

16 May 2017

Dr Brent Layton
Chair
Electricity Authority
PO Box 10041
Wellington 6143

Dear Brent

Advice resulting from 28 March 2017 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 nine different papers at its 28 March 2017 meeting. This letter is the SRC's advice arising from six of those papers.

Advice on lessons arising from a 22 July 2016 incident at Manapouri power station

On 22 July 2016, the Manapouri power station unexpectedly ramped down from 750 MW to 400 MW – a sizable loss of generation that came very close to causing impacts for electricity consumers. The SRC received a presentation from Meridian Energy in relation to this event. Meridian initiated this presentation as they thought it would be of interest to the group and the wider industry. The SRC was appreciative of Meridian's open and proactive approach.

The SRC's advice to the Authority is:

- power systems technology has evolved considerably and is inextricably tied up with IT network infrastructure as an interconnected system. As such, inter-disciplinary interaction of engineering and IT specialists is vitally important
- having an organisational culture where staff and contractors feel empowered to pause and ask questions is, in part, enabled by management not playing the 'blame game'
- the SRC encourages all industry participants that have the potential to adversely affect the power system to be proactive about sharing their lessons, within the limits of commercial sensitivity
- venues already exist for industry participants to share lessons relating to cybersecurity or health and safety
- that the Authority should explore with the Electrical Engineers' Association whether they may be a suitable venue for sharing lessons from operational events.

Advice on the risks Transpower manages in relation to its HVDC assets

The SRC received a paper and presentation from Transpower explaining their approach to managing risks relating to their HVDC assets.

The SRC's advice to the Authority is:

- the SRC took comfort from the information presented by Transpower, noting the features, characteristics and management of New Zealand's HVDC link mean it is physically resilient and

able to be used in a variety of contingency situations. As such, it would be unlikely to experience a failure similar to Australia's Basslink HVDC failure in 2016

- there is a large difference in the impacts of outages depending on the timing of an HVDC outage event, and this is uncontrollable
- the slow shift from being an economic asset to becoming a reliability asset could be a creeping risk that will need to be accounted for in the future management of the HVDC.

Advice on the 28 September 2016 South Australia power outage

The SRC received a paper from the system operator on its observations of lessons from the 28 September 2016 South Australia power outage with relevance for the New Zealand power system.

The SRC's advice to the Authority is that the New Zealand power system has features and characteristics that would significantly reduce the likelihood of a similar event occurring here. In particular:

- our black start providers are periodically tested and called upon to energise a section of the transmission network
- the system operator is working with industry participants to promote robust understanding of black start and system restoration arrangements
- our automatic under-frequency load shedding system has been designed to cope with the most extreme events credibly conceivable
- our AUFLS system is being improved with the development of a four-block scheme with rate of frequency decay detection
- the risk posed by wind providers that are expected to trip off immediately after a system event are already covered by additional procurement of reserves by the system operator.

Advice on the system operator's 2017 assessment of security of supply

The SRC received the system operator's 2017 assessment of security of supply.

The SRC's advice to the Authority is:

- the retirement of the Huntly Rankine units is a known transitional issue, though the timing is not yet locked in
- the transition away from the Huntly Rankine units will likely involve some turbulence to the dynamics of the generation market, though the market would reach a new stable equilibrium afterwards
- the potential withdrawal of New Zealand Aluminium Smelters' Tiwai Point plant poses a sizable uncertainty for system security, though this may be a persistent uncertainty that stakeholders need to live with
- there is 4-5 years of satisfactory security in which the market can prepare and respond with development options
- nonetheless, the decision-making and development involved to manage a transition away from the Huntly Rankine units means that it is difficult for the SRC to be assured today that the transition will not involve a squeeze on security margins.

The SRC also agreed that improvements to future annual assessments of security of supply, such as the internal consistency of scenarios, should be pursued jointly by the system operator and the Authority.

Advice on the New Zealand Generation Balance reporting for winter 2017

The SRC received a paper from the system operator that set out the New Zealand Generation Balance (NZGB) results for the 200 days from 10 March 2017 (covering winter 2017). The report explained the differences between the National Winter Group report that the NZGB replaced.

The SRC's advice to the Authority is that the SRC is assured that the capacity security situation for winter 2017 is satisfactory.

Advice on Transpower's major capital proposal for the upper-North Island

The SRC received a presentation from Transpower that provided an update on its major capital proposal for the upper-North Island. Transpower is investigating options (transmission investment or transmission alternatives) to alleviate upper-North Island voltage constraints in the event that Genesis Energy's Huntly Rankine units are retired before 2023. Transpower is concerned that if a market-led solution (such as a generation development at or north of Huntly) does not emerge in time, it will be forced to make an investment decision. As the lead time for a Transpower investment decision is greater than a market-led solution it is possible this will not be the best outcome for consumers.

