

10 November 2015

Dr Brent Layton
Chair
Electricity Authority
PO Box 10041
Wellington 6143

Dear Brent

Advice resulting from 9 November 2015 meeting of the SRC

The Security and Reliability Council (SRC) is tasked with providing the Electricity Authority with independent advice on the performance of the electricity system and the system operator, and reliability of supply issues.

On 4 October 2014, a fire occurred at the Penrose substation that resulted in outages to a significant number of consumers in the Auckland area. The Authority Board sought advice from the SRC on the security and reliability aspects of this event, and specifically in relation to the analysis and recommendations contained in the inquiry conducted by the Authority in response to a request from the Minister of Energy and Resources.

The SRC considered the Penrose-related material provided to it for its 9 November 2015 meeting, which comprised the Authority inquiry report, the joint investigation report prepared by Transpower and Vector and the CCI report from the cable expert. At its 9 November meeting the SRC received a presentation from Transpower and Vector representatives, including a video describing the event and the layout of the Penrose substation, and received a brief overview of the inquiry from the Authority's inquiry team. The SRC sought clarification of several issues and then discussed the Authority inquiry report without the presence of Transpower and Vector representatives. This letter is the SRC's advice arising from the discussion of that material.

Advice about the Authority's inquiry report on the Penrose event

The SRC found the inquiry report to be a thorough and clear response to the questions raised by the Minister. The SRC agrees with the inquiry report's findings and recommendations. The majority of the SRC's discussions on the report were focussed on the significance of risk management in the context of the Penrose event. The SRC has identified the following specific advice in relation to risk management that should be considered for incorporation into the final inquiry report:

- Risk identification for assets needs to take a broader *consequence-based view* as well as an event-based view. This is important to ensure critical areas for supply reliability are identified for review.
- The SRC considers that the consideration of the risks associated with the co-location of critical assets is a vital part of risk management, particularly when the asset management regime for some of the co-located assets is different from the other co-located assets. For example, the co-location of 'run to failure' assets with critical assets undermines the intended reliability of the critical assets.
- Risk identification needs to encompass the complete power system, from the consumer right through the supply chain, so that critical areas for supply reliability can be identified for review. Such an approach can help to ensure that co-located assets, and the boundaries between the assets of different industry participants, can be clearly identified for risk assessment purposes.

- Risk assessment is traditionally undertaken by individual risk owners in relation to their area of responsibility. The Penrose event underscores that *collaborative risk assessment* is a difficult but important undertaking. Transpower and Vector have learned lessons from the experience and are now pioneering collaborative risk assessment from which the broader industry could take lessons. The SRC considers that the Authority's inquiry report should highlight collaborative risk assessment as vital in the potential prevention of this event, and as a lesson to be conveyed to risk owners in a variety of utility settings.
- In relation to collaborative risk assessment, the Authority should consider recommending that Transpower be encouraged to contact all of the parties with direct connections to the national grid and propose they undertake a collaborative risk assessment using the approach that has now been undertaken with Vector. These reviews would need to be completed in a sequential and prioritised basis, so that Transpower can accommodate them amongst their other business activities. The SRC also recommends that Vector and Transpower be encouraged to share their collaborative risk assessment process and templates with other industry participants.
- Assessing the consequences of risks (regardless of the identification process) needs to account for the range of possible consequences arising from each risk, including worst possible outcomes. It is important that risk mitigation takes proper account of all the costs and benefits of reducing risk, recognising that there will be circumstances where it is better to accept the risk rather than invest further to reduce it. The SRC noted that if risk owners compare their existing assets against their present-day design standards, this may alert them to possible risks for identification.

The SRC has also identified the following general matters for consideration for incorporation into the report:

- Although the inquiry report recognises that the co-location risk at Penrose accumulated over a long period of time as more cables were added to the trench, the report could better acknowledge that the 'creeping' nature of the risk over such a long period of time makes it very hard for parties to be sensitised to it, but it is nevertheless important that they are alert to it.
- The SRC considers that there should have been a timely post-event review between Vector, Transpower and the New Zealand Fire Service so that lessons (including security and reliability lessons) could be identified while the event was still fresh.
- The SRC notes that various post-event activities have been performed well. In particular, the response of Vector and Transpower during the event, the communication with the public and media, and the subsequent implementation of actions have all been areas of success. The SRC considers that the focus of the inquiry report has naturally been driven by the focus of the Minister's terms of reference on what went wrong and the lessons to be learned, but the Authority should also emphasise the successes as it is important for consumers to have a balanced view of the outcomes of the Authority's inquiry.

