Please find attached a supplementary submission to the Technical Standards for Wind Generation and other Generation Rule 2006 Draft Determination on behalf of Auswind and REGA.

This submission corrects a number of small typographical errors identified in our original submission, amplifies a few issues and includes further comments and suggested Rules changes following receipt of more detailed comments from our members. The additional comments are marked in colour to indicate the changes but have all been made in the original table submission. This table can replace the table submitted earlier.

We have included comments from several manufacturers with their suggested changes to the rules, these illustrate the concern that the wind turbine manufacturers have concerning their intellectual property. While we acknowledge that NEMMCO require data to study the system and manage system stability and that participants deserve to study the network adequately for the development of connection application, it is not viable for all IP to made public. We trust that the AEMC will give this careful consideration in light of the developing renewable energy sector and the management of the system ś mathematical modelling.

The members are deeply concerned with the use and definition of ‘normal ’ voltage and how this has been applied in the current rules. We recommend removing the references and use of ‘normal voltage ’and returning voltage to being based on nominal voltage as this the more commonly used term. Contracts for the purchase of plant are based on the Australian Standards. Manufacturers work with the IEC and Australian Standards – the performance of, and guarantees for, equipment are based on the figures for ‘highest voltage for a system ’within the standards. We have included within this submission an additional rule change to re-word S5.1a.4 to return it to represent voltages that should be possible for equipment designed to meet the Australian Standard. The current definitions for steady state voltages and transient voltages are beyond the design of equipment.

We have recommended removal of the partial load rejection clause as to have both the rate of change of frequency requirement and the partial load rejection adds a conflicting requirement. The TSRG accepted removal of the partial load rejection clause as it cannot be tested, monitored or proven due to the inability to replicate the terminal load conditions on generators. As compliance programs require testing and monitoring – it makes more sense to do this through rate of change of frequency. For background on what actions a large generator makes for partial load rejection we recommend that you read the power system investigation into the SA incident on the 8th March 2004 available on NEMMCO ś website at:
http://www.nemmco.com.au/marketandsystemevents/232-0019.pdf
The protection that triggered the trip of the machine/s involved, is the same protection that Vencorp is requesting. This protection is valid – but should not necessarily form a mandated performance standard for all equipment. It

is appropriate for large prime movers where shaft damage could occur as a result of the imbalance.

Many of the Automatic Access Standards proposed here can only be met by a limited number of technologies in a limited number of locations. It is therefore critical for the development of future generation that will be needed to meet the growing energy demand, and in particular the zero and low emission generation needed to reduce Australia's greenhouse emissions, that all parties negotiate in good faith to achieve Negotiated Access Standards that provide an acceptable level of reliability and security at the least cost. Such an outcome will, in the long run, provide the maximum consumer benefits.

Auswind and REGA still have reservations about the way Chapter 5 is drafted and believe that many of the automatic standards are written implicitly around the performance of large thermal synchronous plant without any real justification given as to the appropriateness of the access standards. We note that little innovative thinking has gone control requirements of the automatic standards, in many places the automatic standard does not provide for innovative solutions to control concerns.

We note that the Commission plans to review how the technical and performance standards should evolve and interact over time as part of a broader review of the technical standards to be completed by 30 June 2008 and looks forward to this as an opportunity to re-visit both the standards of the plant connected to the system and the protection and control setting implemented by NEMMCO and the NSPs.

24 November 2006

Dr John Tamblyn
Chairman
Australian Energy Market Commission
PO Box H166
Australia Square NSW 1215

Dear Dr Tamblyn,

National Electricity Rule Amendment
Technical Standards for Wind Generation and other generation Rule

The Australian Wind Energy Association (Auswind) represents all major wind turbine manufacturers, wind farm owners and developers. We have more than 100 members in all regions of the NEM representing $1.7 billion of capital investment in existing wind farms and the potential for $13 billion of new investment.

The Renewable Energy Generators of Australia (REGA) represents Australia's leading renewable energy generators, project developers and equipment and service providers. REGA's members are responsible for more than 95% of the electricity generated from renewable sources in Australia each year and have around $8b invested in existing generation infrastructure. REGA has members with major generating plant in all regions of the NEM.

Auswind and REGA participated in the TSRG and together have given careful consideration to the draft determination proposed by the AEMC. In considering the proposed changes, both organizations have compared the determination paper and rule change document and tried to reconcile the two. There appear to be a number of drafting errors in the proposed rules changes which require amendment and hopefully our submission will help with the corrections.

The organizations have concentrated on the rule changes which will have the greatest affect on a generator's ability to connect. There are a number of controversial rule changes which we think require further work and hope to provide alternative wording to the Commission within the next week. We believe that further consultative work with the broader industry should be undertaken to resolve these issues.

In preparing this submission the organizations have included comments from power system engineering specialists within the electricity industry, particularly those involved providing advice on connections. Collectively their engineering work has covered:

- connection of wind generation projects in both transmission and distribution,
- transmission and distribution system planning,
- dynamic modelling and simulation,
- wind farm fault ride-through studies,
- system transient analysis,
- design and calculation of inter-regional transfer limits,
- harmonic studies,
- system reliability studies,

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- synchronous generator testing and analysis,
- synchronous generator control system parameter setting, and
- system operations.

It is of concern to the broader industry that the Rules in some areas are deviating from the International and Australian Standards where the design of high voltage equipment is concerned. There are several anomalies in the power system which NEMMCO are using as examples for driving in words that can be interpreted as requiring all equipment to be continuously rated for 120% nominal voltage. This should not be the case and requires correction. Equipment is designed to withstand 110% of nominal voltage continuously (highest system voltage).

Australia is a small market in global terms yet it stands to benefit from the clarification of connection requirements in Europe as this has had a flow on affect via the manufacturers on the performance and control of wind turbines. In the last three years significant improvements have been made to the various technologies. However Australia as a market place cannot justify special equipment design or manufacture as it does not drive the International Standards nor is its market large enough to impose large additional costs on manufacture.

The organizations support positive non-controversial changes which will allow the planning and grid integration of wind energy to continue. We understand NEMMCO's requirements for adequate performance, reliability, information and modelling so that power system security can be maintained. A number of manufacturers are deeply concerned with the provision of data clauses and it is evident that Intellectual Property rights need to be carefully considered without compromising the ability to study the network. We think that further work on S5.2.4 is required.

To aid the AEMC, we have prepared a detailed set of comments which are attached. We have paid particular attention to the sections which we find incompatible with the market objectives, Australian standards, or where power system realities are not being considered.

As indicated above, the association anticipate being in a position to make a supplementary submission early next week further clarifying some of the issues we have identified in the draft determination.

If you have any questions or need any clarification on this please contact Rob Jackson on (03) 8628 9741 or email rob.jackson@rega.com.au, or Kate Summers on (03) 9615 6442 or email ksummers@pacifichydro.com.au.