The SRC's advice to the Authority is:

- the main risk of this situation is not likely to be a security or reliability concern, but whether the investment that gets made is an efficient solution for New Zealand
- the situation might be resolved by either regulated investment or private investment, so the relevant regulators should be monitoring the situation to ensure the matter is resolved for the long-term benefit of consumers.

There is no further advice arising from the matters discussed at the SRC's 28 March 2017 meeting.

Yours sincerely



Mike Underhill

Chair
Security and Reliability Council

cc SRC members, Carl Hansen (Electricity Authority)

23 June 2017

Security and Reliability Council

By Email

Dear SRC members

Security of supply situation

Since February, hydro storage has been declining due to low inflows in the South Island. We are currently experiencing a dry winter, and in late May the security of supply situation entered the 'Watch' phase on the risk meter. The system operator is progressing the potential actions required of it under the security of supply framework in the Electricity Industry Participation Code 2010 (Code).

New Zealand Hydro Risk Meter

South Island Hydro Risk Meter



The purpose of this correspondence is to provide you with an update on the current security of supply situation and links to where further information can be found. The information contained within this letter is correct as at 23 June 2017.

The Authority, system operator and SRC each have key roles under the security of supply framework

The security of supply framework is designed to facilitate the management of security of supply risks that could emerge during an extended dry sequence or could be triggered by a sudden loss of generation or transmission capacity. This is accomplished by:

- a) providing industry participants with high quality information about security of supply risks to assist their risk management decisions
- b) providing for centralised emergency measures (such as official conservation campaigns and rolling outages) if security of supply risks increase to specific levels set out in the Emergency Management Policy (EMP).

The Authority is responsible for the overall framework governing security of supply and emergency measures. This framework is set out in the Code and several important documents approved by the Authority and incorporated by reference in the Code, in particular:

- Part 9 of the Code deals solely with security of supply and provides for:¹
 - o the triggers for the system operator to start and end official conservation campaigns
 - o the customer compensation scheme that runs in tandem with official conservation campaigns

¹ Part 9 of the Code can be viewed or downloaded from <http://www.ea.govt.nz/code-and-compliance/the-code/part-9-security-of-supply/>

- o the system operator's obligations for rolling outages and the supporting participant rolling outage plans
 - o when urgent temporary grid reconfigurations are permitted
- the Security of Supply Forecasting and Information Policy (SOSFIP), which "sets out the system operator's policy on information and forecasting for New Zealand and South Island security of supply"²
- the EMP, which "sets out the steps the system operator must take, as a reasonable and prudent system operator, and encourage participants to take at various stages of an extended emergency"³
- the System Operator Rolling Outage Plan (SOROP), which "provides for the management and co-ordination of planned outages as an emergency measure during energy shortages".⁴

The system operator, with respect to security of supply matters, is responsible under section 8(2) of the Electricity Industry Act (2010) to "provide information, and short- to medium-term forecasting on all aspects of security of supply and manage supply emergencies." To meet its Act responsibilities and Code obligations, the system operator creates policies and plans (including the SOSFIP, EMP and SOROP for Authority approval), implements the framework, administers it on a day-to-day basis and manages emergencies.

The function of the SRC (set out in section 20 of the Act) is to provide independent advice to the Authority on the performance of the electricity system and the system operator, and on reliability of supply issues. It is not authorised to take a role in managing security of supply issues, though it may have advice about what lessons the Authority should take from any period of reduced security of supply. Such advice is more likely to be retrospective in timing and focus on the longer-term, strategic implications for security and reliability.

As members are likely already aware, the SRC has no public- or media-facing communications role. While attempts by the media to seek comment from the SRC Chair have occurred and are likely to continue, members should also be prepared to refuse comment *in their capacity as SRC members*.

The security of supply situation has entered the 'Watch' phase

Figure 1 below shows the hydro risk curves (HRCs) for New Zealand and for the South Island as at 23 June 2017. These are our primary operational security of supply risk metrics and provide a benchmark to compare against current storage to objectively evaluate the likelihood of requiring an official conservation campaign.⁵ The system operator calculates and publishes the HRCs in accordance with the SOSFIP, and regularly updates them with current storage information.