The SRC also notes that the joint investigation and the inquiry report have both taken a significant length of time to reach this stage. This appears to be due to an unwarranted focus on waiting for a highly technical and definitive view of the specific cause of the fire, which was unnecessary for properly assessing the overall event in this case. For future inquiries, some latitude in the terms of reference on reporting on the specific cause of an event could greatly speed up the completion of the reports and improve public perceptions of the inquiry process.

Advice about the security and reliability implications of the Penrose event

The SRC considers that the broader lessons from this event are very valuable, not just for the electricity industry, but also for utilities more generally. In addition to the specific advice on risk assessment and the importance of effective communication provided above:

- The SRC considers that the Authority should undertake to draw the electricity industry's attention to the findings of this inquiry. This communication needs to recognise and acknowledge the challenges associated with identifying risks of this type, but should also clearly leave risk owners with the responsibility for effective risk management, rather than being directive about the sorts of mitigations that ought to be undertaken.
- The SRC considers the lessons relating to the co-location of assets do not just apply to situations such as Transpower's grid entry/exit points. Network companies and other market participants should be encouraged to review their risk management for co-located assets within their systems.
- The SRC considers that the Authority should consider whether the cost of events should include other factors such as the costs of emergency services in widespread outages.

If the Authority Board has any questions in relation to these matters, I am happy to present or respond on behalf of the SRC. There is no further advice arising from the discussion at the SRC's 9 November 2015 meeting.

Yours sincerely



Mike Underhill

Chair

Security and Reliability Council

cc SRC members, Carl Hansen (Electricity Authority)

20 November 2015

Security and Reliability Council
c/- Mike Underhill
Chair of the Security and Reliability Council

Dear Security and Reliability Council (SRC) members

SRC advice on the Penrose substation fire

Thank you for your letter on 10 November 2015 setting out the advice of the SRC in regards to the Authority's inquiry into the 5 October 2014 fire at the Penrose substation. The Authority Board was impressed with the quality of the advice provided, especially given the short timeframe available to you, and is very appreciative of you making so much of your valuable time available and for your diligent and careful consideration of the topic. Your advice has enabled changes and improvements to be made to the final inquiry report.

The Board also notes that:

- the final inquiry report was submitted to the Minister of Energy and Resources on 20 November
- the SRC's advice is appended to the final inquiry report, and will be published together with the report
- the Authority's Chief Executive will advise Transpower New Zealand Limited and Vector Limited of the SRC's advice prior to the public release of the inquiry report by the Minister. The Minister must release the report within 15 days of receiving it.

As previously advised, SRC members are requested to not discuss the contents of the draft inquiry report outside of the SRC until the final report has been published by the Minister.

Thank you again for your valuable input into this inquiry. We anticipate that the inquiry's findings will be of strong interest to a wide range of industry participants and stakeholders and hope they will be of enduring benefit to the industry and consumers.

Yours sincerely



Brent Layton
Chair

2 December 2015

Dr Brent Layton
Chair
Electricity Authority
PO Box 10041
Wellington 6143

Dear Brent

Advice resulting from 22 October 2015 meeting of the SRC

The Security and Reliability Council (SRC) is tasked with providing the Electricity Authority with independent advice on the performance of the electricity system and the system operator, and reliability of supply issues.

The SRC considered and discussed six different papers at its 22 October 2015 meeting. This letter is the SRC's advice arising from four of those papers.

Further advice on the work of the Smart Grid Forum and 'edge' technologies

The SRC previously gave advice to the Authority on the work of the Smart Grid Forum in a letter dated 14 July 2015. That advice highlighted risks of regulators struggling to keep pace with rapid consumer-led technological transition and what information the SRC might need to identify and fulfil its role with respect to the impending technological transition.

