42,962,711	700,745	72.54	1.18
01/02	44,334,800	717,551	73.46	1.19
02/03	65,712,304	973,596	105.62	1.56
Average			**85.46**	**1.31**
REGULATED YEARS				
03/04	66,366,199	920,075	104.38	1.45
04/05	53,327,968	741,579	82.54	1.15
05/06	77,436,612	994,085	118.10	1.52
06/07	76,991,457	945,818	**115.60**	**1.42**

Customer numbers

Year	Northern	Wellington	Auckland	Vector	Regulation year	Regulation customers
1-Apr-94	157978	134830	242066	534874		
1-Apr-95	157978	136852	243104	537934		
1-Apr-96	160313	138905	249622	548840		
1-Apr-97	164587	140989	251490	557066		
1-Apr-98	173802	143104	252361	569267		
1-Apr-99	173802	145250	257478	576530	98/99	572898
1-Apr-00	175285	147429	268621	591335	99/00	583933
1-Apr-01	181266	150493	261500	593259	00/01	592297
1-Apr-02	185918	152595	275329	613842	01/02	603551
1-Apr-03	190074	154554	285850	630478	02/03	622160
1-Apr-04	192075	156357	292739	641171	03/04	635825
1-Apr-05	196828	158462	295763	651053	04/05	646112
1-Apr-06	198309	158647	303391	660347	05/06	655700
1-Apr-07	201334	160602	309742	671678	06/07	666013

Note to reliability data tables

In relation to the Northern and Wellington networks acquired in October 2002, the historical information has been prepared from records acquired with the business. In some cases these records have been limited and are not consistent with other operational network management systems. We are satisfied that the information available is reliable and has been consistently compiled for the purposes of the preparation of the calculations.

Appendix 2-2 Beaufort wind scale (Land) as supplied by NIWA

Beaufort wind scale (Land)	Mean Wind Speed		Limits of wind speed		Wind descriptive terms	Land descriptive terms
	Knots	m/s	Knots	m/s		
0	0	0	<1	0-0.2	Calm	Calm, smoke rises vertically
1	2	0.8	1-3	0.3-1.5	Light air	Light air, direction of wind shown by smoke drift only
2	5	2.4	4-6	1.6-3.3	Light breeze	Light breeze, wind felt on face, leaves rustle, vanes moved by wind
3	9	4.3	7-10	3.4-5.4	Gentle breeze	Gentle breeze, leaves and small twigs in constant motion, wind extends light flag
4	13	6.7	11-16	5.5-7.9	Moderate breeze	Moderate breeze, raises dust, loose paper, small branches move
5	19	9.3	17-21	8.0-10.7	Fresh breeze	Fresh breeze, small trees in leaf begin to sway
6	24	12.3	22-27	10.8-13.8	Strong breeze	Strong breeze, large branches in motion, umbrellas used with difficulty
7	30	15.5	28-33	13.9-17.1	Near gale	Near gale, whole trees in motion, inconvenience felt walking against the wind
8	37	18.9	34-40	17.2-20.7	Gale	Gale, breaks twigs off trees, impedes progress
9	44	22.6	41-47	20.8-24.4	Severe gale	Strong gale, slight structural damage occurs
10	52	26.4	48-55	24.5-28.4	Storm	Storm, trees uprooted, considerable damage occurs
11	60	30.5	56-63	28.5-32.6	Violent storm	Violent storm, widespread damage
12	-	-	64+	32.7+	Hurricane	Hurricane, extreme destruction

Note 3.6 km/h = 1m/s