Yours sincerely

Rob Jackson
Technical Director
REGA

Dominique La Fontaine
CEO
Auswind

National Electricity Rule Amendment
Technical Standards for Wind Generation and other Generation Rule 2006

REGA – AUSWIND Summary Comments and Suggested Wording Changes

Schedule 1 Amendment of National Electricity Rules
(Clause 3)

Rule change	Changes Proposed	Agree/ Disagree – Reason
[1] Clause 2.2.1 Registration as a Generator Omit clause 2.2.1(e) and substitute: (e) To be eligible for registration as a Generator, a person must: (1) obtain the approval of NEMMCO to classify each of the generating units that form part of the generating system that the person owns, operates or controls, or from which it otherwise sources electricity, as either a scheduled generating unit or a non-scheduled generating unit; (2) classify the generating units in accordance with NEMMCO's approval as referred to in subparagraph (1); (3) satisfy NEMMCO that those generating units and the connection points for those generating units comply with the relevant technical requirements set out in Chapter 5; and (4) satisfy NEMMCO that each generating system will be capable of meeting or exceeding its performance standards.	No changes	Accept
[2] Clause 2.9.2 Admission as a Registered Participant Omit clause 2.9.2 and substitute:	No changes	Accept

2.9.2 Registration as a Registered Participant (a) In this clause: receiving date means the date on which NEMMCO receives: (1) an application for registration referred to in clause 2.9.1; (2) further information or clarification referred to in clause 2.9.1(b); or (3) the information requested under clause S5.2.4(b), whichever is the later. (b) NEMMCO must within 15 business days of the receiving date, determine that an applicant is to be registered in the category of Registered Participant applied for if NEMMCO is reasonably satisfied that: (1) an applicant meets the eligibility requirements specified for the category of Registered Participant to which the application relates; (2) if the application relates to registration in one of the categories of Market Participant, the applicant is and will be able to fulfil the applicable financial obligations under Chapter 3 of the Rules; and (3) an applicant has demonstrated a commitment to comply with the Rules. (c) If NEMMCO determines that an applicant does not satisfy the requirements referred to in paragraph (b), NEMMCO must determine that the applicant is not qualified to be registered as a Registered Participant in the relevant category and provide reasons for that determination.		
[3] Clause 3.13.3(k) Standing Data Omit clause 3.13.3(k)–(q) and substitute: (k) Subject to rule 5.3.8(a), a Registered Participant may request from NEMMCO: (1) registered bid and offer data; (2) information that is reasonably required by the Registered Participant to carry out power system studies (including, without limitation, load flow and dynamic simulations) for planning and operational purposes including: (i) historical information relating to the operating conditions of the power system; (ii) information and data provided to NEMMCO under paragraphs	No changes	Accept

(f) and (g) and clause S5.2.4(g); (iii) information and data described in the Generating System Model Guidelines, Generating System Design Data Sheet, and Generating System Setting Data Sheet in accordance with clause S5.2.4(g); (iv) information and data described in schedules 5.5.3 and 5.5.4; and (3) operation and maintenance procedures and practices for transmission network or distribution network operation, developed for the purposes of schedule 5.1 sufficient to enable the Registered Participant to carry out power system modelling under normal, outage and emergency conditions, (l) Where NEMMCO holds information requested under paragraph (k), it must be provided to the Registered Participant as soon as practicable. (m) NEMMCO may provide information of the type described in paragraph (k) to persons other than Registered Participants on request, for the purpose of undertaking research or providing advice to Registered Participants or potential investors in the power system. (n) Where special approvals or exemptions have been granted by NEMMCO, including approval to aggregate generating units, market network services or loads for central dispatch, or exemptions from central dispatch, details of such special arrangements must be published by NEMMCO. (o) NEMMCO must determine and publish intra-regional loss factors in accordance with clause 3.6.2 by 1 April each year and whenever changes occur. (p) Network Service Providers must advise NEMMCO of their distribution loss factors, duly authorised by the appropriate Jurisdictional Regulator, and NEMMCO must publish such distribution loss factors in accordance with clause 3.6.3(i). (q) NEMMCO must publish on a quarterly basis details of: (1) interconnector transfer capability; and (2) the discrepancy between interconnector transfer capability and the capacity of the relevant interconnector in the absence of outages on the relevant interconnector only, for each day of the preceding quarter for all interconnectors. Statement of opportunities (r) By 31 October in each year, NEMMCO must prepare and publish at a reasonable charge to cover the cost of production, a statement of opportunities, including at least the following information for the subsequent 10 year period:		

(1) projections of aggregate MW demand and energy requirements for each region; (2) generating capabilities of existing generating units and generating units for which formal commitments have been made for construction or installation; (3) planned plant retirements; (4) a summary of network capabilities and constraints based upon Annual Planning Reports; and (5) operational and economic information about the market to assist planning by Scheduled Generators and Market Participants and potential Scheduled Generators and Market Participants. (s) If after the publication of the most recent statement of opportunities, significant new information becomes available to NEMMCO relating to: (1) the matters covered by paragraphs (r)(1),(2) and (3); or (2) the matters covered by clause 5.6.5(c)(8) and (9); NEMMCO must, as soon as practicable, publish that information in a descriptive form that is consistent with the statement of opportunities. (t) In preparing a statement of opportunities NEMMCO may seek the assistance of the Inter-regional Planning Committee. (u) As soon as practicable after a Scheduled Generator, Market Participant or Network Service Provider becomes aware of any information required for publication by NEMMCO under paragraph (r), that information must be provided to NEMMCO by that Scheduled Generator, Market Participant or Network Service Provider.		
[4] Clause 4.9.2 Dispatch Instructions to Scheduled Generators Omit clause 4.9.2 and substitute: 4.9.2 Dispatch Instructions to Scheduled Generators (a) To implement central dispatch or, where NEMMCO has the power to direct or to instruct a Scheduled Generator either under Chapter 3 or this Chapter, then for the purpose of giving effect to that direction or instruction, NEMMCO may at any time give an instruction to a Scheduled Generator in relation to any of its scheduled generating units (a "dispatch instruction"), in accordance with clause 4.9.5(b), nominating: (1) whether the facilities for generation remote control by NEMMCO, if available, are required to be in service; and (2) the level or schedule of power to be supplied by the generating unit over the specified period.	No changes	Accept

(b) Subject to paragraph (c), NEMMCO may at any time give an instruction to a Generator in relation to any of its generating units with a nameplate rating of 30MW or more, or its generating systems of combined nameplate rating of 30 MW or more, nominating that: (1) the generating unit or generating system transformer is to be set to a nominated tap position (if it has on-load tap changing capability); (2) the generating unit's or generating system's voltage control system set-point is to be set to give a nominated voltage; or (3) the generating unit or generating system is to be operated to supply or absorb a nominated level of reactive power at its connection point. (c) Unless otherwise provided under an ancillary services agreement or a connection agreement, NEMMCO must not give an instruction under paragraph (b) that requires a generating unit or generating system to supply or absorb reactive power at a level outside the plant's relevant performance standard. (d) A Scheduled Generator must, with respect to scheduled generating units which have an availability offer of greater than 0 MW (whether synchronised or not), ensure that appropriate personnel are available at all times to receive and immediately act upon dispatch instructions issued to the Scheduled Generator by NEMMCO.		
[5] Clause 4.14 Acceptance of Performance Standards In clause 4.14(n), omit "5.3.7(e)(1) "and substitute "5.3.7(g)(1) ".	No changes	Accept
[6] Clause 4.15 Performance Standard Compliance In clause 4.15(b), omit "5.3.4A(g) "and substitute "5.3.4A(i) ".	No changes	Accept
[7] Clause 5.1.2 Purpose Omit clause 5.1.2(a) and substitute: (a) This Chapter: (1) provides the framework for connection to a transmission network or a distribution network and access to the national grid; and (2) has the following aims: (i) to detail the principles and guidelines governing connection and access to a network; (ii) to establish the process to be followed by a Registered Participant or a person intending to become a Registered Participant to establish or modify a connection to a network or to alter generating plant connected to a network; (iii) to address a Connection Applicant's reasonable expectations of the level and standard of power transfer capability that the	No changes	Accept

