



1 August 2017

Mr Neville Henderson
Chairman
NEM Reliability Panel
Australian Energy Markets Commission
PO Box A2449
Sydney South NSW 1235

Dear Mr Henderson

RE: REL0065 Review of the Frequency Operating Standard – Issues Paper

ERM Power Limited (ERM Power) welcomes the opportunity to respond to the National Electricity Market (NEM) Reliability Panel (the Panel) Review of the Frequency Operating Standard (FOS) – Issues Paper (the Paper) dated July 2017.

About ERM Power Limited

ERM Power is an Australian energy company operating electricity sales, generation and energy solutions businesses. The Company has grown to become the second largest electricity provider to commercial businesses and industrials in Australia by load¹ with operations in every state and the Australian Capital Territory. A growing range of energy solutions products and services are being delivered, including lighting and energy efficiency software and data analytics, to the Company's existing and new customer base. ERM Power also sells electricity in several markets in the United States. The Company operates 497 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland.

www.ermpower.com.au

General comments

Maintenance of accurate frequency control of the power system within defined limits is one of the key requirements for secure operation of a power system. With ongoing changes in the NEM generation mix resulting in less controllable generation, increasing levels of uncontrolled intermittent generation and opaque demand response, frequency control in the National Electricity Market (NEM) has deteriorated as highlighted in recent reports issued by the Australian Energy Market Operator (AEMO). With this observable deterioration in frequency control ERM Power believes it is timely that the Panel has been tasked with conducting a review of the FOS.

In addition to this, the recent National Electricity Rules (NER) Rule Change – Emergency Frequency Control Schemes (EFCS) requires that the Panel set an additional FOS to be applied to the new Protected Event EFCS classification.

¹ Based on ERM Power analysis of latest published financial information.

In the Paper, the Panel proposes that the review of the FOS be split into two stages; ERM Power fully supports this proposal for the reasons as stated by the Panel. In this submission we have in general limited our views to those factors contained within Stage one of the review process, as significant additional work pertaining to the area of frequency control in the NEM is still to be undertaken by the Australian Energy Market Commission (AEMC) prior to the Panel releasing the issue paper to apply to Stage two².

Protected Event EFCS FOS

The Emergency Frequency Control Schemes rule change introduced into the NEM a new contingency event classification for protected events to allow for more efficient operation of the power system, whilst providing both security and reliability benefits for consumers. The Protected Event classification is to apply to those non-credible contingency events which, if they occur, have the potential to significantly compromise secure operation of the power system or reliable supply of electricity to consumers.

ERM Power understands that the reclassification of a non-credible contingency event to a protected event implies that while the probability of the event occurring is low; the occurrence of the event has the potential to significantly impact the power system. As such, we believe the FOS containment, stabilisation and recovery standards applied to a protected event condition should be constrained well within that applied to the current Multiple Contingency Event condition contained in the FOS as otherwise there is no rationale for the introduction of the new protected events category.

Therefore, we believe the impact on the power system for the occurrence of a protected event should be limited to a similar level as that set for the separation event condition as the potential impact on the power system of the occurrence of a protected event would generally be of the same or similar severity. This would then still allow for AEMO to reclassify the protected event as a credible contingency at which time the tighter generation or load event condition or network event condition would apply.

Review of the Multiple Contingency Event Condition

During the EFCS rule change process the issue was raised that the requirement for maintenance of the FOS for any multiple contingency event was not practicable. ERM Power agrees that at the extreme this is correct. Notwithstanding, we also agree with the Panel's view that the existing requirement in part B(f) of the FOS may be viewed as a general obligation for AEMO to act in a way that seeks to prevent the system from collapsing following an extreme event³. We believe this existing requirement in this regard performs a critical function with regard to AEMO's operation of the power system.

Rather than simply removing the Multiple Contingency Event condition from the FOS we believe a preferable outcome would be to retain the condition and specify what multiple contingency event conditions this classification should apply to. This would supply certainty to the Market and to AEMO as to the conditions that AEMO are to operate the market to achieve the settings in the FOS for the occurrence of such an event. It would also potentially alleviate the need to assess and reclassify some potential events as a protected event which may have a more limiting FOS. This would supply increased surety to the Market, Jurisdictions and consumers that the operation of the NEM should remain in a stable operating state and return to a secure operating state in a timely manner following what could be considered an extreme event.

² Section 3.2.1 Page 31 Reliability Panel - Review of the frequency operating standard – Issues Paper

³ Page 40 Reliability Panel - Review of the frequency operating standard – Issues Paper

The NEM has experienced at least one event in each region where a network event or weather conditions has led to the simultaneous trip of all in-service units at a large multi-unit power station. These events have not occurred at a time when the simultaneous loss of all units at that power station has been reclassified as a credible contingency, and therefore with the system prepared to withstand such an event, and have generally resulted in a very large drop in system frequency triggering a large loss of load due to activation of under frequency load shedding schemes, across multiple regions. We suggest that this level of event would be one of the highest impact events that can occur within a region and would generally be larger than the simultaneous loss of multiple circuits of an interconnector.

