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DuPont (New Zealand) Ltd
Level 1 / 14 Ormiston Road
East Tamaki Auckland 2013
New Zealand

Entrust
P O Box 109626
Auckland 1149
New Zealand

Attn: The Trustees

12th September 2016

State of the Network Report 2016

As a requirement of the Deed Recording Essential Operating Requirements (DREOR), Vector management is required to provide a report from an independent expert to advise on the state of the Auckland Electricity reticulation assets.

The scope of work required is to prepare a report on:

- the state of Vectors electricity lines across its Auckland and Northern networks with regard to maintenance programmes and expenditure;
- any need for the upgrading of Vectors electricity assets, taking into account what is already being planned by Vector management;
- the capacity of Vectors electricity assets in relation to forecast demand;
- any security risks to Vectors electricity lines network; and
- High Impact Low Probability (HILP) events.

DuPont (New Zealand) Ltd was engaged by Vector Energy to undertake the 2016 review on behalf of Entrust. DuPont is a 214-year-old global company that has invented and manufactures many of the products that have changed the way people live and work (including Nylon, Kevlar, Lycra, Teflon). During our long history, we have strived to constantly improve the way operational risk, such as the reticulation of electricity, is managed. Our 'Commitment to Zero', is a personal pledge to this ambition for our 65,000 employees. The professional services division of DuPont, DuPont Sustainable Solutions conducted the review and prepared this report. The review team consisted of Chartered Engineers with a background in utilities and process safety, and Organisational Psychologists to allow coverage of both engineering and human factors.

In the period since the last State of the Network report, a number of factors have had influence on the areas covered by the scope of work. These factors include:

- Release of new WorkSafe (NZ) regulations;
- Actions arising from the Penrose Substation outage; and

- Continuing impact of new technology and customer behaviour.

From the information presented, assessment of operational risk management, in field observations and subject to the matters raised in the report we find that processes, strategies and initiatives underway or in development are appropriate for managing the security, investment, maintenance and operation of the Auckland and Northern networks in their current state.

We support Vector's decision to improve public safety and reduce workplace risk by phasing out live line work. This decision has introduced transitional issues including an increase in system outages. However, we acknowledge that Vector and its Field Service Providers are working to restructure their works management processes to maximise the use of planned system outages that should improve unplanned outages as system improvements are installed.

Significant work has been undertaken to create detailed Asset Strategies and standardised designs that will bring improved levels of performance, and cost efficiencies to network operation and maintenance. The rollout of this work with the Field Service Providers has commenced and will require considerable investments of time and resource to maximise the benefits.

Using detailed analysis of population changes, uptake of energy efficiencies (appliances, heating, lighting), and consumer usage profiles, Vector is achieving a high degree of accuracy on its demand forecasts, building a strong base for investment decisions. Additionally, Vector is actively considering the impact of new technologies such as battery storage to minimise the risk of today's investment becoming a future stranded asset. Like all technology driven changes, Vector must continue the work to transform many of its business processes to capitalise on the opportunity this new technology will deliver.

We assess that the required business processes are at various levels of maturity in terms of Vector's ability to identify and manage the controls associated with lowering the likelihood and consequence of HILP (High Impact Low Probability) events. We acknowledge that Vector has a number that are 'best in class' and have already undertaken considerable effort to analyse and embed controls on its most vital assets (GXPs, Zone Substations) and continues to invest in programs to build further capability in this important area.

System performance in both the Northern and Auckland networks is not at the required regulatory targets. Vector has a number of initiatives underway seeking to improve performance. The Top 40 feeders program identifies and targets effort at improving the reliability of the network's worst performing feeders. In the past 2 years of this program, the work carried out has reduced the outages on many of the feeders by as much as 85%. Equally, factors such as traffic congestion in Auckland and new workplace safety requirements are increasing response time to repair faults by as much as 20% per year. Strategies such as network design modifications, increasing use of automation and changes to first responder management will need to be investigated to counter this impact.

Observations carried out in the field demonstrated a high standard of workplace safety and customer support from field crews both in Northern and Auckland networks.

We thank Vector and its Field Service providers for their support and assistance to enable the preparation of this report, and also Entrust for the opportunity to undertake this engagement.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'Rodney Nelson', with a stylized flourish at the end.

Rodney Nelson
Regional Director
New Zealand, Australia and Pacific.