The SRC received further information from representatives of the Smart Grid Forum and Transpower about the modelled growth of 'edge' technologies and the implications for power system management. The SRC's discussion prompted some further advice on this topic, as follows:

- it is essential that industry and regulators don't try to make decisions for consumers, but ensure availability of information that enables informed choices
- there is merit in comparisons to learn from other international jurisdictions, though these lessons will need interpretation to account for the New Zealand context. The SRC has requested the secretariat to provide information on two or three specific problems that have arisen overseas (such as the unintended consequences of subsidies)
- it is important to understand the thresholds at which penetration of new technologies starts having material security and reliability impacts on the power system
- the development of standards that affect technology on low voltage systems will be an important issue for the continued efficient operation of low voltage networks
- industry ought to use existing avenues (such as the Smart Grid Forum and the Electricity Networks Association) to co-ordinate efficient responses to the challenges ahead.

Initial advice on industry arrangements for information security

In response to a direction from the Authority Board, the secretariat presented a paper to the SRC on the topic of information security. This was the first paper the SRC has received on this topic.

The SRC stresses that any advice it provides on the topic of information security needs to be interpreted with the knowledge that the SRC members are not experts in information security. The SRC's initial advice is as follows:

- the secretariat's paper appears to provide a complete and accurate high-level description of the arrangements for information security in New Zealand's electricity industry, though the SRC will find out whether this is a view shared by the Control Systems Security Information Exchange and the Smart Grid Forum
- the SRC is aware of one concern with the ability of industry to purchase field equipment with confidence that it doesn't come pre-fitted with security deficiencies, such as 'backdoors' that allow undocumented and privileged access to critical systems
- the National Cyber Security Centre's questions in Appendix A of the secretariat's paper could be good questions for the Authority to ask of its market operation service providers
- the Institute of Directors issued a *Cyber-Risk Practice Guide* that the Authority Board should consider¹
- certain of the SRC members' employers take information security very seriously, though the SRC can't speak for the rest of the industry in this regard
- the SRC wishes to continue to receive reporting about the security and reliability implications of information security as it comes to hand.

Initial advice on the impacts of thermal generation decommissioning

The SRC received reporting from the secretariat and the system operator on the impact of proposed thermal generation decommissioning. As this is a strategically important topic for the SRC, it expects the secretariat to report back with the results of any new monitoring or reporting of security published by the system operator or the Authority. The SRC's initial advice to the Authority is, as follows:

- ensuring the market has access to information relevant to assessing future security of supply
- the SRC understands the Authority's position to be that there are market mechanisms in place, suitable information available to the market, and time enough for the market to respond to the proposed decommissioning of thermal generation. While the Authority appears confident that the market will deliver a solution, it is prudent for the Authority to actively monitor progress towards achieving this and to have contingency plans in place
- there appears to be an increase in electricity security risk as the continued presence of dual-fuel gas/coal generators cannot be relied on, and this would increase electricity security risks during gas contingency events.

Advice on the system operator's performance for the year ending 31 August 2015

The SRC received the system operator's annual assessment of its performance for the year ending 31 August 2015. There was little discussion required and the SRC notes that:

- the *reporting* of system operator performance has improved significantly
- it had no areas of concern with the performance of the system operator.

¹ *Cyber-Risk Practice Guide* available from <https://www.iod.org.nz/Portals/0/Governance%20resources/Cyber-Risk%20Practice%20Guide.pdf>

There is no further advice arising from the matters discussed at the SRC's 22 October 2015 meeting.

Yours sincerely



Mike Underhill

Chair

Security and Reliability Council

cc SRC members, Carl Hansen (Electricity Authority)

18 January 2016

Security and Reliability Council
c/- Mike Underhill
Chair of the Security and Reliability Council

Dear Security and Reliability Council (SRC) members

Advice resulting from the SRC meeting on 22 October 2015

Thank you for your letter of 2 December 2015 setting out the advice of the SRC in regards to the matters that it considered at its 22 October 2015 meeting. The wide range of topics that you have provided advice on, and the nature of the advice, suggests that the SRC is taking a comprehensive view of reliability of supply, and power system and system operator performance, and from both a near term and longer term perspective.

The Authority is aware of the potential implications of 'edge' technologies

The Authority expects the increased role for demand side management and electricity storage will have a material impact on the operation of the electricity system and markets. The uptake of various 'edge' technologies is likely to be consumer-led, and it is important that regulations do not create barriers to entry or unnecessarily influence consumers' decision-making. With this in mind, we have initiated a project to review the market arrangements for consumers utilising these technologies with a view to identifying potential work programme initiatives for our 2015/16 work programme.