We suggest that before simply removing the Multiple Contingency Event condition from the FOS, the Panel give consideration to redefining the condition to that of the simultaneous trip of all units at the largest power station defined on a per region basis. This would allow for the following simultaneous loss of generation capability in any region;

Region	Power Station	Contingency Size
Queensland	Gladstone	1,710 MW
New South Wales	Eraring	3,000 MW
Victoria	Loy Yang A	2,300 MW
South Australia	Torrens Island B	840 MW
Tasmania	Gordon	450 MW

ERM Power also suggests that given the change in generation mix in the NEM it would be prudent to review the containment FOS for the Multiple Contingency Event condition as part of the Stage one process to consider if an interim adjustment is warranted to provide additional space between the Standard and the point at which frequency deviation may initiate the loss of additional multiple generation units following the occurrence of such an event. This interim change would remain in place pending the full technical review of generator capabilities proposed in stage two of this review.

Guidance in relation to the definition of an electrical island

ERM Power supports the Panel's view regarding the need for additional guidance with regards to the definition of an electrical island. We support the Panel's view that for an electrical island to be viable there would need to be a possibility of separation and a realistic prospect of continued operation after the separation event. If there is no possibility that an area of the network can continue to operate following a separation event, i.e. due to the absence of either generation or load, then that area of the network should not be considered to meet the definition of an electrical island.

We believe the decision to define the area of the network as an electrical island should be based solely on the ability of that area of the network to continue to operate in a satisfactory operating state following a separation event, regardless of the amount of load or generation contained within the electrical island.

It would be a poor outcome if an arbitrary minimum size criterion resulted in the loss of an area of the power system following a separation event, which had the real potential to maintain ongoing stable operation.

Utilising the wording in the Paper as a guide for electrical sub-networks used for procurement of system restart ancillary services (SRAS) we suggest an electrical island could be defined as:

an electrical island should be capable of being maintained in a satisfactory operating state following a separation event to the extent practicable during the stabilisation and recovery process, following which in a secure operating state until electrical reconnection to the main power system is re-established.

ERM Power also supports the Panel's view that there may be benefit in standardising, where appropriate, the definitions in the FOS for the mainland NEM and Tasmania. Further detail is required from the Panel regarding the proposed changes and we would be interested in further discussion with the Panel regarding this.

The Panel has also sought views with regard to how the characteristics of an electrical island for the FOS relate to the characteristics of the electrical sub-networks used for SRAS procurement. While some electrical islands may align with the electrical sub-networks used for SRAS procurement, we do not believe the existing electrical sub-networks used for SRAS procurement should be a consideration in determining the viability of an electrical island. The decision should be based solely on the possibility of separation and a realistic prospect of continued stable operation after the separation event.

Accumulated time error

ERM Power agrees with the Panel's decision to review the continued need for the accumulated time error in the FOS and that the assessment criteria as set out in the Paper are appropriate⁴. We have reviewed the requirement for the management of accumulated time error with regard to the operation of Oakey Power Station and are not aware of any issue that would impact operations if the management of accumulated time error was removed from the FOS.

If following further assessment the Panel determines that the accumulated time error is not required to ensure the reliability of supply or security of the power system and the costs of maintaining the standard exceed any wider benefits to the community, then we would support its removal.

Consideration of the definition of terms in the FOS for Tasmania and for the mainland

ERM Power supports the Panel's view that there may be benefit in standardising, where appropriate, the definitions in the FOS for the mainland NEM and Tasmania. Further detail is required from the Panel regarding the proposed changes and we would be interested in further discussion with the Panel regarding this.

We also support AEMO's view that the current wording for the definition of generation event could be interpreted as applying only to a reduction in output of generation due to a generating unit trip event. Therefore we support amendment to the definition to allow the clear interpretation that generation event applies to; *the unforecast and sudden decrease or increase exceeding 50 MW of generator output from a generating unit* as opposed to the current wording *a synchronisation of a generating unit of more than 50 MW*.

⁴ Section 4.3.1 Page 43 Reliability Panel - Review of the frequency operating standard – Issues Paper

Approach to stage two of the Review

In general, ERM Power supports the steps proposed by the Panel for stage two of the review. We also believe the work undertaken by the Panel in stage two of the Review would benefit from the engagement of additional independent specialist resources in the area of power systems frequency control and its impact on secure operation of the power system to directly provide technical advice to the Panel.

In assessing the normal operating frequency band and the normal operating frequency excursion band we believe the Panel should also assess the requirement for the continuation of the normal operating frequency excursion band. Alternatively, the Panel could also assess if secure operation of the power system would be better served by allocation by the Panel of additional apportioning of the normal operating band to specific percentage of time requirements. An example of this is shown in the following table.

Operating Band Range	% of Time
49.95 - 50.05 Hz	80.0%
49.90 - 50.10 Hz	90.0%
49.85 - 50.15 Hz	99.0%
49.80 - 50.20 Hz	99.9%
49.75 - 50.25 Hz	100.0%

Conclusion

The real time management of frequency outcomes in the NEM is one of the critical factors in maintaining the power system in a secure operating state. The changing mix of generation and opaque demand management in the form of load reduction and behind the meter generation is having an observable impact, as identified by AEMO, on AEMO's control of power system frequency, both during periods of normal operation and following any power system events. ERM Power supports this timely review of the Frequency Operating Standards by the Panel.

We look forward to further engagement with the Panel during this review process.

Please contact me if you would like to discuss this submission further.

Yours sincerely,

[signed]

David Guiver
Executive General Manager - Trading

07 3020 5137 – dguiver@ermpower.com.au