relevant network should provide; and (iv) to establish processes to ensure ongoing compliance with the technical requirements of this Chapter to facilitate management of the national grid.		
[8] Clause 5.1.3 Principles Omit clause 5.1.3 and substitute: 5.1.3 Principles This Chapter is based on the following principles relating to connection to the national grid: (a) All Registered Participants should have the opportunity to form a connection to a network and have access to the network services provided by the networks forming part of the national grid. (b) The terms and conditions on which connection to a network and provision of network service is to be granted are to be set out in commercial agreements on reasonable terms entered into between a Network Service Provider and other Registered Participants. (c) The technical terms and conditions of connection agreements regarding standards of performance must be established at levels at or above the minimum access standards set out in schedules 5.1, 5.2, 5.3 and 5.3a, with the objective of ensuring that the power system operates securely and reliably and in accordance with the system standards set out in schedule 5.1a. (d) A Registered Participant or person intending to become a Registered Participant may request connection of a facility, modification of a connection, or alteration of connected plant at a standard below an automatic access standard if the connection, modification to the connection, or alteration of connected plant does not adversely affect: (1) power system security; (2) reliability of supply in relation to the connection of a generating system; or (3) the quality of supply to other Network Users. (e) In some jurisdictions separate agreements may be required for connection services and use of system services. (f) The operation of the Rules should result in the achievement of: (1) long term benefits to Registered Participants in terms of costs and reliability of the national grid; and (2) open communication and information flows between Registered Participants themselves, and between Registered Participants and NEMMCO, relating to connections while ensuring	Clause 5.1.3(d) A Registered Participant or person intending to become a Registered Participant may request connection of a facility, modification of a connection, or alteration of connected plant at a standard below an automatic access standard if the connection, modification to the connection, or alteration of connected plant does not materially adversely affect: Add new clause 5.1.3 (g) In deciding to accept or reject a proposed negotiated access standard the network service provider must act in good faith and give due consideration of the technology proposed, the size and location of the generator, the materiality of any impacts of the generator ~~and the costs and benefits~~. Add new clause 5.1.3 (h) NEMMCO must, when considering any matters allocated to NEMMCO under clause 5.3.3(b1)(4), act in good faith and give due consideration of ~~the technology proposed, the size and location of the generator,~~ the materiality of any	Many technologies cannot meet the proposed automatic access standards. The Rules need to be clear that both the NPS ŝ and NEMMCO are obliged to negotiate in good faith to reach agreement on negotiated access standards.

the security of confidential information belonging to competitors in the market.	impacts of the generator ~~and the costs and benefits~~.	
[9] Clause 5.2.2 Connection Agreements Omit clause 5.2.2(b) and substitute: (b) The Rules apply to: (1) connection agreements made after 13 December 1998; (2) deemed connection agreements under paragraph (a); and (3) requests to establish connection after 13 December 1998.	No changes	Accept
[10] Clause 5.2.5 Obligations of generators Omit clauses 5.2.5 and substitute: 5.2.5 Obligations of generators (a) A Generator must plan and design its facilities and ensure that they are operated to comply with: (1) the performance standards applicable to those facilities; (2) subject to subparagraph (1), its connection agreement with a Network Service Provider; and (3) subject to subparagraph (2), the system standards. (b) A Generator must: (1) submit an application to connect in respect of new generating plant owned, operated or controlled by the Generator, or to be owned, operated or controlled by the Generator, and enter into a connection agreement with a Network Service Provider in accordance with rule 5.3 prior to that generating plant being connected to the network of that provider; (2) comply with the reasonable requirements of the relevant Network Service Provider in respect of design requirements of generating plant proposed to be connected to the network of that provider in accordance with rule 5.4 and schedule 5.2; (3) provide generation forecast information to the relevant Network Service Provider in accordance with rule 5.6; (4) permit and participate in inspection and testing of facilities and equipment in accordance with rule 5.7; (5) permit and participate in commissioning of facilities and equipment which are to be connected to a network for the first time in accordance with rule 5.8; and (6) give notice of intended voluntary permanent disconnection in accordance with rule 5.9.	No changes	Accept
[11] Clause 5.2.6 Omit clause 5.2.6.	No changes	Accept
[12] Clause 5.3.1 Process and procedures Omit clause 5.3.1 and substitute: 5.3.1 Process and procedures (a) For the purposes of this rule 5.3: establish a connection includes modifying an existing connection or altering plant but	No changes	Accept

does not include alterations to generating plant in the circumstances set out in clause 5.3.9. (b) A Registered Participant or person intending to become a Registered Participant who wishes to establish a connection to a network must follow the procedures in this rule 5.3. (c) Any person wishing to establish a connection to a network may elect to follow the procedures in this rule 5.3. (d) A Generator wishing to alter connected generating plant must comply with clause 5.3.9.		
[13] Clause 5.3.2 Connection Enquiry Omit clause 5.3.2 and substitute: 5.3.2 Connection Enquiry (a) A person referred to in clause 5.3.1(b) or (c) who wishes to make an application to connect must first make a connection enquiry by advising the Local Network Service Provider of the type, magnitude and timing of the proposed connection to that provider's network. (b) If the information submitted with a connection enquiry is inadequate to enable the Local Network Service Provider to process the enquiry the Local Network Service Provider must, within 5 business days, advise the Connection Applicant what other relevant preliminary information of the kind listed in schedule 5.4 is required before the connection enquiry can be further processed. (c) The Local Network Service Provider must advise the Connection Applicant within 10 business days of receipt of the connection enquiry and the further information required in accordance with paragraph (b) if the enquiry would be more appropriately directed to another Network Service Provider. (d) The Connection Applicant, notwithstanding the advice received under paragraph (c), may if it is reasonable in all the circumstances, request the Local Network Service Provider to process the connection enquiry and the Local Network Service Provider must meet this request. (e) Where the Local Network Service Provider considers that the connection enquiry should be jointly examined by more than one Network Service Provider then, with the agreement of the Connection Applicant, one of those Network Service Providers may be allocated the task of liaising with the Connection Applicant and the other Network Service Providers to process and respond to the enquiry.	No changes	Accept

