Security and Reliability Council ::: Meeting Number 14
Venue ::: Level 7, ASB Bank tower, 2 Hunter Street, Wellington
Time and date ::: 9:30 am ::: 22 October 2015

Minutes

Members present

::: Mike Underhill (Chair)
::: Albert Brantley
::: Barbara Elliston
::: Bruce Turner
::: Erik Westergaard
::: Guy Waipara
::: Judi Jones
::: Nigel Barbour
::: Vince Hawksworth (from 10.08 am)

Apologies - none

In Attendance

Electricity Authority (Authority):

::: Carl Hansen, Chief Executive
::: Fraser Clark, General Manager Market Services
::: Grant Benvenuti, Manager Market Operations (until 10:50 am)
::: Callum McLean, Adviser System Operations
::: Rory Blundell, General Manager Market Performance (10.08 am until 12:26 pm and 1:10 pm until 1:38 pm)

System operator:

::: Andrew Gard, Engineering Manager (from 10.08 am until 10.50 am)
::: Nyuk-Min Vong, Principal Engineer (from 10.08 am until 10.50 am)
::: John Clarke, General Manager (from 1.40 pm until 1.44 pm)
::: Gillian Rodger, Power System Analysis Team Leader (from 1.10 pm until 1.38 pm)
::: Bennet Tucker, Senior Analyst Market Operations (from 1.10 pm until 1.38 pm)
::: Kevin Duckworth, Business Manager (from 1.38 pm until 1.44 pm)

Others:

::: John Hancock, secretariat, Smart Grid Forum (from 10.08am until 10.50am)
::: Bill Heaps, Principal Consultant Strata Energy (from 10.58 am until 12:26pm)
::: Rebekah Henderson, Consultant Strata Energy (from 10.58 am until 12:26pm)
::: Zac Clark, Energy Analyst Ministry of Business, Innovation and Employment (from 10.08 am until 10.50 am)

The meeting opened at 09:30 am.

1 Welcome and apologies

1. The Chair welcomed members to the fourteenth meeting of the Security and Reliability Council (SRC).

2 Changes to disclosure of interests

2. The Chair reviewed the latest interests register and approved members to act despite those declared interests.

ACTION POINT

1. The secretariat to remove Dennis Barnes from the interests register.

3 Previous minutes

3. The minutes of the 1 July 2015 meeting were accepted as a true and accurate record provided paragraph 20 is re-written to include the individuals' names.

ACTION POINT

2. The secretariat to replace the attendees initials with full names below paragraph 20 of the 1 July 2015 minutes.

4 Action list

4. The SRC reviewed the current action list.

5. Item 8 – A member noted that a misconception about the Quality of Supply Incentives Working Group actions may exist. The Chair emphasised that the SRC wants end-to-end view of industry performance and how this affects consumers.

ACTION POINTS

3. The secretariat to ensure every item on the action list has a completion date.

4. The secretariat to rephrase item #2 on the 22 October 2015 action list to better align with the scope of the Quality of Supply Incentives Working Group.

5 Correspondence

6. The SRC noted the 21 September 2015 letter from the Chair of the Authority.

Reliability of supply

6 Expectations for the 9 November 2015 meeting to discuss the 5 October 2014 fire at Penrose substation

7. The Chair commented that Transpower and Vector are very interested in the topic and rightly keen to ensure a robust process is followed. The Chair noted that members' interests had been

considered and that there were no relevant interests of concern at this time.[1]

