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29 June 2009

Darryl Renner  
Director System Operations and Common Quality  
Electricity Commission  
PO Box 10041  
Wellington

Dear Darryl,

## **Development of automatic under-frequency load shedding**

### **Introduction**

1. The automatic under-frequency load shedding (AUFLS) arrangements contained in the Electricity Governance Rules 2003 (rules) are largely based on Transpower's 2003 Common Quality Obligation arrangements for AUFLS. As not all of the historic arrangements were imported into the rules, a number of associated regulations and rules were written to assist the transition to the electricity regulatory and rule environment. These included a provision to exempt participants from the need to comply with rules.
2. The Electricity Commission (Commission) and System Operator (SO) have discussed the limitations of the AUFLS arrangements and related exemption provisions on a number of occasions. The SO is becoming concerned about an apparent continued focus on fine tuning the existing arrangements for an interim period rather than undertaking a more substantive review of the role of AUFLS.
3. We think it useful to set out our thoughts on the issues.

### **Background**

4. Prior to the establishment of the electricity regulatory regime in 2003 the owners of industrial load were not required to provide AUFLS. This approach was based on the assumption that the cost of interrupting industrial load was more expensive than the cost of interrupting domestic, small commercial, or small industrial load.
5. The rules recognise security is a common good, and that security should be provided in the least cost manner and that, where possible, the rules should establish processes to facilitate the discovery and provision of security in the least cost manner. In the absence of knowing the relative costs of interrupting different classes of load one

of the transitory rules, rule 6.6 of technical code B of schedule C3 of part C of the rules, sought to establish a mechanism allowing the Commission to undertake an initial analysis of interruption costs and for industrial load, if desired, to be exempt from the obligation to provide AUFLS (and in doing so reveal its cost of interruption).

6. Under the arrangement if an industrial load could demonstrate that the cost of interrupting what would have otherwise been its share of AUFLS was higher than the benchmark cost established by the Commission it qualified to be exempt from the AUFLS obligation.
7. Those who drafted rule 6.6 did not anticipate large volumes of industrial load would be offered into instantaneous reserves (IR) market or that industrials would claim loss of revenue from participation in the IR market as a cost of compliance within the AUFLS exemption rules. The provision of IL into the market began to indicate that the cost of interrupting industrial load may not be as high as originally thought and lost revenue hadn't been anticipated as a potential "cost" when the interim exemption provisions were designed
8. The Electricity Governance Regulations 2003 (regulations) contain a generic exemption provision whereby the Commission may, in its discretion and upon the terms and conditions (if any) it thinks fit, exempt any participant, or class of participants, from compliance with all or any of the rules. Under these provisions, rather than rule 6.6, the Commission has granted a series of short term exemptions to: PanPac, Tasman Pulp & Paper (now Norske Skog), Winstones, Toll New Zealand, and NorthPower in respect of NZ Refining. The current exemptions expire on 31 March 2010.
9. The limitations of rule 6.6 were exposed shortly after the rules came into effect. In September 2005 the Commission issued a consultation paper on the issues and proposed rule changes to deal with the limitation of the interim rules. The rule change did not proceed because of changes required to the So's Reserve Management Tool Software (RMT).
10. Importantly, in our view, the consultation paper highlighted the limitation and need for review of the overall AUFLS obligations and raised issues that needed to be considered in a wider review, not the least of which is the number and size of AUFLS blocks.
11. Transpower's submission on the consultation paper also focused on issues associated with the interim arrangements and the proposed changes to these arrangements. Transpower's comments included:
  - a. the dislocation between South Island distributor's ability to participate in the instantaneous reserves market without reference or consequence to distribution network owners obligation to provide AUFLS; and

- b. the grant of exemptions could lead to a reduction in aggregate of available interruptible load and AUFLS since there is no guarantee that industrial load contracted as Instantaneous Reserves (IR) would be offered or cleared; or alternately, that the appropriate portion of unoffered or un-cleared IL would be made available as AUFLS capability.
- 12. The limitations of rule 6.6 have again been considered internally by Commission staff in a paper to the Electricity Governance Rules Committee in April 2009. The paper expresses some concern at the possible need, and the Commission's ability, to again consider extending the current exemptions under the regulations. It proposed two options:
  - a. repeal rule 6.6 leaving participants with the obligation to either comply with AUFLS obligations, or seek exemptions under the regulations, or seek a dispensation from the SO. These options, in effect, recognise that rule 6.6 is inoperable. This option however would not address the Commission's continued ability to grant exemptions under the regulations; or
  - b. replace rule 6.6 with a new set of rules that makes explicit the process and criteria currently employed by the Commission in implementing the existing exemption regulations thereby addressing the Commission's concern regarding its ability to grant ongoing exemptions from AUFLS rule obligations.
- 13. In assessing a request for an exemption in accordance with either rule 6.6 or the regulations, the Commission seeks advice from the SO on whether, if the exemption were granted, the SO could continue to meet its principal performance objectives (PPOs). Since rule 6.6 explicitly requires the Commission to consider cost, and the regulations explicitly require the Commission to have specific regard to its principal objective, while the SO may comment on the cost implications of granting an exemption, the SO largely considers the request for advice on its actual ability to meet its PPOs.
- 14. To manage contingent events, the SO, through the scheduling and dispatch process, will seek to schedule sufficient reserves and or constrain the quantum of the contingent risk. The SO's management of extended contingent events is similar. By taking into account AUFLS capability, asset redundancy, and acceptance of greater quality disturbances, the scheduling and dispatch process will schedule sufficient reserves and/or constrain the quantum of the extended contingent risk. For other events emergency measures, including pre-event load shedding, and black start restoration procedures will be employed.
- 15. The SO's advice on whether it can continue to meet its PPOs is almost certainly going to be that it is able to do so given additional reserves can be scheduled as a substitute, the quantum of any extended