(f) A Network Service Provider must, to the extent that it holds technical information necessary to facilitate the processing of a connection enquiry made in accordance with paragraph (a) or an application to connect in accordance with clause 5.3.4(a), provide that information to the Connection Applicant in accordance with the requirements of schedules 5.1, 5.2, 5.3 or 5.3a, as relevant.		
[14] Clause 5.3.3(b) and (b1) Response to Connection Enquiry Omit clause 5.3.3(b) and (b1) and substitute: (b) The Network Service Provider must provide the following information in writing to the Connection Applicant within 10 business days after receipt of the connection enquiry and all such additional information (if any) advised under clause 5.3.2(b) or, if the Connection Applicant has requested the Local Network Service Provider to process the connection enquiry under clause 5.3.2(d), within 10 business days after receipt of that request: (1) the identity of other parties that the Network Service Provider considers: (i) will need to be involved in planning to make the connection or must be involved under clause 5.3.5(e); and (ii) must be paid for transmission or distribution services in the appropriate jurisdiction; (2) whether it will be necessary for any of the parties identified in subparagraph (1) to enter into an agreement with the Connection Applicant in respect of the provision of connection or other transmission services or distribution services to the Connection Applicant or both; (3) whether any service the Network Service Provider proposes to provide is contestable in the relevant participating jurisdiction; and (4) a preliminary program showing proposed milestones for connection and access activities which may be modified from time to time by agreement of the parties, which agreement must not be unreasonably withheld. (b1) The Network Service Provider must, within 20 business days after receipt of the connection enquiry and all such additional information (if any) advised under clause 5.3.2(b) or, if the Connection Applicant has requested the Local Network Service Provider to process the connection enquiry under clause 5.3.2(d), within 20 business days after receipt of that request, provide the Connection Applicant with written details, for each technical requirement set out in the schedules to this Chapter and which are relevant to the proposed plant, of:	No changes	Accept

(1) the automatic access standards; (2) the minimum access standards; (3) the applicable plant standards; and (4) which of the requirements NEMMCO will be involved in the negotiation of for the purposes of clause 5.3.4A(c),		
[15] Clause 5.3.3(c) Response to Connection Enquiry In clause 5.3.3(c), omit "5.3.2(a1) "and "5.3.2(b) "and substitute "5.3.2(b) "and 5.3.2(d) ", respectively.	5.3.2(d) – should read 5.3.2(c)	Reference wrong
[16] Clause 5.3.4 Application for connection After 5.3.4(f), insert: (g) For the purposes of clause 5.3.2(f), where the performance or operation of plant that is the subject of an application to connect could in the reasonable opinion of the Network Service Provider, be materially affected by another project, the Network Service Provider must provide to the Connection Applicant the following information about the other project sufficient to identify the extent of the impact: (1) if an application to connect has been received in respect of the other project, information of the types specified in schedule 5.4 but not clauses S5.4(d) or S5.4(i), consistent with the application to connect of the other project; and (2) if an offer to connect has been made in respect of the other project, information of the types specified in clauses S5.2.4(g), and S5.5, consistent with the offer to connect of the other project.	No changes	Accept
[17] Clause 5.3.4A Negotiated access standards Omit clause 5.3.4A and substitute: 5.3.4A Negotiated access standards (a) For the purposes of this clause 5.3.4A: NEMMCO advisory matter means any matters that relates to NEMMCO's functions under the National Electricity Law and any matter identified as a matter on which NEMMCO is required to advise in schedules 5.1, 5.2, 5.3 and 5.3a. (b) A negotiated access standard must: (1) be no less onerous than the corresponding minimum access standard specified by the Network Service Provider under clause 5.3.3(b1)(2); (2) be set at a level that will not adversely affect power system security;	Clause 5.3.4A(b)(2) be set at a level	This clause needs to recognise the materiality of the impact as it is possible that any connection could be interpreted in some ways as have an adverse affect on an area of the system, to be rejected or treated as adverse it should be large enough to be considered material. An example of this is the inter-regional planning committee recently decided on what was large enough to be considered as adverse to the inter -regional flows.

(3) be set at a level that will not adversely affect the quality of supply for other Network Users; and (4) in respect of generating plant: (i) be set at a level that will not adversely affect reliability of supply to the extent specified in schedule 5.2; and (ii) in respect of generating plant, meet the requirements applicable to a negotiated access standard in clauses S5.2.5, S5.2.6, S5.2.7 and S5.2.8. (c) A Network Service Provider must, following the receipt of a proposed negotiated access standard under clause 5.3.4(e) or paragraph (h) consult with NEMMCO in relation to NEMMCO advisory matters for that proposed standard. (d) NEMMCO must, within 20 business days following the submission of a proposed negotiated access standard under clause 5.3.4(e) or paragraph (h), respond to the Network Service Provider in writing in respect of any NEMMCO advisory matters. (e) A Network Service Provider must, within 30 business days following the receipt of a proposed negotiated access standard in accordance with clause 5.3.4(e) or paragraph (h)(3), accept or reject a proposed negotiated access standard. (f) The Network Service Provider must reject the proposed negotiated access standard if that connection, or alteration of the generating plant (as the case may be), at the negotiated access standard proposed by the Connection Applicant would: (1) on NEMMCO ś advice: (i) adversely affect power system security; or (ii) in respect of the connection of generating plant, adversely affect reliability of supply beyond the extent specified in schedule 5.2; (2) in the Network Service Provider ś opinion, adversely affect quality of supply for other Network Users; (3) in the opinion of NEMMCO or the Network Service Provider, in respect of a NEMMCO advisory matter or a matter allocated to the Network Service Provider, respectively, be lower than the corresponding minimum access standard; or (4) in respect of the connection of generating plant, in NEMMCO ś opinion, not satisfy subparagraph (a)(4)(ii). (g) If a Network Service Provider rejects a proposed negotiated access standard, the Network Service Provider must, when rejecting the proposed negotiated access standard, advise the Connection Applicant of a negotiated access standard that the Network Service Provider will accept. (h) The Connection Applicant may, in relation to a proposed	that will not <u>materially</u> adversely affect power system security; Clause 5.3.4A(b)(3) be set at a level that will not <u>materially</u> adversely affect the quality of supply for other Network Users; and Clause 5.3.4A(f)(1)(i) <u>materially</u> adversely affect power system security; or Clause 5.3.4A(f)(1)(ii) in respect of the connection of generating plant, <u>materially</u> adversely affect reliability of supply beyond the extent specified in schedule 5.2; Clause 5.3.4A(f)(2) in the Network Service Provider ś <u>reasonable</u> opinion, <u>materially</u> adversely affect quality of supply for other Network Users; Add new subclause Clause <u>5.3.4A(f)(5) – The Network Service Provider must advise the Connection Applicant of NEMMCO ś reasons for the rejection.</u>	

