NATIONAL GENERATORS FORUM

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Chair, Reliability Panel
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235
By email: submissions@aemc.gov.au

Dear Ian

Review of Frequency Operating Standards during periods of Supply Scarcity for the mainland of Australia – Reliability Panel Draft determination

Please accept the following comments on behalf of the National Generators Forum (NGF) on the Reliability Panel Draft determination. In our earlier submission to this review on 2 May 2008 the NGF noted that Frequency Operating Standards are of critical interest to generators as frequency fluctuations are a key risk to the reliable operation of synchronous generating plant. The NGF therefore appreciates the opportunity to comment on NEMMCO's modified proposal.

In our earlier submission the NGF supported NEMMCO's motivation and agreed, in principle, that frequency standards may take into account UFLS during periods of supply scarcity as an alternative to ancillary services procurement in order to restore supply to customers as quickly as possible

We support the form of the decision the panel has proposed by including a new set of requirements in the Frequency Operating Standards to apply during supply scarcity, and the expansion of the standards to include stabilisation and recovery in addition to containment and the requirement that the Power System has stabilised to the normal frequency band prior to implementation of the proposed FCAS reduction..

However, after review of NEMMCO's revised proposal we are concerned that the major issues previously identified, that in our view require the panel to exercise caution, have not been adequately addressed. These issues are discussed in more detail below.

Linkage to Under Frequency Load Shedding (UFLS) Setting Review

We note that NEMMCO has advised that the modified UFLS Scheme will continue to operate within the range 47.5 to 49 Hz, and on that basis does not believe that there is a dependency between the UFLSS and this Panel review

The NGF remains of the view that it is necessary for the Reliability Panel and participants to be informed and consulted in relation to that UFLS review before they can reasonably consider the NEMMCO proposal. In the absence of a distribution of the schedule (MW blocks and frequency and time) for all regions the NGF is unable to comment on the interaction of the NEMMCO proposal with the UFLS review outcomes, or on the assertion that implementation of the current changes to the UFLSS will have no bearing on frequency management.[1]

It is also expected that the findings of the UFLS review might take some time to fully implement. This will clearly impact on the timing of any changes to the Frequency Operating Standards. The timeframe of these changes, and the nature of any interim arrangements proposed in the transition to new frequency standards, should be clearly articulated, noting that completion of the UFLSS change is expected to occur in 2009.

Interaction with Generator technical performance standards

The NGF noted in its earlier submission that the targeted lower frequency limit should be no lower than the lower operating frequency limit for any large generator as registered in its performance standard.

A very low frequency may cause large synchronous generators to trip thereby compounding the shortage and possibly triggering a cascading system failure (black system) condition. It is critical that the new frequency operating standards do not target a frequency where this is likely to occur.

All generators have individual performance standards which may be different to the default performance standards, or the system performance standards in the Rules and it is these individual generator performance standards that should be considered in setting the alternative frequency operating standard.

NEMMCO has responded to stakeholder concern by increasing the lower frequency level from 47.5 Hz to 48 Hz because this:

- will reduce the number of generators with grandfathered performance standards that trip; and
- provides a safety margin relative to the bottom of the UFLS operating range.

While both statements are true, the analysis is theoretical, qualitative and simplistic because it does not adequately take into account all the relevant facts.

The NGF advises the Reliability panel that;

- the standards in the technical schedules are system standards and are not necessarily met by all generators,

[1] We note that only the UFLS schedule to be implemented in South Australia is included (as Attachment 1 on page 23) in the draft Determination.

- some members have advised that significant blocks of generation have operating frequency limits that are significantly higher than 48Hz,
- some generators have complex operating frequency limits that vary with prior load, boiler condition, or with other technical constraints or conditions,
- there may also be significant blocks of generation at risk under the "stabilisation" and "recovery" standards that have been specified. The NGF understands that some of the existing performance standards for recovery (for example restoration to 49.5 to 50.5 Hz within 10 mins) following a multiple contingency event falls outside a number of generators' agreed performance standards and thus increases the probability of cascading failure of generators.

It is for these reasons the NGF requested in its earlier submission that the analysis and establishment of the safety margin the benefits and the risks be carried out using registered generator performance standards.

The NGF is unable to comment in detail on individual generator performance standards as this information is confidential to individual members, however the NGF is of the view that the Panel needs to be accurately informed of these circumstances by NEMMCO before it can properly assess NEMMCO's proposal. This could be facilitated by a confidentiality agreement.

Case Studies

The case studies presented in the report are for the SA region only, and in the view of the NGF are not representative examples of likely scenarios for that region. The NGF is not convinced that in the larger regions at higher loads the amount of load not shed or reduced FCAS requirements are likely to be significant with respect to the risk of generators not remaining connected.

Included in Attachment 1 are some comments on the NEMMCO calculation for SA and an estimation of the benefits at higher load levels.

Case studies should be carried out to identify the benefits for each region based on realistic representative load levels taking into account registered generator performance capability for generators in that region. If the benefits are positive an assessment should be made of the consequences of plant being unable to remain in service and exacerbating the problem. These case studies should also address system performance during the stabilisation and recovery periods.

A case study should also be carried out assessing the impact of how the proposed lower target frequency limit would have improved the return to service of load for the events of 23 January 2008.

The NGF also suggests that as an alternative to lowering the lower frequency level the Panel should consider a greater role for demand side response, ie paying demand willing to remain offline as an alternative to increasing the risk to generators by relaxing the frequency standards.