contingent event (ECE) limited and, ultimately, the level of pre-event load shedding increased. However the SO notes that:

- a. there is a cost (ultimately paid by the final consumer) associated with the procurement of additional reserves, constraining the quantum of an ECE, or an increase in pre-event load shedding; and
- b. any reduction in AUFLS capability will increase the likely need to employ emergency measures or restoration procedures in the management of other events (events more severe than ECEs).
- c. the grant of any exemption should not delay or reduce the need to identify the appropriate role(s) for AUFLS, and means of delivery, in the New Zealand power system.

### **Discussion and next steps**

16. The SO is concerned about the continued focus on exemption arrangements rather than a focus on the need to undertake the longer term development initiative identified in the September 2005 consultation paper.
17. There will be costs associated with introducing another interim arrangement and there is always uncertainty in the outcome of new arrangements. The SO believes it would be better to retain the existing arrangement and that if the Commission is concerned about the lack of clarity within rule 6.6 that the work contemplated by option two in April 2009 Electricity Governance Rules Committee paper is undertaken and set out in a policy consistent with rule 6.6. The focus of any Commission and SO effort should be the longer term review.
18. Internationally AUFLS schemes of up to 60 percent of peak demand exist to manage extended contingent events and reduce the need for restoration procedures. Comparatively New Zealand's AUFLS scheme appears limited. The SO believes the role and nature of the New Zealand AUFLS scheme needs to be reviewed.
19. The SO is aware that NZ Steel has applied for an exemption from its obligation to provide AUFLS. Historically NZ Steel has not provided AUFLS and it was not anticipated that firm would not provide AUFLS for an initial period. Subject to sighting the detail of the application the SO is very likely to support the grant of an exemption while the longer term development review is undertaken.
20. For similar reasons (and absent any new factors) we are likely to support an extension to the exemptions held by PanPac, Norske Skog, Winstones, Toll NZ, and NorthPower in respect of NZ Refining.

## Long term development initiative

21. AUFLS capability is a cornerstone of the SO's credible event and risk management policies. We are very keen that a substantive review is completed on which to found a long term arrangement for AUFLS with some haste.
22. In this regard, the SO is prepared to contribute the resources necessary to progress the review in a timely manner and, if appropriate, lead the review. The SO would need to agree with the Commission on the scope of the review, the relative roles, the review timetable and the funding of SO resources.
23. SO believes the scope of the review should:
  - a. include a survey of international AUFLS practice and developments. The SO has started a survey based contact with international peers;
  - b. identify the rules (and obligations) under review;
  - c. identify value of lost load for all load. A likely starting point for this work is the Commission's current work on this issue;
  - d. review the economics and consequence of AUFLS as a component of extended contingent event (ECE) management;
  - e. review the economics of AUFLS as an insurance policy, to provide for the rare but unidentified events, and consequence of insufficient insurance. Internationally up to 60% of load is part of AUFLS schemes rather than risk a larger unmanaged cascade failure and the need to black start the power system;
  - f. identify the respective roles, and their relationship, of AUFLS and special protection schemes (SPSs);
  - g. identify the extent to which AUFLS contribute to the management of regional risks;
  - h. identify the optimal number and size of AUFLS blocks for ECE risk management and for insurance against rare but unidentified events while ensuring system stability;
  - i. review the merits of who, distributor or grid owner, has the obligation to provide AUFLS in the South Island;
  - j. consider, given the outcome of the above, if there a need for an exemption or dispensation regime for AUFLS obligations. If so what are the criteria, processes and conditions; and
  - k. review model requirements.

## **Companion SO workstreams**

24. While the review is being carried out the SO and participants will continue to operate in accordance with the current rules, including:
- a. annual provision and assessment of AUFLS capability;
  - b. the resolution of issues arising from annual assessments of AUFLS capabilities;
  - c. requests for redistribution of AUFLS capability amongst grid exit points; and
  - d. four yearly relay tests and resolution of issues arising.
25. The SO will also continue to ensure the reserve management tool (RMT) inputs remain current, including at least an annual review of modelled AUFLS capability taking into account granted exemptions and or dispensations.

We appreciate that some of the above may overlap with the Commission's Common Quality Development work plan initiatives. However, it is not clear that all of the above is covered by that work plan. To the extent if any of the proposal that is covered by the plan is not clear (that all will be completed within the timeframe), we will require a substantive review to be completed.

We welcome the opportunity to discuss this letter and our proposal.

Yours sincerely

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