negotiated access standard advised by a Network Service Provider in accordance with paragraph (g): (1) accept the proposed negotiated access standard; (2) reject the proposed negotiated access standard; (3) propose an alternative proposed negotiated access standard to be further evaluated in accordance with the criteria in paragraph (a); or (4) elect to adopt the relevant automatic access standard or a corresponding plant standard. (i) An automatic access standard or, if the procedures in this clause 5.3.4A have been followed, a negotiated access standard that forms part of the terms and conditions of a connection agreement, is taken to be the performance standard applicable to the connected plant for the relevant technical requirement.		
[18] Clause 5.3.5 Preparation of offer to connect Omit clause 5.3.5 and substitute: 5.3.5 Preparation of offer to connect (a) The Network Service Provider to whom the application to connect is submitted: (1) at the automatic access standard under clause 5.3.4; or (2) at a negotiated access standard that has been accepted by the Network Service Provider under clause 5.3.4A(f); must proceed to prepare an offer to connect in response. (b) The Network Service Provider must use its reasonable endeavours to advise the Connection Applicant of all risks and obligations in respect of the proposed connection associated with planning and environmental laws not contained in the Rules. (c) The Connection Applicant must provide such other additional information in relation to the application to connect as the Network Service Provider reasonably requires to assess the technical performance and costs of the required connection and to enable the Network Service Provider to prepare an offer to connect. (d) So as to maintain levels of service and quality of supply to existing Registered Participants in accordance with the Rules, the Network Service Provider in preparing the offer to connect must consult with NEMMCO and other Registered Participants with whom it has connection agreements, if the Network Service Provider believes, in its reasonable opinion, that compliance with the terms and conditions of those connection agreements will be affected, in order to assess the application to connect and	No changes	Accept

determine: (1) the technical requirements for the equipment to be connected; (2) the extent and cost of augmentations and changes to all affected networks; (3) any consequent change in network service charges; and (4) any possible material effect of this new connection on the network power transfer capability including that of other networks. (e) If the application to connect involves the connection of generating units having a nameplate rating of 10 MW or greater to a distribution network, the Distribution Network Service Provider must consult the relevant Transmission Network Service Provider regarding the impact of the connection contemplated by the application to connect on fault levels, line reclosure protocols, and stability aspects. (f) The Transmission Network Service Provider consulted under paragraph (e) must determine the reasonable costs of addressing these matters for inclusion by the Network Service Provider in the offer to connect and the Distribution Network Service Provider must make it a condition of the offer to connect that the Connection Applicant pay these costs. (g) The Network Service Provider preparing the offer to connect must include provision for payment of the reasonable costs associated with remote control equipment and remote monitoring equipment as required by NEMMCO and it may be a condition of the offer to connect that the Connection Applicant pay such costs.		
[19] Clause 5.3.6 Offer to connect Omit paragraph (e) and substitute: [Deleted]	No changes	Accept
[20] Clauses 5.3.7 – 5.3.8 Omit clauses 5.3.7 and 5.3.8 and substitute: 5.3.7 Finalisation of connection agreements (a) If a Connection Applicant wishes to accept an offer to connect, the Connection Applicant must negotiate a connection agreement with each relevant Network Service Provider identified in accordance with clause 5.3.3(b)(2) and, in doing so, must use its reasonable endeavours to negotiate in good faith with all parties with which the Connection Applicant must negotiate such a connection agreement. (b) The connection agreement must include proposed		

performance standards with respect to each of the technical requirements identified in schedules 5.2, 5.3 and 5.3a and each proposed performance standard must have been established in accordance with the relevant technical requirement. (c) The proposed performance standards must be based on the automatic access standard or, if the procedures in clause 5.3.4A have been followed, the negotiated access standard. (d) The provision of connection by any Network Service Provider may be made subject to gaining environmental and planning approvals for any necessary augmentation or extension works to a network. (e) Where permitted by the applicable law in the relevant participating jurisdiction, the connection agreement may assign responsibility to the Connection Applicant for obtaining the approvals referred to in paragraph (d) as part of the project proposal and the Network Service Provider must provide all reasonable information and may provide reasonable assistance for a reasonable fee to enable preparation of applications for such approvals. (f) Subject to paragraph (e), each connection agreement must be based on the offer to connect as varied by agreement between the parties. (g) The Network Service Provider responsible for the connection point and the Registered Participant must jointly advise NEMMCO that a connection agreement has been entered into between them and forward to NEMMCO relevant technical details of the proposed plant and connection, including, as applicable: (1) details of all performance standards that form part of the terms and conditions of the connection agreement; (2) if a Generator, the arrangements for updating the information required in accordance with clause S5.2.4(b); (3) the proposed metering installation; (4) arrangements for the Metering Provider to obtain physical access to the metering installation; and (5) the terms upon which a Registered Participant is to supply any ancillary services under the connection agreement. (h) NEMMCO must, within 20 business days of receipt of the notice under clause 5.3.7(g), advise the relevant Network Service Provider and the Registered Participant of whether the proposed metering installation is acceptable for those metering installations associated with those connection points which are classified as metering installation types 1, 2, 3 and 4 as specified in schedule		

7.2. 5.3.8 Provision and use of information (a) The data and information to be provided under rule 5.3 must: (1) be prepared, given and used in good faith; (2) be treated as confidential information; and (3) not be disclosed or made available by the recipient to a third party except in the circumstances set out in clauses 5.3.2(c), and paragraphs (b),(c) and (d). (b) The data and information to be provided under this rule 5.3 may be disclosed between a Network Service Provider and NEMMCO for the purpose of enabling Network Service Providers or NEMMCO to: (1) assess the effect of the proposed facility or proposed alteration to generating plant (as the case may be) on the performance of the power system or another proposed facility or another proposed alteration; (2) determine the extent of any required augmentation or extension; or (3) advise NEMMCO of services described in clause 3.11.3(j). (c) Where a technical requirement in clauses S5.2.5, S5.2.6, S5.2.7 or S5.2.8 requires a Network Service Provider or a Generator (who is the Connection Applicant) to take into account a considered project when negotiating a negotiated access standard, the data and information to be provided under this rule 5.3 on the considered project may be disclosed by the Network Service Provider in a non confidential form to the Connection Applicant to the extent reasonably necessary for the Connection Applicant to determine a proposed negotiated access standard for that technical requirement. (d) The data and information to be provided under rule 5.3 may only be disclosed by the recipient to a third party the disclosure is not to a Transmission Network Service Provider, only if it does not contain data and information from which the load characteristics described in clause S5.5.5 could be derived as an identifiable component. (e) A person intending to disclose information under paragraph (b) must first advise the relevant Connection Applicant of the extent of the disclosure. (f) If a Connection Applicant or Network Service Provider becomes aware of any material change to any information contained in or relevant to an application to connect then it must promptly notify the other party in writing of that change.	Clause 5.3.8(d) The data and information to be provided under rule 5.3 may only be disclosed by the recipient to a third party, if the disclosure is not to a Transmission Network Service Provider, ~~only~~ if it does not contain data and information from which the load characteristics described in clause S5.5.5 could be derived as an identifiable component.	Clause as drafted does not make sense. Change corrects grammar

