Dominic Adams
Australian Energy Market Commission
PO BOX A2449
SYDNEY SOUTH NSW 1235

(Lodged electronically)

**AEMC Generator Technical Performance Standards Rule Change (Ref. ERC0222)**
**Draft Determination (31 May 2018)**

Delta Electricity operates the Vales Point Power Station situated at the southern end of Lake Macquarie in NSW. The power station consists of two 660MW conventional coal-fired steam turbo-generators. Delta Electricity appreciates the opportunity to comment on the proposed rule change.

The Generator Technical Performance Standards (Standards) are an important framework underpinning the reliability and security of the power system. It is arguable that new generation technology has not been guided correctly by the existing Rules and Standards. However, the reasoning for why this has been the case is not clearly understood. Either the current technical standards require modification and/or the approval to permit lower standards has been regularly given. Delta Electricity seeks to raise AEMC awareness of the challenges the new Rules pose to new and existing participants.

To support the National Electricity Objective, the technical standards should be:

- not open to misinterpretation;
- straightforward to facilitate in the design and testing of new control systems;
- effective in application; and
- achievable without undue expense.

## Interpretation

Since the commencement of the NEM, the technical rules have become more complex in wording, thus opening them up to varying interpretations in application, design and testing requirements. The latest rule change determination is continuing the trend towards greater complexity. The most obvious example is the evolution of the voltage ride-through standards in S5.2.5.4 which contain a greatly more complex arrangement of ride-through requirements than previous and, as mentioned in the workshop, provide designers with far greater variations and possibilities to consider in each design. The S5.2.5.5 standards are also greatly more complex than previous seeking Units designed to ride through a series of fifteen network events of varying degrees within five minutes.

As an example of the difficulties with interpretation, the word “capable” has previously been cause for differences in interpretations by experts as to whether capability implies delivery by necessity for the system or delivery by choice of the participant. Some participants have successfully argued that frequency control capability is an optional and not a mandatory standard. Why do the Automatic Standards use the word capability without defining how the employment of that capability is to be determined?

A similar example exists in the draft Rule with regards to S5.2.5.3, S5.2.5.4, S5.2.5.5 and S5.2.5.7. In S5.2.5.3, S5.2.5.4 and S5.2.5.7, Units “must be capable of continuous uninterrupted operation” whilst in S5.2.5.5, Units must “remain in continuous uninterrupted operation”. It is possible to interpret these phrases quite differently. Addressing areas of the Standards open to misinterpretation is recommended.

Sunset Power International Pty Ltd t/as Delta Electricity ABN 75 162 696 335 ACN 162 696 335
**SYDNEY OFFICE** Level 7 / 287 Elizabeth Street, Sydney NSW 2000 PO Box 7285 Mannering Park NSW 2259
Telephone 02 4352 6406 Facsimile 02 4352 6460 www.de.com.au

**System Design**

The issues with interpretation lead to a more complicated process of new control system design and testing. System testing requires enhanced guidelines in the AEMC/Reliability Panel's Template for Technical Performance Standard Compliance Programs to minimize ambiguity and uncertainly.

**Effective in Application**

The effectiveness of the Standards only become observable in times of extreme system stress. Interestingly, the current technical rules make no mention of the types of protection (Voltage dip counts) that contributed to the S.A. black out. However, application of the current Rules in the processes by participants, NSPs and AEMO for proposing, negotiating and registering performance standards should have resulted in these protection systems being clearly identified in a Unit's registered performance standards.

The Standards as worded may never be as effective as the applied process by which a final negotiated standard is determined. If this process is not effective, complete and tightly controlled within the boundaries of a commissioning program, the resultant standards are likely to be less effective.

**Achievable without Undue Expense**

If the Standards become unnecessarily complex, this will lead to increased expenditure for all market participants, NSPs and AEMO.

Even if all generating facilities could be made compliant to the most conservative of Automatic technical standards there still may exist extreme conditions that threaten secure operating states. By its nature and the large separations between load centres, the NEM is subject to locational impacts that it can never be totally immune to interruption using reasonable engineering within the boundaries of sensible economics. In such circumstances, the security of the system relies on good operating decisions and the time to make the decisions.

Good operational decisions underpinned by reliable equipment and sensible levels of reserve capacity can prevent multiple contingencies in any one area interrupting the region or any interrupted region itself causing an interruption to an adjacent region. Greater interconnectivity between regions, should this be pursued, will need to take account of operational decisions and Standards as greater interconnectivity can provide larger conduits for more wide-spread interruptions.

The following pages contain comments to AEMCs specific table of interest regarding the draft determination.

Delta Electricity would be happy to participate further with regards to the determination and if the AEMC wishes to discuss this submission please contact Simon Bolt on (02) 4352 6315 or simon.bolt@de.com.au.