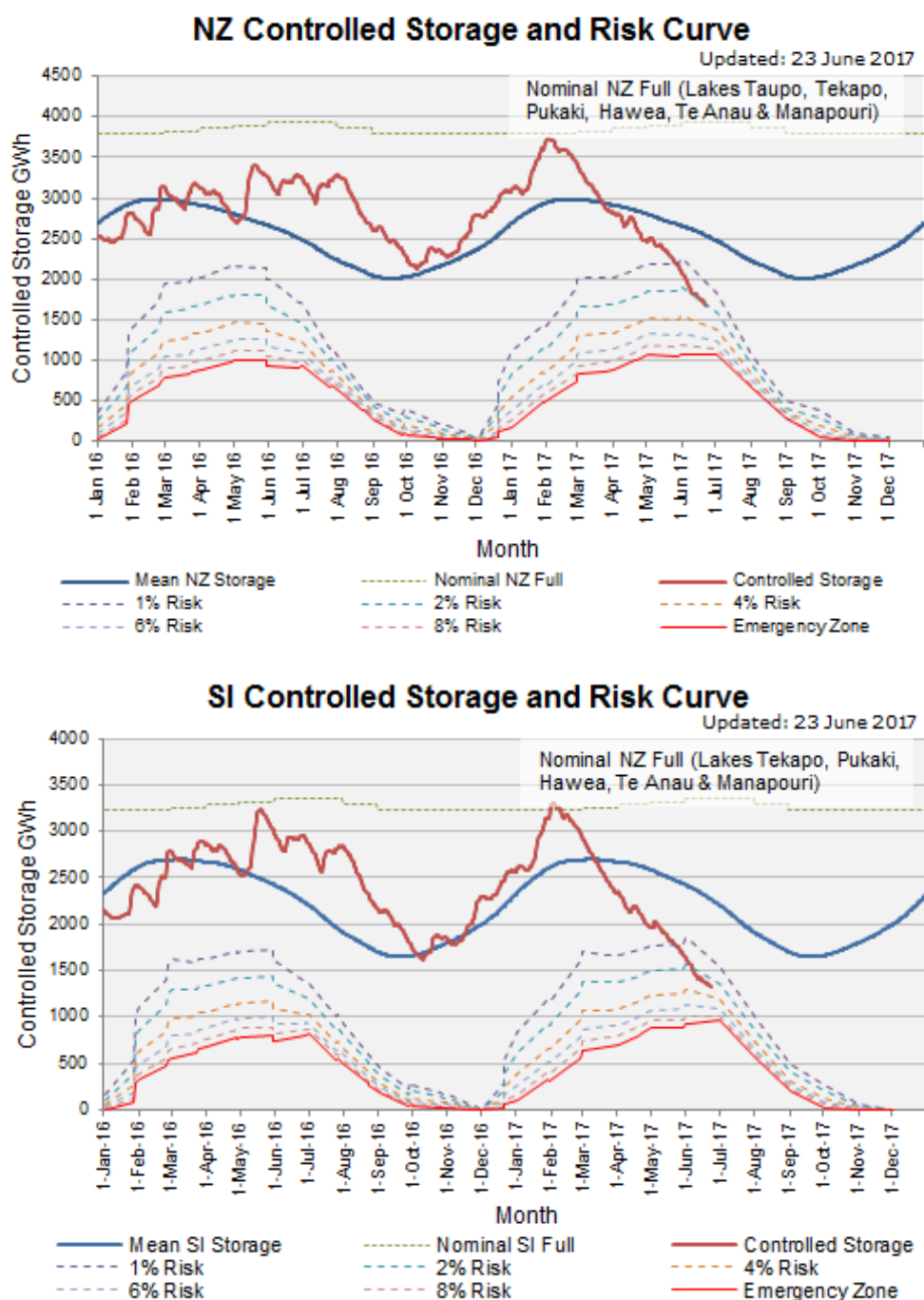
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⁵ An explanation of hydro risk curves is available at <https://www.transpower.co.nz/system-operator/security-supply/hydro-risk-curves-explanation>

Figure 1: Hydro Risk Curves for New Zealand and the South Island



Actual storage crossed the relevant HRCs on the following dates: the South Island 1% HRC on 22 May 2017; the New Zealand 1% HRC on 27 May 2017; the South Island 2% HRC on 6 June 2017. As set out in the SOSFIP, once hydro storage crossed the 1% HRC, the risk meter status shifted from 'Normal' to 'Watch'.⁶

Under the EMP, this changed risk status requires the system operator to take certain actions. It has increased the frequency and breadth of its security of supply monitoring, reporting and

⁶ The risk meter status would be elevated to 'Alert' if New Zealand or South Island storage crossed the 4% HRC.