(g) A Registered Participant must, within 5 business days of becoming aware that any information provided to NEMMCO in relation to a performance standard or other information of a kind required to be provided to NEMMCO under clauses 5.3.7(g)(1) or 5.3.7(g)(2) is incorrect, advise NEMMCO of the correct information. 5.3.9 Procedure to be followed by a Generator proposing to alter a Generating System (a) This clause 5.3.9 applies where a Generator proposes to alter: (1) a connected generating system; or (2) a generating system for which performance standards have been previously accepted by NEMMCO, in a manner that will affect the performance of the generating system relative to any of the technical requirements set out in clauses S5.2.5, S5.2.6, S5.2.7 and S5.2.8. (b) A Generator must submit to the Network Service Provider, with a copy to NEMMCO: (1) a description of the nature of the alteration and the timetable for implementation; (2) in respect of the generating system as altered: (i) details of the generating unit design data and generating unit setting data in accordance with schedule S5.5 or the Generating System Model Guidelines, Generating System Design Data Sheet, or Generating System Setting Data Sheet; and (ii) the information described in clause S5.2.4(g); and (3) proposed amendments to the relevant performance standard being, for each relevant technical requirement for which the proposed alteration to the equipment will affect the performance of the generating system: (i) the applicable automatic access standard; or (ii) a proposed negotiated access standard. (c) For the purposes of subparagraph(b)(3), clause 5.3.4A applies to a submission by a Generator under this clause 5.3.9. (d) Without otherwise limiting subparagraph (b)(3), for the purposes of that clause, a proposed alteration to the equipment specified in column 1 of the table set out below is taken to affect the performance of the generating system relative to technical requirements specified in column 2, thereby necessitating a submission under subparagraph (b)(3): Column 1 (altered equipment) Column 2 (clause) machine windings S5.2.5.1, S5.2.5.2, S5.2.9		

power converter S5.2.5.1, S5.2.5.2, S5.2.5.5, S5.2.5.12, S5.2.5.13, S5.2.9 reactive compensation plant S5.2.5.1, S5.2.5.2, S5.2.5.5, S5.2.5.12, S5.2.5.13 excitation control system S5.2.5.5, S5.2.5.12, S5.2.5.13 voltage control system S5.2.5.5, S5.2.5.12, S5.2.5.13 governor control system S5.2.5.11, S5.2.5.14 power control system S5.2.5.11, S5.2.5.14 protection system S5.2.5.3, S5.2.5.4, S5.2.5.5, S5.2.5.8, S5.2.5.9 auxiliary supplies S5.2.5.1, S5.2.5.2, S5.2.8 remote control and monitoring system S5.2.5.14, S5.2.6.1, S5.2.6.2 (e) The Network Service Provider may, as a condition of considering a submission made under paragraph (b), require payment of a fee to meet the reasonable costs anticipated to be incurred by it and any other Network Service Providers and NEMMCO in the assessment of the submission. (f) The Network Service Provider must require payment of such a fee under paragraph (e) if so requested by NEMMCO. (g) On payment of the required fee referred to paragraph (e), the Network Service Provider must pay such amounts as are on account of the costs anticipated to be incurred by the other Network Service Providers and NEMMCO as appropriate. (h) If the application of this clause 5.3.9 leads to a variation to an existing connection agreement the Network Service Provider and the Generator must immediately jointly advise NEMMCO. 5.3.10 Acceptance of Performance Standards for Generating Plant that is Altered (a) A Generator must not commission altered generating plant until Network Service Provider has advised the Generator that NEMMCO is satisfied in relation to the matters set out in paragraph (b). (b) NEMMCO must advise the Network Service Provider that is satisfied in relation to altered generating plant that: (1) that the Generator has complied with clause 5.3.9; and (2) that each amended performance standard submitted by the Generator either meets the automatic access standard applicable to the relevant technical requirement or, if the performance standard does not meet that standard, it would not be rejected if clauses 5.3.4A(b) and (f) were applied at the time the submission	Clause 5.3.9 Add new subparagraph (i): Should the moneys collected under subparagraphs (e) (f) and (g) exceed the actual costs incurred, the NSP shall refund to the generator for difference between actual and estimated costs 5.3.10(b)(2) that each amended performance standard submitted by the Generator either meets the automatic access standard applicable to the relevant technical requirement or, if the performance standard does not meet that standard, ~~it would not be rejected if clauses 5.3.4A(b) and (f) were applied at the time the submission of performance~~	The clause as drafted would discourage plant currently grandfathered below the minimum standard to make the most efficient upgrades. If plant can be upgraded to better performance, which may still be below the minimum standard it should be encouraged to do so rather than continue at its current performance.

of performance standards is received by NEMMCO, and the Network Service Provider must advise the Generator that NEMMCO is satisfied in accordance with this paragraph (b).	~~standards is received by NEMMCO, and the Network Service Provider must advise the Generator that NEMMCO is satisfied in accordance with this paragraph (b).~~ the negotiated access standard is no less onerous than the standard that applied prior to the plant being altered.	
[21] Clause 5.4.1 Applicability Omit clause 5.4.1 and substitute: 5.4.1 Application Rule 5.4 applies only to new installations and modifications to existing installations (including, without limitation, alterations to existing generating plant) after 13 December 1998 (in the case of installations located in participating jurisdictions other than Tasmania) and after 29 May 2005 (in the case of installations located in Tasmania).	No changes	Accept
[22] Clause 5.4.2 Advice of inconsistencies Omit clause 5.4.2 and substitute 5.4.2 Advice of inconsistencies (a) At any stage prior to commissioning the facility in respect of a connection, the Registered Participant or the person intending to be registered as a Generator must advise the relevant Network Service Provider and NEMMCO in writing of any inconsistency between the proposed equipment and the connection agreement including the performance standards and, if necessary, the Network Service Provider and the Registered Participant or the person intending to be registered as a Generator must negotiate in good faith any necessary changes to the connection agreement. (b) If there is an inconsistency in a connection agreement including a performance standard identified in paragraph (a), the Registered Participant or the person intending to be registered as a Generator and the Network Service Provider must not commission the facility in respect of a connection unless the facility or the connection agreement or performance standard has been varied to remove the inconsistency. (c) Nothing in this clause 5.4.2 affects the operation of clause	No changes	Accept

5.3.6(c1).		
[23] Clause 5.7.3 Tests to demonstrate compliance with connection requirements for generators Omit clause 5.7.3 and substitute: 5.7.3 Tests to demonstrate compliance with connection requirements for generators (a) Each Generator must, prior to the Generator implementing a compliance program in accordance with clause 4.15(b), provide evidence to any relevant Network Service Provider with which that Generator has a connection agreement and NEMMCO that its generating system complies with the applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant connection agreement and the performance standards for that generating system. (b) Each Generator must negotiate in good faith with the relevant Network Service Provider and NEMMCO to agree on a compliance monitoring program, including an agreed method, for its generating system to confirm ongoing compliance with the applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant connection agreement and the performance standards for that generating system.. (c) If, prior to the Generator implementing a compliance program in accordance with the requirements of clause 4.15(b), a performance test or monitoring of in-service performance demonstrates that a generating system is not complying with one or more technical requirements of clause S5.2.5 of schedule 5.2 and the relevant connection agreement or one or more of the performance standards for that generating system then the Generator must: (1) promptly notify the relevant Network Service Provider and NEMMCO of that fact; (2) promptly advise the Network Service Provider and NEMMCO of the remedial steps it proposes to take and the timetable for such remedial work; (3) diligently undertake such remedial work and report at monthly intervals to the Network Service Provider on progress in implementing the remedial action; and (4) conduct further tests or monitoring on completion of the remedial work to confirm compliance with the relevant technical requirements or performance standards (as the case may be). (d) If NEMMCO reasonably believes that a generating system is	(b) Each Generator must negotiate in good faith with the relevant Network Service Provider and NEMMCO and the Network Service Provider and NEMMCO must negotiate in good faith with the Generator to agree on a compliance monitoring program, including an agreed method, for its generating system to confirm ongoing compliance with the applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant connection agreement and the performance standards for that generating system.	All parties should be required to negotiate in good faith