8. The Authority's Chief Executive outlined the Authority's expectations of the SRC in relation to the Penrose event, including:
    a. an overview of the SRC role in relation to the Penrose event
    b. the length and type of material the SRC is likely to receive for review
    c. that the advice the Authority seeks falls into two categories:
        - advice on the report itself including any required changes
        - advice on any broader changes to industry arrangements recommended as implications from the Penrose event
    d. the report does discuss safety issues but that this is outside the SRC's scope
    e. that the report is not to be discussed outside of the SRC until it is made public by the Minister of Energy and Resources
    f. the Penrose reports will be issued to the SRC members on Tuesday, 3 November for the 9 November meeting
    g. that the Authority would like to get the SRC's advice by 5pm on Tuesday, 10 November if possible but the speed should not compromise the quality.
9. The Chair noted that this means the SRC will not be able to comprehensively comment on the scope of the Authority's report, as aspects of it are outside the SRC's purview. Therefore, the Authority will need to ensure it is satisfied with the broader scope.
10. The Authority's Chief Executive explained the key causes of the delays in getting this report completed.
11. The SRC discussed whether there would be merit in members having email correspondence between 3-8 November to identify (but not discuss or reach conclusions on) areas that the SRC would like to ask questions about. The SRC was emphatic that this should only be done if legal advice considered this was not problematic.
12. The Authority's Chief Executive undertook to identify if any parts of the report (such as appendices) could be delivered earlier to spread the reading burden on the SRC, without compromising the appropriate consideration process.

ACTION POINTS

5. The secretariat to re-send the Minister's letter regarding Penrose.
6. The secretariat is to obtain legal advice on whether SRC members identifying questions areas over email is legally robust.
7. The Authority's Chief Executive to identify if any parts of the Penrose event report (such as appendices) could be delivered earlier than 3 November without

[1] Subsequent to the 22 October 2015 meeting of the SRC, Judi Jones requested that she be excluded from further correspondence or meetings relating to the 5 October 2014 fire at the Penrose substation. Commissioner Jones considered that having an input into the creation of the Authority's Penrose inquiry would create a conflict for her ability to later deal with consumer complaints about the same incident in her capacity as the Electricity and Gas Complaints Commissioner. The chairperson agreed to the request.

compromising the SRC's consideration.

7 Strategic alignment of SRC activities

13. The SRC considered the secretariat's paper that compared the alignment of the SRC's activities with its regulated function and commented as follows.
14. A member commented on the absence of retrospective reporting on security and asked if there were any near misses. An Authority representative assured the SRC that notable incidents would be reported on and that the system operator also has a published commitment to report on events.
15. A member noted that showing trends adds value for the SRC, as this can highlight when things have gone well.
16. SRC members questioned:
    a. whether nine years was the correct length of the reporting for the annual assessment of security of supply and whether reporting durations across all reports should be looked at on a first principles basis
    b. whether further reporting of gas market developments that inform investment decisions would be of value to the SRC.
17. The SRC agreed that it could review matters that deal with competition issues, so long as there was an implication for security or reliability and the SRC keeps its focus on providing security and reliability advice that doesn't delve into solutions

Vince Hawksworth joined the meeting at 10:08am.

18. The Chair summarised the SRC's advice on the four questions posed by the paper. The SRC:
    a. had no concerns with the material it already receives
    b. was keen to ensure the it had a strategic look at security matters, such as provided by the thermal decommissioning information
    c. would like to review strategic alignment on an annual basis
    d. had no advice for the Authority Board.

8 Future scenarios for edge technologies

Andrew Gard, Nyuk-Min Vong, Zac Clark, John Hancock and Rory Blundell joined the meeting at 10:08 am.

19. An Authority representative noted that the Authority's paper on the distribution pricing is quite relevant to this topic. That paper stresses that there is no "one-size-fits-all" answer to distribution pricing and that distributors will need to lead the change process, with some easier pricing decisions able to be implemented sooner rather than later.
20. John Hancock presented the background and context of the paper and highlighted the following points:
    a. the 'edges' modelling scenarios had been intended for generation modelling but are now used for many purposes

b. the 'edges' modelling scenarios are conservative

c. the modelling in this presentation draws on Tony Seba's 'exponential technology' work. These assumptions were used in the models.

d. the trend overseas is to build new network capacity, though New Zealand tends to take a different approach in terms of providing subsidies or incentives.

21. The SRC asked questions of the presenters, which were answered as follows:

a. the Green Grid project is represented on the Smart Grid Forum, so is fully aware of the Smart Grid Forum's activities

b. oil and petrol prices may push the presented scenarios out, but only slightly

c. the modelling assumptions are based on all customer-driven uptake, with no subsidies.

