Security and Reliability Council

Development of the risk management framework

An update on progress and verifying future development objectives and principles

June 2016

Contents

Executive summary

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

Over the course of three meetings, the SRC has considered the structures through which the electricity industry manages supply reliability risks and how it might use a risk management framework (RMF) to assist it in identifying, understanding, communicating and advising on significant security and reliability risks.

The SRC has considered the development of a RMF that could assist the SRC in undertaking its monitoring role and provide benefits through its application in the broader risk management process. For example, the RMF could improve the communications between risk owners and stakeholders and allow risks arising from multiple triggers to become more visible.

This paper provides:

- a summary of progress on the development of the RMF since the 15 March 2016 SRC meeting
- a consolidated list of SRC guidance relevant for the future development of the RMF
- a list of the lessons learned so far by the SRC secretariat and the implications for the future development of the RMF
- questions for the SRC to consider, including verifying that the future development meets the group’s expectations.

1 Introduction

1.1 The SRC has endorsed the development of a RMF for its use

1.1.1 The SRC has previously agreed that there is value in the development and implementation of a RMF that describes industry-wide security and reliability risks. This is the fourth paper that the SRC has received on the topic of a RMF.

1.1.2 Based on previous discussions, the secretariat believes the SRC is expecting it to deliver a RMF that:

a) visualises risks using the bowtie method

b) has the New Zealand electricity industry as its scope

c) is focussed on material security and reliability matters only.

1.2 The purpose of this paper is to update the SRC on progress with developing the RMF and check the future direction aligns with the SRC's expectations

1.2.1 This paper summarises:

a) progress on development of the RMF (section 2)

b) the guidance for developing the RMF already given by the SRC (section 3)

c) the lessons learned so far by the secretariat while developing the RMF and the implications for future development (section 4).

1.2.2 The purpose of this paper is to ensure the future RMF development aligns with the SRC's expectations.

2 Progress on developing the RMF has been slower than anticipated

2.1.1 The secretariat has been undertaking development of the RMF in line with previous discussions with the SRC. This development has been less straightforward than anticipated. Challenges have included working at the level of the entire industry (rather than from the perspective of an individual participant), aligning the framework with the SRC and Authority's role, and the necessarily iterative nature of the process.

2.1.2 While progress has been slower than expected, there have been valuable lessons learned that will have implications for continued development of the RMF (as set out in section 4).

2.1.3 The one area of progress worth reporting back on at this time relates to the list of prioritised risk events set out in Table 1 below. As set out in Table 5 in Appendix A , the changes Table 1 largely address the SRC's requests or comments from its 15 March 2016 meeting.

2.1.4 The biggest change is that risk events are no longer expressed as ICP thresholds and have instead been normalised to economic cost. An economic cost of $10 million is equivalent to:

a) 30,790 residential ICP days without power; or

b) 6,540 small non-residential ICP days without power; or

c) 9,773 medium non-residential ICP days without power; or

d) 41,705 large non-residential ICP days without power.[1]

2.1.5 The loss to large/major industrials is too bespoke to be expressed meaningfully in ICP days without power.

Table 1: Prioritised risk events (deletions shown with strikethrough)

Prioritisation	Risk events	Estimated economic cost
Priority 1	North and/or South Island outage	\$0.7-\$2.4 billion[2]
Priority 2	Loss of supply to consumers with an estimated economic cost of more than \$100m arising from one or more related events within a one year period	>\$100 million (by definition)
Priority 3	Loss of supply to consumers with an estimated economic cost of more than \$10m arising from a single event	\$10-\$100 million (by definition)
~~Priority 3~~	~~Major CBD outage with a resulting economic cost calculated at more than \$10m~~	
~~Priority 3~~	~~Loss of supply to a residential area with a resulting economic cost calculated at more than \$10m~~	
~~Priority 3~~	~~Loss of supply to a rural area with a resulting economic cost calculated at more than \$10m~~	
~~Priority 3~~	~~Loss of major industrial load 5 days or longer with a resulting economic cost calculated at more than \$10m~~	
Priority 3	Official conservation campaign implemented due to failure of supply to meet demand	Unknown, but *at least* in the single millions of dollars
Priority 3	At least one tranche of automatic under-frequency load shedding activated	\$8-\$23 million[3]
Excluded	All risks below priority 3 are considered to be outside the terms of reference of the SRC unless the Authority specifically requests the SRC's advice on these risks.	