not complying with one or more applicable performance standards or one or more applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant connection agreement, NEMMCO may instruct the Generator to conduct tests within 25 business days to demonstrate that the relevant generating system complies with those performance standards or technical requirements and if the tests provide evidence that the generating system continues to comply with those requirement(s) NEMMCO must reimburse the Generator for the reasonable expenses incurred as a direct result of conducting the tests. (e) If NEMMCO: (1) is satisfied that: (i) a generating system does not comply with the relevant performance standards for that system in respect of one or more of the technical requirements contained in S5.2.5, S5.2.6, S5.2.7 or S5.2.8 and the relevant connection agreement; or (ii) a generating system's performance is not adequately represented by the applicable analytical model provided under clause 5.7.6(h) or clause S5.2.4; and (2) holds the reasonable opinion that there is, or could be, a threat to power system security because of the performance of the generating system, or because the inadequacy of the applicable analytical model is adversely affecting NEMMCO's ability to assess power system security, including power transfer capabilities, NEMMCO may direct the relevant Generator to operate the generating system at a particular generated output or in a particular mode until the relevant Generator submits evidence reasonably satisfactory to NEMMCO that the generating system is complying with the relevant performance standard and performing substantially in accordance with the applicable analytical model. (f) Each Generator must maintain records for 7 years for each of its generating systems and power stations setting out details of the results of all technical performance and monitoring conducted under this clause 5.7.3 and make these records available to NEMMCO on request.	7.7.3(e)(2) holds the reasonable opinion ~~that there is, or could be, a threat to power system security because of the performance of the generating system, or because the inadequacy of the applicable analytical model is adversely affecting NEMMCO's ability to assess power system security~~, <u>the performance of the generating system, or inadequacy of the applicable analytical model of the generating system is or will materially impede NEMMCO's ability to discharge it's power system security obligations under the Rules.</u>	The wording should be amended to better reflect NEMMCO's obligations rather than a vague undefined "threat"
[24] Clause 5.7.6 Tests of generating units requiring changes to normal operation Omit clause 5.7.6 and substitute: 5.7.6 Tests of generating units requiring changes to normal operation (a) A Network Service Provider may, at intervals of not less than	Clause 5.7.6(a) A Network Service Provider may, at intervals of not less than 12 months per generating ~~unit~~	The reference should be to system and not unit.

12 months per generating unit, require the testing by a Generator of any generating unit connected to the network of that Network Service Provider in order to determine analytic parameters for modelling purposes or to assess the performance of the relevant generating unit for the purposes of a connection agreement, and the Network Service Provider is entitled to witness such tests. (b) If NEMMCO reasonably considers that: (1) the analytic parameters for modelling of a generating unit or generating system are inadequate; or (2) available information, including results from a previous test of a generating unit or generating system are inadequate to determine parameters for an applicable model developed in accordance with the Generating System Model Guidelines, or otherwise agreed with NEMMCO under clause S5.2.4(b1)(2), NEMMCO may direct a Network Service Provider to require a Generator to conduct a test under paragraph (a), and NEMMCO may witness such tests. (c) Adequate notice of not less than 15 business days must be given by the Network Service Provider to the Generator before the proposed date of a test under clause 5.7.6(a). (d) The Network Service Provider must use its best endeavours to ensure that tests permitted under this clause 5.7.6 are conducted at a time which will minimise the departure from the commitment and dispatch that are due to take place at that time. (e) If not possible beforehand, a Generator must conduct a test under clause 5.7.6 at the next scheduled outage of the relevant generating unit and in any event within 9 months of the request. (f) A Generator must provide any reasonable assistance requested by the Network Service Provider in relation to the conduct of tests. (g) Tests conducted under clause 5.7.6 must be conducted in accordance with test procedures agreed between the Network Service Provider and the relevant Generator and a Generator must not unreasonably withhold its agreement to test procedures proposed for this purpose by the Network Service Provider. (h) A Generator must provide the test records obtained from a test under paragraph (a) to the Network Service Provider, who must derive the analytical parameters for the applicable model developed in accordance with the Generating System Model Guidelines, or otherwise agreed with NEMMCO under clause S5.2.4(b1)(2) and provide them to NEMMCO and the relevant Generator.	system, require the testing by a Generator of any generating unit connected to the network of that Network Service Provider in order to determine analytic parameters for	

(i) Each of the Generator, the Network Service Provider and NEMMCO must bear its own costs associated with tests conducted under this clause 5.7.6 and no compensation is to be payable for financial losses incurred as a result of these tests or associated activities.		
[25] Diagram in clause S5.1a.4 Omit the diagram in clause S5.1a.4 and substitute: Percentage overvoltage 0.0% 5.0% 10.0% 15.0% 20.0% 25.0% 30.0% 35.0% 0.01 0.10 1.00 10.00 100.00 1,000.00 Time period (seconds) Percent	This must be treated as a percentage of nominal voltage - not of 'normal' Disagree with the change proposed to the chart – the extension lifts the post contingent voltage an additional 10% above the poorly defined normal voltage making the expected rating of equipment 120% continuous. Suggest – remove the extension on the chart and leave the post contingent elevated voltage as recovering back to the pre-contingent voltage after 10 minutes (600 seconds).	This must be treated as a percentage of nominal voltage - not of 'normal' Design and purchase of equipment is all done in accordance with the Australian Standards (or appropriate international standard) and generally the rating of equipment is taken to be the 'highest system voltage" - this is always a percentage above nominal. The use of 'normal' now places the voltage criteria into NEMMCO's discretion - this should not be the case as the network has existing design voltages. Experience shows that this criteria creates a situation where the TNSP cannot provide the connecting party with the contingency case that would cause this level of over voltage in many parts of the network - but the connecting party must prove that they can ride through this
[26] Clause S5.1.7 Voltage unbalance After clause S5.1.7(b) insert: (c) A Network Service Provider must include conditions in connection agreements to ensure that each Generator will balance: (1) the voltage generated in each phase of its generating system and, (2) when not generating, the current drawn in each phase, so as to achieve average levels of negative sequence voltage at each of the generating system connection points due to phase imbalances within the generating plant not more than the values determined by the Network Service Provider to achieve average levels of negative sequence voltage at the connection points of other Network Users of not more than the values set out in Table S5.1a.1 and clause S5.1a.7.	No changes	Accept