We note the SRC's interest in considering whether the experience already being gained in other markets might be relevant to New Zealand's specific circumstances, and welcome any advice you may have in the future in light of those investigations. We agree that overseas experience can be useful, and to that end we regularly engage with our counterparts in other markets to identify if and how their experiences with these technologies might be relevant to us.

We agree that understanding the threshold at which the cumulative impact of these technologies becomes significant is important and are pleased to see that the system operator has established a programme of work to complete relevant investigations over the next 2-3 years. We expect that the results of that work will be shared with the SRC as it is progressed, and will welcome any resulting advice.

However, as you have identified, these technologies are most likely to impact on the operation of low voltage networks before they impact on the wider electricity system. The operation of these networks falls mainly under the jurisdiction of the Commerce Commission, and we are working closely with them to share information and consider how we can jointly progress our respective regulatory approaches to issues around the relevant technologies. The Code also already includes consideration of relevant standards related to small scale distributed

generation,¹ and we will continue to monitor the development of these and other relevant standards.

We agree that there should be benefits to the industry through working collaboratively through existing avenues such as the Smart Grid Forum, and we will remain engaged with these forums. It is important, however, that we retain the ability to act independently when it is necessary for the purposes of achieving our statutory objective and delivering long term benefits to consumers.

Information security will continue to be a critical consideration

We have identified that information and cyber security are very important to the reliable and efficient operation of the electricity industry, and are pleased that the SRC also wishes to remain engaged on this issue. The external advice we receive from you can help us remain vigilant to potential risks and consequences.

As part of our internal assurance processes we have been looking at the information security arrangements of our market operation service providers, and we have also looked closely at our contractual arrangements with these providers as part of our recent re-contracting processes. We have drawn on the advice of relevant experts such as the National Cyber Security Centre to ensure we are operating in line with recognised good practice. This includes putting arrangements in place to ensure that the Authority Board receives regular updates on relevant information security matters.

The impacts of thermal generation decommissioning are being closely monitored

We agree that it is important that the market has access to information relevant to assessing future security of supply, and this is reflected in the structure of the security of supply policy framework that is established in the Code. That framework is largely about the provision of timely information of a suitable quality. Shortly after the recent thermal decommissioning announcements, we encouraged the system operator to extend its hydro risk curve analysis from a 'one year ahead' focus to looking through to 2019, to provide more meaningful information than provided by the annual security of supply assessments. The system operator published this report on 9 December 2015.

We also note that prices on the futures market suggest the market will adequately address the potential security of supply issues resulting from the completed and announced thermal generation decommissioning. Nevertheless, we are actively monitoring and analysing a wide range of relevant data sources, and have been reviewing our existing and potential work programme to ensure we have identified all of the potential actions that might be required in order for an effective and efficient outcome to be achieved. This includes ensuring that market arrangements do not suppress peak prices in a manner that prevents the utilisation of peaking generation.

¹ Australian Standard AS 4777, for the grid connection of energy systems via inverters, is directly referenced in Part 6 of the Code. Part 6 relates to the connection of distributed generation.

We look forward to receiving any further advice from the SRC as it considers this matter further.

Yours sincerely

A handwritten signature in blue ink, consisting of a large, stylized 'B' followed by a long, sweeping horizontal stroke.

Brent Layton
Chair, Electricity Authority


Paremata

2 March 2016

Mike Underhill
Chair
Security and Reliability Council

Sent by email

Copied to the Electricity Authority (Carl Hansen, Callum McLean, Saltanat Cole)

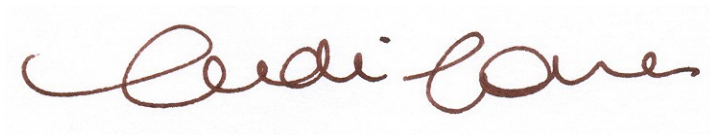
Dear Mike

Security and Reliability Council – resignation

This letter records my resignation from the Security and Reliability Council, effective immediately. This is because I am moving to Australia to take up the role of Telecommunications Industry Ombudsman.

I have enjoyed my time on the Council, and valued your chairmanship.

Kind regards



Judi Jones