2.1.6 The content of Table 1 is also likely to inform the secretariat about what types of system events the SRC would expect to receive retrospective reporting on. The secretariat will separately develop documentation setting out these reporting thresholds and provide that to the SRC for its approval.

[1] Using Value of Lost Load (VoLL)[1] calculated by PWC in March 2015 for an 8 hour duration outage in Christchurch. Using Auckland residential VoLL rather than Christchurch yields an equivalent of 38,000 residential ICP days without power.

[2] The low range assumes a weekday loss of the South Island for 24 hours with a VOLL of \$20,000 MWh. The high range assumes the weekday loss of the North Island for 48 hours with identical VOLL.

[3] The low range assumes losing 16% of the South Island for 4 hours at a time of low load, with a VOLL of \$10,000. The high range assumes losing 16% of the North Island for 4 hours a time of high load, with an identical VOLL.

3 The secretariat has consolidated the SRC's RMF guidance to date and wishes to verify its understanding with the SRC

3.1.1 The SRC has provided various feedback, comments and formal actions to guide the secretariat's development of the RMF. In order to verify that it correctly understands the SRC's expectations, the secretariat has consolidated the SRC's guidance and classified it as relating to either:

a) the objective and outcomes of the RMF

b) the principles to be applied during the development of the RMF.

3.2 The secretariat wishes to verify the SRC's desired objective and outcomes for the RMF

3.2.1 The secretariat understands that the objective for the RMF is to provide a framework through which the SRC can discuss material security and reliability risks and their management in order to be able to improve the group's advice to the Authority.

3.2.2 The discussion of risks and subsequent advice is expected to create these key outcomes:

a) improve the visibility of risks that are not widely known

b) improve the understanding of risks (and their interactions) that are not well understood

c) identify any gaps between the responsibilities of risk owners

d) stimulate valuable risk conversations within the electricity industry.

3.2.3 Table 2 sets out specific feedback from SRC minutes that relate to the objective or outcomes of the RMF.

Table 2: SRC's RMF guidance relating to objectives or outcomes

SRC's RMF guidance (quoted from SRC minutes)	Which SRC meeting quote is drawn from
"establishing processes that facilitate a meaningful SRC discussion at an appropriately high-level"	1 July 2015
"the SRC's role could include identifying gaps (like Penrose or in relation to the management of medically dependent consumers) and advise the Authority Board"	15 March 2016
"the process flushes out a level of information that is not well or widely known"	15 March 2016
"driving good risk conversations in the industry is a desired outcome"	15 March 2016

3.3 The secretariat wishes to verify the SRC's principles for RMF development

3.3.1 The secretariat understands that the key principles that the SRC expects to be applied during the development of the RMF are that:

a) while the RMF will deal with the management of industry and power system risks, it needs to clearly maintain the linkage to long-term benefits for consumers

b) the SRC is not a risk owner and the RMF needs to be clear that risk owners retain full accountability for their risk management decisions

c) the SRC wants to keep its focus on higher-level abstractions of risk, though it will need sufficient information to provide meaningful advice

d) risk management can absorb a lot of time, so the secretariat needs to be careful not to impose onerous time commitments on itself, the SRC or the wider industry

e) the RMF should reflect that security or reliability risks can include loss-of-life, economic, social, environmental or reputational consequences

f) the role and jurisdiction of the Commerce Commission needs to be contemplated in the design and operation of the RMF.

3.3.2 Table 6 in Appendix A sets out specific feedback from SRC minutes that relate to the principles the SRC expects to be applied to the development of the RMF.

4 The secretariat's experiences are also guiding the future direction of RMF development

4.1.1 In the course of developing the RMF, the secretariat has made some observations and drawn some lessons from them. This paper is not seeking the SRC's feedback on these observations and lessons as they are largely a consequence of subjective experience and nothing much hinges on them.

4.1.2 However, the secretariat has developed a list of what the implications of those lessons are for the future development of the RMF. This paper asks the SRC to consider those implications in order to check the direction of them is consistent with members' understanding of risk management generally and their expectations for the RMF specifically.