dialogue with industry stakeholders. It has also established a programme of work to ensure it is well-placed to respond quickly if the situation deteriorates. This includes early-stage preparations for an official conservation campaign, which is triggered if New Zealand or South Island storage crossed the 10% HRC and was expected to remain so for at least a week.⁷

The system operator publishes weekly security of supply newsletters.⁸ The system operator also offers a subscription service for any interested party wishing to automatically receive these newsletters by email.⁹ In its 13 June 2017 newsletter, the system operator advised that, at this stage, it is likely that we have sufficient hydro storage to make it through the winter period without initiating emergency response measures, provided none of the following occur:

- a repeat of the lowest recorded inflow sequence
- the incidence of a lower inflow sequence than ever recorded
- a reduction in expected thermal generation availability.

The system operator held an industry teleconference on Wednesday 14 June to discuss security of supply matters including, and in particular, an urgent proposal to amend the SOSFIP (discussed in the following section below). The teleconference attracted participants from across the industry with representatives from generation and distribution companies, financiers and the Authority.

The system operator laid out its risk modelling and the current situation. It also outlined the steps it has already undertaken to prepare for all possibilities as the dry winter situation develops. These include:

- a review of upcoming planned outages that may cause constraints
- an assessment of transmission that could limit southwards HVDC transfers
- consideration of temporary grid reconfigurations that might assist transfers across the inter-island link and into the south of the South Island.

The system operator has received an urgent proposal to review the treatment of contingent hydro storage in its calculation of HRCs

Meridian Energy has requested an urgent variation to the SOSFIP to change the treatment of contingent hydro storage in the evaluation of hydro risk.¹⁰ The request was made to the system operator under clause 7.6(1) of the Code. The system operator must consider the proposed variation and may submit a request for a variation to the SOSFIP to the Authority.

Contingent hydro storage is hydro storage that becomes available for use either under emergency conditions or specifically to mitigate the risk of shortage, but is unavailable for generation of electricity under normal conditions. Currently, contingent hydro storage is excluded from the calculation of the HRCs under the SOSFIP. This approach was decided in 2013 following consultation with interested parties. If contingent hydro storage becomes available (because the resource consent conditions triggering its availability are met), it is still treated as contingent (at that point called active contingent hydro storage) and remains excluded from the calculation of the HRCs.

⁷ Provisions relating to an official conservation campaign are set out in the EMP.

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The proposed change would mean contingent hydro storage would be included in the calculation of HRCs, but only for those HRCs at which it would be active. Currently Lake Hawea has 67 GWh of contingent hydro storage available to Contact Energy if storage falls below the 4% HRC. The effect of the proposal would be to push the 6%, 8% and 10% HRCs down by 67 GWh.

This proposal would likely have a material impact on the market (especially if the change was implemented under urgency). It would, effectively, constitute a change to the trigger for an official conservation campaign: that is, lowering it by the amount of contingent hydro storage available above the 10% HRC, and therefore delaying or possibly preventing it.

The system operator hosted a discussion on the treatment of contingent storage at the 14 June teleconference. Interested parties were invited to provide written comments by 21 June.

Authority staff are actively engaged with the system operator regarding the proposal to review the treatment of contingent storage and possible next steps. We are also undertaking our own analysis. We anticipate receiving formal notification of the system operator's decision whether or not to submit a proposal once it has considered the views expressed at the teleconference and in written comments. Our next steps will depend on the nature of the system operator's decision and our consideration of that decision alongside our own analysis.

The SRC received a paper at its 25 February 2014 meeting that included discussion about the treatment of contingent hydro storage under the SOSFIP.¹¹

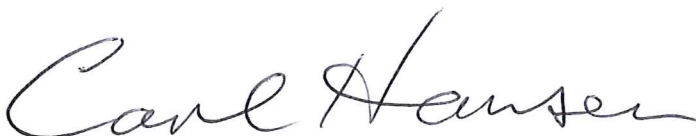
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Authority staff will provide SRC members with a further update on these matters at the 28 July SRC meeting. If there are any major developments before then, we will provide an update via email.

In the meantime, you are welcome to monitor the system operator's security of supply website for regular newsletters and updates at <https://www.transpower.co.nz/system-operator/security-supply>.

If members have any substantive requests or concerns (such as suggested responses to the situation or requests for SRC papers), please direct these to your SRC Chair. If members have any operational questions (such as where to find information or seeking a clarification), these can be directed to either Saltanat Cole (saltanat.cole@ea.govt.nz) or Callum McLean (callum.mclean@ea.govt.nz and 04 462 0618) on behalf of the secretariat.