22. The presenters noted that:

a. the BusinessNZ Energy Council has released modelling based on the World Energy Council models that project the number of electric vehicles in New Zealand as two to three million by 2050

b. central government projections have all been well below reality and that new models are needed

c. the Smart Grid Forum will not be modelling the impact of scenarios of electricity prices but that a very high growth scenario in the 'edges' modelling would be a prerequisite for that analysis.

23. Andrew Gard presented the views of Transpower (including the system operator) on the impact of new technology on their operations. Some key points made were:

a. generation dispatch and system frequency are areas of possible concern

b. expects voltage management will impact on distribution networks first, but that Transpower are keen to stay involved

c. Transpower needing a better understanding of new technology responds to system changes.

24. Transpower will be looking closely at the role of the system operator's market system and policies as solution areas for the challenges ahead.

25. Nyuk-Min Vong commented that the New Zealand power system is in some ways simple, such as keeping system balance largely being a task of suitable scheduling of variable generation. Significant growth in solar generation would change this and make power system scheduling more interesting and challenging. He also outlined the work programme as set out in the presentation slides, but noted that power quality (harmonics and voltage) is less of an issue for transmission and more problematic for distribution.

26. The SRC discussed what lessons can be learned from Australia, which currently has greater penetration of new technologies, particularly solar generation. It was noted that voltage limits are already being reached due to the large photovoltaic population, which can disappear and re-appear from the system all at once. As distribution networks have traditionally been designed with no voltage headroom to account for voltage drop, any new technology that drives voltage up can cause voltage limit breaches. Changes and control on the low voltage

network are needed. It was suggested that new businesses with new business models may appear which can be disruptive.

27. SRC members identified the need for the SRC to understand customer choices and not to decide or pre-choose for them.

28. Andrew Gard concluded Transpower's presentation by noting that Transpower are keen to work with distributors, regulators and standard-setters on emerging challenges.

Andrew Gard, Nyuk-Min Vong, Zac Clark and John Hancock departed at 10.50 am.

29. The SRC members asked if the modelling scenarios were sufficiently descriptive for electricity industry purposes, including whether it enables distinction of the differences between local- and national-scale problems.

30. The Chair summarised the discussion and the SRC agreed to provide the following advice to the Authority:

    a. while New Zealand differs from other countries, there is merit in taking lessons from overseas, though they need interpretation and context

    b. the SRC would like to receive information on two or three specific problems that have arisen overseas. The unintended consequences of subsidies could be one of them

    c. it is essential that industry and regulators don't try to make decisions for consumers, but ensure availability of information that enables informed choices

    d. it is important to understand what are the thresholds at which penetration of new technologies becomes material and what are the impacts on power systems

    e. 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

    f. industry will do well to use existing avenues (such as the Smart Grid Forum and the Electricity Networks Association) to co-ordinate responses to the challenges ahead.

ACTION POINTS

8. The secretariat is to provide information to the SRC on two or three specific problems that have arisen overseas in the context of security and reliability issues caused by the use of 'edge' technologies.

9 Risk management framework workshop

Bill Heaps and Rebekah Henderson joined the meeting at 10.58 am.

31. Bill Heaps, the facilitator, explained that this session was a workshop to ensure the criteria for evaluating risks are generated by the SRC and that this gives the SRC better ownership of the outputs. He noted that the secretariat had been asked by the SRC to approach the risk management framework slowly and iteratively. The workshop is about developing the framework, not about rating particular risks.

32. The facilitator explained how the workshop will proceed and tabled the *Draft SRC Boundary Survey* (Annex 1 to these minutes).

33. The workshop participants briefly discussed the metrics, in particular the scale which the

facilitator cautioned against getting out of sync with the Authority's threshold.

34. The workshop then proceeded to consider each tabled metric and the participants completed the boundary survey.

35. SRC members discussed the metrics presented and identified possible new metrics in systemic vs isolated issues and power quality impacts. Members also questioned how safety and loss-of-life events should be included within impact measurements.