Yours sincerely

Anthony Callan
Executive Manager Marketing

ATTACHMENT – AEMCs TOPICS OF INTEREST

| Topic | Draft rule clause | AEMCs Issue | Delta Electricity Comments |
|---|---|---|---|
| **Negotiating framework** | 5.3.4A(b1) and (b2) | Nil | The adoption of more stringent and complex standards and the requirement for a participant to demonstrate why a proposal cannot meet the Automatic Standard will add an order of expense to the design process. |
| | 5.3.4A(g) | Should this clause remain a civil penalty clause? | If the civil penalty is to remain for other participants in the 5.3.4A clause it would seem appropriate that NSPs not be provided a lesser obligation in order for the success of the proposed change to the process. |
| **Active power control** | S5.2.5.14(a)(1)(iii), (3)(iii) and (b)(1)(iii) and (3)(iii). | Would the proposed AGC capability requirements congest SCADA comms networks over time? Would this create extra costs over time for NSPs, AEMO and generators? | The AGC signaling described already exists for many larger Units. |
| | S5.2.5.14(a) and (b) | Is there a need for smaller generating system to have ramp rate control capabilities? Can stakeholders provide | No comment. |

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| | | evidence as to why these capabilities are required? | |
| **Remote monitoring and control** | | In addition to impacts of increased AGC signals, will the other remote monitoring and control capabilities congest SCADA comms networks over time? | AEMO has many of the proposed signals already from larger Units. |
| **Reactive power control** | S5.2.5.13(b)(2A) | Are there any issues associated with requiring remote switching capability for voltage control mode? | Control changes like these need to be passed through an HMI gateway interface. Local Participants should always receive such control requests as instructions but maintain the right to overrule the instruction for plant and personnel safety reasons. |
| | S5.2.5.13(b)(2A) | What kinds of issues and risks could arise in terms of actual operational switching processes? Can these issues be effectively managed through the development of procedures? | See above. |

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| | S5.2.5.13(c1) and (d)(3)3 | What are the appropriate control settings for the performance requirements for operating in power factor and reactive control modes? | The existing AVRs of most of the existing large NEM Units have not been required to have this form of control. As with other comments in this submission, the standards are trending toward more complexity which brings with it more interpretational difficulties and expense in designing and testing. |
| **Reactive current response** | S5.2.5.5(c)(3) | Is a 2% magnitude of response in the minimum access standard practical? | No comment. |
| | S5.2.5.5(i)(4) | What are the appropriate ride through threshold ranges? | No comment. |
| | S5.2.5.5(i)(1) and (c)(3) and (b)(3) | On the occurrence of a fault, what is the appropriate limit on consumption of active power and reactive power? | As with other comments in this submission, the standards are trending toward more complexity which brings |

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| | | | with it more interpretational difficulties and expense in designing and testing. |
| | S5.2.5.5(i)(6) | Are there physical limits that apply to the capability of generators to maintain total current at a given level on a fault at all times? | These technical questions should be researched and answered by technical design experts. Generally, Delta Electricity is not supportive of design requirements that have not been included in original design contract specifications of all impacted equipment. Many changes in the technical standards are difficult in application on an altered Unit because an alteration is usually only changing one item of equipment and not the whole generating system. |
| | S5.2.5.5 | Do the requirements for asynchronous units established under S5.2.5.5 create barriers to the connection of type 3 wind generators, or other doubly fed induction machines? | No comment. |

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| | S5.2.5.5(c)(3) and (4) | Is the proposed 2 second inverter ride through duration in the minimum access standard appropriate? | No comment. |
| **Continuous uninterrupted operation** | Definition | What is the appropriate definition of CUO? Is the definition proposed in the draft rule specific enough, or too specific? Does it impact on the ability of generators to meet other aspects of the access standards? How else might this definition be constructed? | CUO should make allowances for minor loss (not Unit trip) of output that are reasonably likely. For example, a coal-fired Unit has the reasonable likelihood of experiencing a coal feeder/mill interruption at any time. Hence why each Unit relies on multiple feeders and multiple mills. Under the definition, it could be implied that small MW reductions such as the loss of a mill occurring at the same time as some system event will result in a Unit being non-compliant because of the definition.<br><br>Reasonable contingencies should be expected and planned for by NEM processes not unrealistically expected to be eliminated because of words in a definition in the Rules. |

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| | S5.2.5.3(c) | Will CCGT generating systems have the capability to withstand RoCoF levels as proposed in the minimum access standard? | No comment. |
| **System strength** | Nil | Can stakeholders provide any further information about potential avoided costs for TNSPs and future connecting generators, if the system strength access standard were implemented? This could include case studies from specific parts in the network where material investment is likely to be required (e.g. in synchronous condensers) due to sub-optimal system strength withstand capability | No comment. |

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| | | from existing incumbent or currently connecting generators. | |
| **Consequential amendments** | 5.3.9(d) | Would the changes to NER clause 5.3.9 prevent generators from making like for like changes of equipment, where the generator doesn't intend to change the level of performance? | The rule hinges on the interpretation of the word "alter". Many "like for like" changes ought not to alter the system and can be interpreted as not being an alteration in which case no 5.3.9 process would apply.<br><br>e.g. should a rotor replacement in a Generator be interpreted as an alteration if the rotor has been built and maintained as a rotable spare? |
| **Transitional arrangements** | Ch 11 | Are there any system security implications, or cost implications, associated with a longer transitional period? | A longer transitional period is considered appropriate. |