Yours faithfully



Carl Hansen
Chief Executive

¹¹ [Security of Supply Risks](http://www.ea.govt.nz/development/advisory-technical-groups/src/meeting-papers/2014/25-february/), available from <http://www.ea.govt.nz/development/advisory-technical-groups/src/meeting-papers/2014/25-february/>

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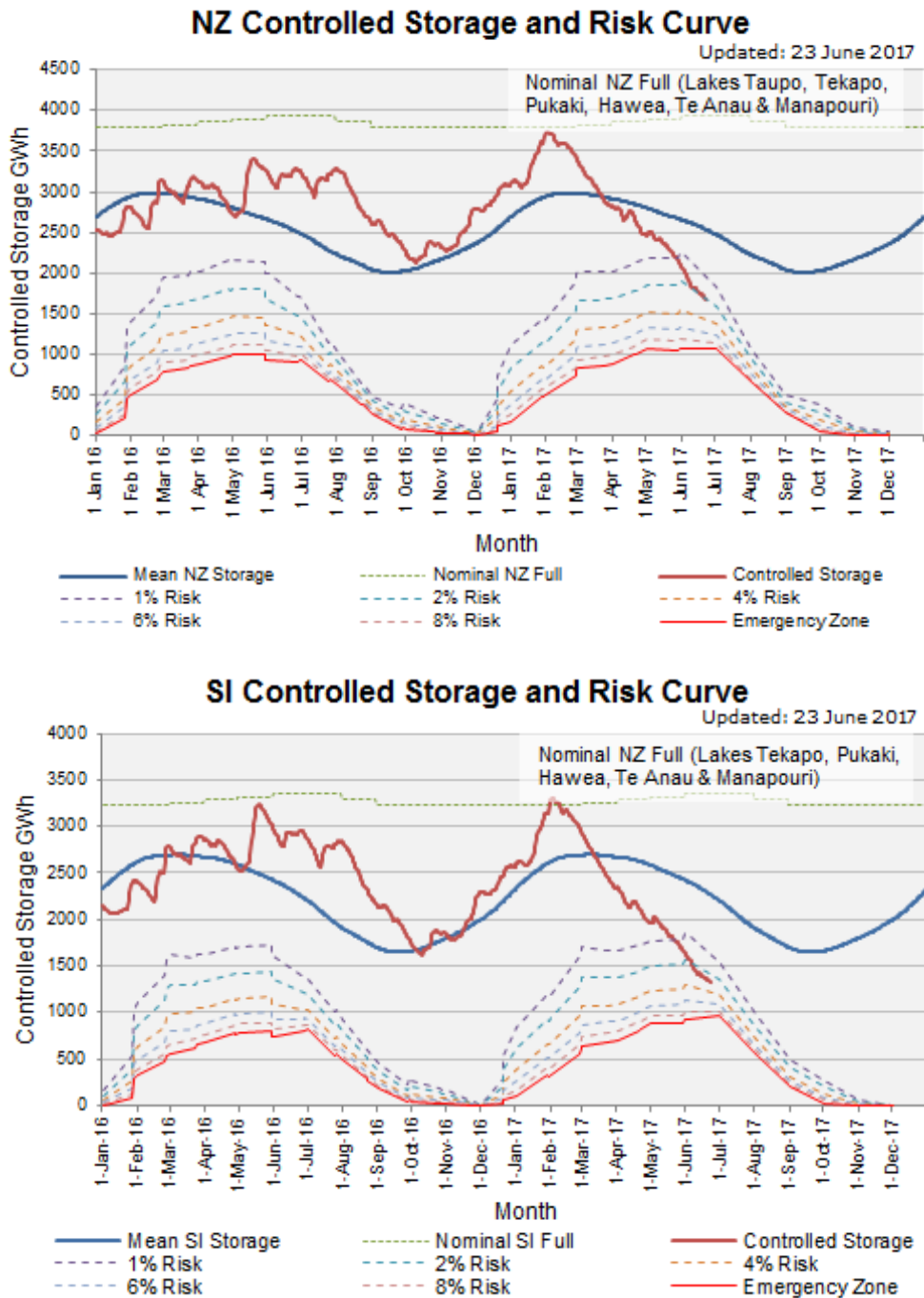
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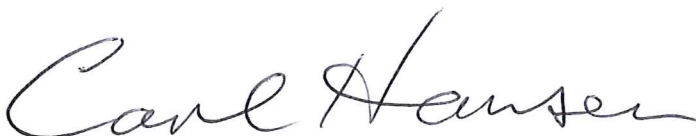
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