36. An Authority's representative noted that the SRC can and should take a whole-of-system view and the Authority can liaise with other agencies as appropriate.

Grant Benvenuti departed the meeting at 11.50 am.

37. The facilitator explained the results from the exercise and the range of members' responses per metric.

38. The facilitator then tabled *Risks for Risk Management Framework* (Annex 2 to these minutes) initiated discussion of some of the specific risks raised by SRC members in preparation for the meeting. The risks discussed were:

    a. multiple localised outages due to wild weather lead to unacceptable restoration times for some consumers

    b. emergence of micro-grids with inadequate grid connection/disconnection protocols

    c. loss of power regionally, leading to consequential loss of critical supplies such as water, petrol, sanitation, life support equipment, mobile network base stations (communications and internet)

    d. market design is unable to respond to technology changes (this could be slow but the impacts considerable).

39. The members identified that the next steps should include:

    a. further engagement on the development of the RMF with the SRC, though the next engagement is expected to be a smaller time commitment for the SRC

    b. parallel development of thresholds for determining what system events the SRC should receive detailed reporting on.

Bill Heaps, Rebekah Henderson and Rory Blundell departed the meeting at 12.26 pm and the meeting broke for lunch. The meeting resumed at 12.44 pm.

10 Industry arrangements for information security

40. An Authority representative explained some of the context behind the paper, including that the Authority's Board requested the SRC to consider information security and to provide advice to the Authority.

41. A member asked what New Zealand's international links are. Responses from attendees included:

    a. that the voluntary standards developed by the Control Systems Security Information Exchange (CSSIE) are largely based upon standards by NERC

    b. that the system operator is a part of an international network of system operators

c. that New Zealand is partner to the International Electricity Infrastructure Assurance Forum

d. the National Cyber Policy Office has expressed interest in establishing a Computer Emergency Response Team, similar to what operates in other jurisdictions

e. that in the case of an emergency, New Zealand may be constrained by the availability of experts, so quickly drawing on overseas experts would be valuable.

42. A member asked about what assurance New Zealand companies can seek about field equipment (such as remote terminal units) they buy, as there is a risk of buying equipment pre-fitted with security backdoors. An attendee noted that for the purchase of fewer, higher-value units, vendor reputation and compliance with rigorous North American standards provides a level of assurance.

43. A member noted that different information systems have different requirements in terms of communication confidentiality, availability and integrity. Furthermore, the electricity industry is co-dependent with the telecommunications industry, as loss of communications networks severely impacts on most participants' ability to manage their operations.

44. A member noted that individual companies ought to consider deliberately using 'dumb' technology to decrease cybersecurity risks where appropriate.

45. The SRC answered the four questions posed in the paper:

a. to the somewhat limited extent of the SRC's knowledge in this area, the paper did provide a complete and accurate high-level description of the arrangements for information security in New Zealand's electricity industry

b. the SRC stressed that it is not expert in the area of information security and that any entity suffers from the same problem of there being things that it is not even aware that it doesn't know. 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

c. the SRC would like to hear the advice received from the CSSIE and the Smart Grid Forum

d. the SRC's advice to the Authority at this stage is that:

- the National Cyber Security Centre's questions in Appendix A of the paper could be good questions for the Authority to ask of its market operation service providers
- the Institute of Directors issued some advice in the last 12 months that the Authority Board should consider
- the SRC members currently working in the industry take information security very seriously, though the SRC can't speak for the rest of the industry in this regard
- the SRC wishes to keep information security on its radar and continue to consider relevant information as it comes to hand.

Cobus Nel departed the meeting at 1.10 pm.

Security of supply

11 Thermal generation decommissioning

John Clarke, Gillian Rodger, Bennet Tucker and Rory Blundell joined the meeting at 1.10 pm.

46. John Clarke introduced the team and explained the initial steps the system operator has taken: a report on the thermal and voltage constraints in the upper-North Island was released in September, comparisons with the Authority's security margins are to be published in November and some specific analysis of 2019 is to be released some time after that. These reports are of interest as they analyse energy security (is there enough fuel) and capacity security (is there enough North Island capacity).