4.1.3 The secretariat's observations and lessons have largely been drawn from two experiences:

a) the secretariat has met with the system operator to understand the lessons from its implementation of a bowtie-based risk management framework and to view the bowtie software that Transpower has procured

b) the secretariat has begun redeveloping draft SRC bowties with a broader range of Authority staff.

4.1.4 The secretariat's observations and lessons from its experiences, and the implications for future RMF development, are set out in Table 3.

Table 3: Secretariat observations and lessons from RMF development to date and the implications for future RMF development

Observation	Lessons	Implications for future RMF development
Risk management is a process	The quality of the process largely determines the outcome (eg insight derived) Stimulating conversations that produce insights that can be acted on is a large part of the benefit Effective and efficient risk management helps set organisational focus (time, money) in relative and absolute terms	The secretariat's engagement with Authority staff, industry participants and the SRC needs to be well-prepared to enable high-quality discussions
SRC risk management is unusual as the SRC is not a risk owner	Each 'top event' needs to enable assessment of industry-wide security and reliability, as distinct from the SRC's functions or outputs Choose the desired level of bowtie detail carefully as it needs to align with information requirements on third parties (the risk owners)	The RMF will be focussed on an industry-wide view of risks so needs to be kept high-level, yet be meaningful
Development of bowties happens iteratively	Developing bowties with subject-matter experts is time-consuming, but also not a good use of executive time Initial bowtie versions usually need substantial restructuring and rewording Once a bowtie's 'top event' is settled, the bowtie structure forms around it	The secretariat will use the SRC's time sparingly, especially during early development when the content is more fluid
Bowties are especially valuable as a way of visualising risks and their relationships	How the bowties look influences the quality of development discussions How easily bowties can be reconfigured influences the quality and efficiency of development discussions Overcrowding a bowtie reduces users' comprehension Presenting executives with too many bowties also risks reducing comprehension	The secretariat will trial the use of bowtie software until 30 June 2017 Earlier iterations envisaged ~10 bowties, though the secretariat now considers that is too many to be actively managed by the SRC

There is no well-standardised jargon for bowties	Intra- and inter-organisational discussion of bowties is aided by common understanding of bowtie jargon	Aligning the SRC's RMF with Transpower's bowtie jargon (and possibly software) is preferable as it will improve common understanding with a key stakeholder
Some bowties can visualise the difference between unmitigated and mitigated (residual) risk	While current development of the RMF excludes assessment of risks before they've been mitigated, the secretariat should anticipate introducing this distinction at a later stage	The secretariat's software trial should seek to determine whether procuring this functionality would be of net benefit

5 Next steps for RMF development

5.1.1 Table 4 below set out the key deliverables that the secretariat expects to provide to the SRC over the course of the 2016/17 year.

Table 4: Schedule of expected RMF development deliverables

SRC meeting	Expected deliverables
21 October 2016	A road-tested list of bowtie 'top events' with a description of the coverage they collectively provide for the security and reliability matters in scope of the SRC One well-tested bowtie for SRC review
March 2017[4]	A (different) comprehensively-tested bowtie for SRC review
June 2017[5]	Another comprehensively-tested bowtie for SRC review An explanation of the results of the secretariat's trial of bowtie software and a plan for the next steps on development of the RMF (including any longer-term software procurement)

6 Questions for the SRC to consider

6.1.1 The SRC may wish to consider the following questions.

Q1. Does the SRC agree that section 3.2 accurately summarises the SRC's desired objectives and outcomes for the RMF? Does the SRC wish to add or modify anything?

Q2. Does the SRC agree that section 3.3 accurately summarises the principles that the SRC expects to be applied during the development of the RMF? Does the SRC wish to add or modify anything?

Q3. Does the SRC disagree with any of the 'implications for future RMF development' in section 4?

Q4. Does the SRC agree with the proposed next steps for RMF development set out in section 5?

Q5. What further information, if any, does the SRC wish to have provided to it by the secretariat?

Q6. What advice, if any, does the SRC wish to provide to the Authority?

[4] This is approximate as the meeting is yet to be scheduled.

[5] This is approximate as the meeting is yet to be scheduled.

Appendix A Tables of minuted SRC comments from previous meetings on the RMF

A.1.1 Table 5 below sets out the SRC's requests or comments from its 15 March 2016 meeting. As discussed in paragraphs 2.1.3-2.1.3.