Conclusion

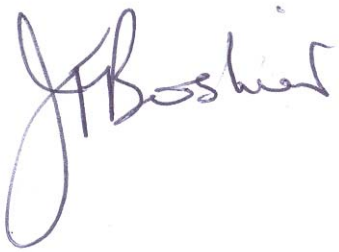
As observed above there remains a number of complex issues raised by NEMMCO's amended proposal which have still not been fully addressed at an appropriate level of detail. In particular the NGF is of the view that neither the benefits of the proposal nor the risks of lowering the frequency standard during periods of supply scarcity have been adequately assessed or quantified.

The NGF therefore supports a continuing, thorough and transparent review by the Reliability Panel to allow the issues identified in this submission to be fully considered.

The NGF also notes that Rules currently do not require NEMMCO to enable sufficient contingency FCAS to ensure maintenance of the current Frequency Operating Standards (although as a matter of practice they seek to do this).

For discussion please call the undersigned on (02) 6243 5120.

Yours sincerely



John Boshier
Executive Director

Attachment 1

This attachment contains:

- comments on NEMMCO's selection of SA region load in their example to quantify the benefits of their proposal, and
- a calculation of the benefits in Qld/NSW.

The benefits in both calculations are based on the methodology as detailed in NEMMCO's original submission (The benefits will reduce further if the lower frequency level needs to be increased to reflect registered generator performance standards).

South Australia

The SA load chosen by NEMMCO is basically representative of SA overnight load levels where the probability of load shedding for loss of the Vic to SA inter-connector is close to zero. Selection of this level of load tends to overstate the benefits of the proposal.

At loads that more correctly reflect the potential load levels in SA (2,800 to 3,000 MW) where loss of the Vic to SA I/C (360 MM) could actually lead to load shedding the benefit is the order of only an additional 107 MW of load restored which represents 4% of supplied SA load.

Under the current standards NEMMCO propose to use the following for a 1,100 MW SA demand (1,100 MW seems a fairly small demand for SA even after load shedding).

R5Min = 234 MW
R60 Sec = 217 MW
R6 Sec = 217 MW
Raise Reg = 70 MW

Under the current standards 234 MW of generation would be required to remain in reserve.

NEMMCO proposes to maintain only 70 MW for all the above services which allows restoration of 164 MW of additional load.

Whilst the example included by NEMMCO in their initial proposal is for SA only, it is worth noting that it only allows an additional 164 MW of load to be restored, whilst at the same time relying on an additional 217 MW (on top of load already shed) of UFLS in the event of a generator contingency. Also if SA load was initially 2,500 MW reducing to 2,000 MW post contingency then the reserve calculation would currently be

R5Min = 150 MW
R60 Sec = 190 MW
R6 Sec = 190 MW
Raise Reg = 70 MW

At this demand level only an additional 120 MW (6% of total demand) is able to be restored. Basically, the higher the SA load the lower the benefit.

The SA example in the draft determination, (using only a fairly small region combined with a very modest system demand) may overstate the benefit of the additional load restoration. It also seems inconsistent that in its example NEMMCO would use 500 MW for Vic to SA on the Heywood inter-connector when it is permanently limited to 360 MW or less.

When NEMMCO's proposed methodology is applied to larger demand regions the benefit vs the increased risk is likely to be questionable.

Qld/NSW Case Study

In this case the NEMMCO methodology has been applied to a NSW/Qld separation event with a major bushfire taking out all lines between Lower/Upper Tumut and Yass/Canberra.

The assumptions are:

- Flow across the lines at the time of the transmission event is assumed to be 3,000 MW towards NSW.
- Load being served prior to the transmission event is assumed to be 13,000 MW in NSW and 8,000 MW in Qld. A total of 21,000 MW.
- Spinning reserve in NSW/Qld is 1,320 MW.
- Available fast start plant is 280 MW in NSW and 860 MW in Qld, total 1,140 MW.
- Initial load shed is 2,000 MW. (320 MW of reserve still maintained)

After 30 mins a further 1,130 MW could be restored as fast start plant has synchronised and loaded. (330 MW of reserve still maintained)

At this stage NEMMCO would currently calculate the following reserve requirements based on Kogan Creek being fully loaded.

R5Min	= 328 MW	750 - (20,130 x 0.015) - 120
R60 Sec	= 146 MW	750 - (20,130 x 0.03)
R6 Sec	= 146 MW	750 - (20,130 x 0.03)
Raise Reg	= 120 MW	

Under NEMMCO's original proposal, NEMMCO would only maintain reserve of 120 MW for all FCAS raise services.

This would allow an additional 208 MW of load (approx 1% of the total load) to be restored.

Loss of a 750 MW unit would reduce frequency to approx 48.45 (provided frequency was initially at 50 Hz) and would require approx 223 MW of UFLS to restore the system initially to 49 Hz. Further manual load shedding would be required after this to restore frequency to 50Hz.

For separation of Qld/NSW across the Tumut to NSW TL's the benefit is in the order of only 210 MW of additional load restored or 1% of total Qld/NSW load.

Whilst acknowledging the risk of the generator contingency is only small, the probability of a contingency occurring during times of significant system stress increases because generator loads may be very high and fluctuating as non

definable load blocks are restored, relying on UFLS to arrest the frequency fall and prevent a cascade of generator trips due to low frequency for only 1% of additional load restoration seems not to be sufficient reward relative to the increased risk.