47. The Chair emphasised that the SRC members are present to speak for the SRC, not for their companies.

48. An Authority attendee stressed that forecasting of security is inherently compromised by the ability to predict market reactions. The Authority anticipates that there is sufficient time for a market reaction to be expected.

49. A member asked whether a key finding of the upper-North Island study was that upper-North Island generation will be essential to meet upper-North Island peak demand. A system operator representative confirmed this was the case.

50. A member asked whether energy constraints would be the first system constraint. The system operator responded that this is not the case and that the key constraint will be either all North Island capacity becoming constrained or the upper-North Island capacity becoming constrained.

51. A member noted that the situation appears to have implications for gas contingency planning. The system operator agreed that there appears to be reduced fuel diversity if Genesis Energy will no longer be able to convert Huntly to run on coal in the unavailability of the gas network.

52. A member asked what assumptions the reporting made about hydrological inflows, given an El Nino pattern is expected. The system operator confirmed that the upper-North Island study doesn't contain any hydro assumptions and that, in any event, any immediate patterns of hydrology will have minimal impact on 2019 hydro storage.

53. The SRC members agreed that discussion about any particular market reactions is not appropriate for the SRC and that its focus needs to be on identification of problems (if any).

54. A member asked the Authority representative whether the Authority considers that market incentives are sufficient. The Authority representative responded that there is information and time available for a market response, but that the Authority is not blindly trusting the market to deliver. The Authority representative also noted that the Authority is aware of the potential public and media interest and would be pleased to engage if that proves to be the case.

55. A member questioned the system operator about the assumption that, in summer, central-North Island generation would operate 70% of the time. The system operator responded that 70% is the system operator's best estimate of it, but that the work of the National Winter Group could be a guide to this figure. The member noted that the National Winter Group's estimate should be treated with caution as the industry may be overly optimistic in this regard.

56. The SRC's responses to the two questions posed in the paper were:

    a. that the SRC expects the secretariat to report back to the SRC with the results of any new monitoring or reporting of security published by the system operator or the Authority

    b. that the SRC's advice to the Authority Board is:

- that ensuring the market has access to relevant information is vital
- that 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, but that the Authority is actively seeking to test these premises rather than assume the market will deliver on a solution
- that the SRC expects further market information being provided to the SRC as it becomes available
- that 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 security risks during gas contingency events.

Gillian Rodger, Bennet Tucker and Rory Blundell departed at 1.38 pm.

Performance of the system operator

12 The system operator's performance for the year to 31 August 2015

Kevin Duckworth joined the meeting at 1.38 pm.

57. John Clarke emphasised the key point that the system operator's self-review used to be a story about the power system, but that it is now a story about the system operator's performance against the strategic objectives.
58. A member asked for an explanation of what 'round-power' is. The system operator explained that it is an ability of the upgraded HVDC to continue operating even when transfer is close to zero. This creates an efficiency improvement in the wholesale market with less instances of interisland price separation.
59. A member asked the system operator what concerns they have about operating the power system. A system operator representative noted that there have been less system events in recent years, and wonders whether this is temporary or the start of a longer-term trend. The member responded that a challenge will be that, like health and safety matters, once an acceptable state is reached, an organisation needs to position itself to not become complacent.
60. The SRC considered the report to be well written and informative.
61. The SRC's responses to the questions posed in the paper were:
    a. that the SRC noted the improved reporting of system operator's performance
    b. that the SRC did not note any areas of concern with the performance of the system operator
    c. that the SRC did not note any aspects of the system operator's performance that the SRC would like the system operator to give greater weight to in its dealings with industry
    d. that the SRC had no advice for the Authority Board at this time.