Table 5: SRC's RMF guidance relating to specific aspects of development

SRC's RMF guidance (quoted from SRC minutes)	Which SRC meeting quote is drawn from	Development status
"parallel development of thresholds for determining what system events the SRC should receive detailed reporting on"	22 October 2015	In progress. As discussed in paragraph 2.1.6.
"economic cost to consumers is the key measure rather than just ICPs affected, especially with the 'Loss of supply to a rural area > 30,000 ICPs for 5 days or longer' event" and "the SRC suggested that the ICP thresholds in the risk events should be refined during further development" and "The SRC questioned whether normalising outages to aggregate economic cost might help with the relative prioritisation of some of the types of outages in the risk register"	15 March 2016	Completed. ICP thresholds have been converted to economic cost.
"the relatively low priority of 'three or more events within a one year period of loss of supply to a residential area of more than 100,000 ICPs for three days or longer' compared to an extended reserve activation ought to be corrected"	15 March 2016	Completed. The loss of a single AUFLS tranche has a prioritisation befitting its estimated economic cost.
"the prioritisation generally needed to increase the focus on consumers"	15 March 2016	Completed. The shift to economic cost to consumers has achieved this.
"even a short official conservation campaign appeared low priority compared to losing 100,000 ICPs for three days, as consumers would still be able to utilise electricity during the campaign"	15 March 2016	Completed. While hard to estimate this economic cost, this now appears to have the most appropriate prioritisation.
"there are some regional particularities about the timing and duration of outages that could create unusually high economic impact (such as regions supporting the dairy industry)" and "there is scope to add a new risk event that covered regional disruptions that may not trigger the	15 March 2016	Cancelled. The shift to economic cost means this is built in to the definitions.

30,000 ICP threshold but that would still be of high consequence. Examples might include the loss of supply to Eastland or the West Coast. The economic cost to the region should be the driver of this risk” and “The SRC would like the secretariat to consider adding a risk regarding a regional outage that can cause significant economic cost but doesn’t trigger the 30,000 or 100,000 ICP thresholds of the other risks”		
“The secretariat was also requested to look at the assessment of the two risks “Short period of conservation” and “Extended Reserve activation” and review whether their categorisation is correct in comparison to some of the other loss of supply risks”	15 March 2016	Completed. These now appear to have the most appropriate prioritisation.

A.1.2 Table 6 below sets out specific feedback from SRC minutes that relate to the principles the SRC expects to be applied to the development of the RMF. The secretariat’s summary of the key principles is set out in paragraph 3.3.1.

Table 6: SRC's RMF guidance relating to development principles

SRC’s RMF guidance (quoted from SRC minutes)	Which SRC meeting quote is drawn from
“ensuring that the next development steps stay small and exploratory at this stage”	1 July 2015
“the potential for the RMF to become big and bureaucratic if it was not appropriately managed, with the risk of it creating unwarranted cost on industry (particularly in terms of data collection)”	1 July 2015
“the need to trust that individual risk owners will appropriately manage their own risks” and “the SRC do not believe their role is to police participants’ risk management” and “risk owners are responsible for identifying what they need to do to mitigate risks” and “important that the risk accountabilities were plainly visible”	1 July 2015 and 15 March 2016 (x2)
“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”	22 October 2015
“the SRC (including its secretariat) need to be careful about where to stop when populating detail into the RMF, especially on the right-hand side of the bowties, in order to avoid delving into individual firms’ responsibilities”	15 March 2016
“most industry players will have their own emergency response plans”	15 March 2016

“the process of identifying gaps will help set the level of detail”	15 March 2016
“inconsistency of language for risk management across the whole industry will make the SRC’s RMF a challenge”	15 March 2016
“the SRC were generally happy with the criteria for assessing probability and consequence, though the RMF should take environmental or social consequences into account”	15 March 2016
“consumer impacts were generally underweighted relative to system risks”	15 March 2016
“Secretariat to consider engagement with industry and the Commerce Commission in further development of the RMF”	15 March 2016
“Secretariat to assess what the threshold should be for a risk that the SRC ‘can live with’, and incorporate into further development of the RMF”	15 March 2016