General Business

13 General Business

62. There was no general business discussed.

14 Administration

63. There were no administrative matters discussed.

15 Meeting close

64. The meeting was closed at 1.44 pm.

Annex 1: "Draft SRC Boundary Survey" tabled at 22 October 2015 meeting by the secretariat's workshop facilitator

Annex 2: "*Risks for Risk Management Framework*" tabled at 22 October 2015 meeting by the secretariat's workshop facilitator

DRAFT SRC Boundary Survey

To be used to obtain views of informed stakeholders within the Electricity Authority.

LHS Metric	Please circle your view on where you consider the LHS boundary to be	RHS Metric
Proactive (Pre event consideration of R&S risks)		**Reactive** (Post event only consideration of R&S risks)
Operational (e.g. distribution feeder or zone substation level)		**Strategic** (e.g. risks arising from reduced NI thermal generation capacity or limitations in primary fuel supply)
Low economic cost to consumers (e.g. below $2m)		**High economic cost to consumers** (e.g. greater than $100m)
Low system impact (e.g. <20k ICPs affected)		**High system impact** (North or South Island outage)
Rural outage for 2day duration		**Extended outage to a major city CBD**
Major industrial load for 2 day duration (e.g. CHH Kinleith Mil)		**Extended outage to a major city CBD**
Residential area 2 day outage		**Extended outage to a major city CBD**
Frequent events (e.g. several annual)		**Rare major events** (e.g. once in 20 years)
Asset specific (e.g. fault prone substation switchgear model)		**Total system level** (e.g. major transmission failure and/of multiple generation plant failure)
		
		

Risks for risk management framework

#	Risk	Further description/qualifier/comment (optional)	Suggested by
1	Multiple localised outages due to wild weather lead to unacceptable restoration times for some customers.	As these events become more common increasing adverse media commentary damages reputation of industry	Mike Underhill
2	Malicious hackers into system control create system mayhem.		Mike Underhill
3	Generation retirement coupled with a return to demand growth put system security at risk particularly at certain times of the year.		Mike Underhill
4	Volcanic eruption/ash cloud forces shutdown of Whakamaru switching station and adjacent hydro and geothermal power stations.		Mike Underhill
5	Residential smart meters are incapacitated by cyber-attack causing long customer outage periods while modified or reprogrammed.		Mike Underhill
6	Disruptive large quantity PV installations lead to local and national instability problems.		Mike Underhill
7	Latest must-have consumer electronic device requires unrealistically high system performance to perform satisfactorily.		Mike Underhill
8	Emergence of micro-grids with inadequate grid connection/disconnection protocols.	The formation of micro-grids with battery storage will likely occur within a 2 to 3 year time frame. The connect/disconnect protocols for these need to be put in place urgently to ensure no security or reliability based barriers to their introduction.	Barbara Elliston
9	Loss of power regionally, leading to consequential loss of critical supplies such as water, petrol, sanitation, life support equipment, mobile network base stations (communications and internet).	A number of the possible critical consequences where we have a power system that cannot be 100% reliable or secure, as well as mitigation strategies, are able to be identified and reported on by the EA to the public	Barbara Elliston
10	Current over-dependence on power being available always.	Security and reliability can be improved by lowering public total dependence on the power system	Barbara Elliston
11	A major geotech event leads to loss of HVDC or “islands” major load from generation.		Vince Hawksworth
12	Market design is unable to respond to Technology Change (this could be slow but the impacts considerable).		Vince Hawksworth

#	Risk	Further description/qualifier/comment (optional)	Suggested by
13	How are “perfect storm” or “black swan” event combinations regarded / thought about.		Vince Hawksworth
14	Disparate regulatory and political interventions (water / carbon / pricing /economic) or put another way who keeps the “whole” in mind?		Vince Hawksworth
15	Catastrophic damage to major gas pipeline leads to loss of gas powered electricity generation		Example
16	Volcanic eruption in central North Island causes disruption to northwards transfer of electricity and loss of some central north island geothermal generation output.		Example
17	Double transformer failure at a CBD zone substation leads to extended loss of supply to the CBD.		Example
18	Line maintenance coupled with persistent unresolved faults on a transmission line cause multiple frequent supply interruptions and quality issues for a major electricity user		Example