(d) The Network Service Provider and Generator may include in the connection agreement a requirement to upgrade performance to an agreed level not higher than the levels agreed under paragraph (c) if at any time in the future, another Network User is adversely affected by negative sequence voltage or current imbalance because of this generating plant.		
[27] S5.1.9 Protection systems and fault clearance times In clause S5.1.9(b), omit "5.3.4A(b) "and substitute "5.3.4A(c) ".	No changes	Accept
[28] Clause S5.2.1 Outline of requirements Omit clause S5.2.1 and substitute: S5.2.1 Outline of requirements (a) This schedule sets out details of additional requirements and conditions that Generators must satisfy as a condition of connection of a generating system to the power system. It does not apply to any generating system that is: (1) subject to an exemption from registration under clause 2.2.1(c); or (2) eligible for exemption under any guidelines issued under clause 2.2.1(c), and which is connected or intended for use in a manner the Network Service Provider considers is unlikely to cause a material degradation in the quality of supply to other Network Users. (b) This schedule also sets out the requirements and conditions, which (subject to clause 5.2.5 of the Rules) are obligations of Generators: (1) to co-operate with the relevant Network Service Provider on technical matters when making a new connection; and (2) to provide information to the Network Service Provider or NEMMCO. (c) The equipment associated with each generating system must be designed to withstand without damage the range of operating conditions which may arise consistent with the system standards. (d) Generators must comply with the performance standards and any attached terms or conditions of agreement agreed with the Network Service Provider or NEMMCO in accordance with a relevant provision of schedules 5.1 or 5.1a. (e) This schedule does not set out arrangements by which a Generator may enter into an agreement or contract with NEMMCO to:	Clause S5.2.1(a)(2) eligible for exemption under any guidelines issued under clause 2.2.1(c), and which is connected or intended for use in a manner the Network Service Provider considers is unlikely to cause a material degradation in the quality of supply to other Network Users <u>to a level below relevant standards.</u>	The clause should only limit plant if the quality of supply is below the relevant standards

(1) provide additional services that are necessary to maintain power system security; or (2) provide additional services to facilitate management of the market. (f) This schedule provides for automatic access standards and the determination of negotiated access standard derived from minimum access standards which, once determined, must be record together with the automatic access standards in a connection agreement and registered with NEMMCO as performance standards.		
[29] S5.2.2 Application of Settings In clause S5.2.2, omit "5.3.4A(b) "wherever occurring and substitute "5.3.4A(c) ".	No changes	Accept
[30] S5.2.3 Technical matters to be coordinated Omit clause S5.2.3 and substitute: S5.2.3 Technical matters to be coordinated (a) A Generator and the relevant Network Service Provider must use all reasonable endeavours to agree upon relevant technical matters in respect of each new or altered connection of a generating system to a network including: (1) design at the connection point; (2) physical layout adjacent to the connection point; (3) primary protection and backup protection (clause S5.2.5); (4) control characteristics (clause S5.2.5); (5) communications facilities (clause S5.2.6); (6) insulation co-ordination and lightning protection (paragraph (b)); (7) fault levels and fault clearance (clause S5.2.8); (8) switching and isolation facilities (clause S5.2.8); (9) interlocking and synchronising arrangements; and (10) metering installations. (b) A Generator must ensure that in designing a generating system's electrical plant operating at the same nominal voltage as at the connection point, including any substation for the connection of the generating system to the network: (1) the plant complies with the relevant Australian Standards unless a provision of these Rules allows or requires otherwise; (2) the earthing of the plant complies with the Electricity Supply Association of Australia Safe Earthing Guide to reduce step and touch potentials to safe levels;	Clause S5.2.3(b)(1) the plant complies with the relevant Australian Standards or International Standards (as applicable) ~~unless a provision of these Rules allows or requires otherwise;~~ Clause S5.2.3(b)(2) the earthing of the plant complies with the ~~Electricity Supply Association of Australia Safe~~	In many cases the Australian Standards have not yet processed and established standards for wind turbines - IEC standards do exist. The Rules should not impose provisions that are more onerous than the relevant standards. If NEMMCO believes there is an issue it should look to have the standards amended.

(3) the plant is capable of withstanding, without damage the voltage impulse levels specified in the connection agreement; (4) the insulation levels of the plant are co-ordinated with the insulation levels of the network to which the generating system is connected as specified in the connection agreement; and (5) safety provisions in respect of the plant comply with requirements applicable to the participating jurisdiction in which the generating system is located, as notified by the Network Service Provider.	~~Earthing Guide~~ ENA EG1-2006 : Substation Earthing Guide to reduce step and touch potentials to safe levels;	ESAA doesn t write these standards any more. The correct earthing standard is: ENA EG1-2006 : Substation Earthing Guide
[31] S5.2.4 Provision of information Omit clause S5.2.4 and substitute: S5.2.4 Provision of information (a) A Generator or person who is negotiating a connection agreement with a Network Service Provider must promptly on request by NEMMCO or the Network Service Provider provide all data in relation to that generating system, specified in: (1) schedule 5.5; (2) the Generating System Model Guidelines; (3) the Generating System Design Data Sheet, or (4) the Generating System Setting Data Sheet. (b) A Generator, or person required under the Rules to register as the Generator in respect of a generating system comprised of generating units with a combined nameplate rating of 30 MW or more, by the earlier of: (1) the date on which proposed performance standards or amendments to performance standards are submitted to NEMMCO under clause 5.3.9(b). (2) three months before commissioning of a generating system or planned alteration to a generating system; or (3) 5 business days before commissioning of an unplanned alteration to a generating system, must provide: (4) to NEMMCO and the relevant Network Service Providers (including the relevant Transmission Network Service Provider in respect of an embedded generating unit) with the following information about the control systems of the generating system: (i) a set of functional block diagrams, including all functions between feedback signals and generating system output; (ii) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits; and (iii) the characteristics of non-linear elements; and	*Manufacturer Proposed revised text* Must provide: *(b)(4)In confidence* to *NEMMCO* and the relevant *Network Service Providers* (including the relevant *Transmission Network Service Provider)* in respect of an *embedded generating ~~unit~~ system)* with the following information about the *control systems* of the *generating* system:	Clause (b) (4) This clause should refer to an "embedded generating system "rather than an "embedded` generating unit "to ensure the model includes the generating units and any associated plant, such as dynamic reactive plant, that determines the characteristics of the generating system. The requirement of this clause to provide detailed information on the generating unit must respect the requirement for protection of the Intellectual Property of the manufacturers of generation system plant. This plant includes the generating units and any associated equipment such as dynamic reactive plant. This data should be required to be provided to NEMMCO and the relevant Network Service Provider to enable understanding of the plant and to enable the building of computer based models in software systems used by NEMMCO and the relevant Network Service Provider. This data must be provided in confidence to NEMMCO and the relevant Network Service Provider to protect the Intellectual Property of the equipment

(5) to NEMMCO only, simulation source code in an unencrypted form suitable for at least one of the software simulation products nominated by NEMMCO and in a form that would allow conversion for use with other software simulation products by NEMMCO, sufficient for NEMMCO and Network Service Providers to perform load flow and dynamic simulation studies. (c) The information provided under paragraph (b) must: (1) encompass all control systems that respond to voltage or frequency disturbances on the power system, and which are either integral to the generating units or otherwise part of the generating system, including, without limitation, those applying to reactive power equipment that forms part of the generating system; (2) conform with the applicable models developed in accordance with the Generating System Model Guidelines, or an alternative model agreed with NEMMCO to be necessary to adequately represent the generating plant to carry out load flow and dynamic simulations. (d) The Generator must update the information provided under paragraph (b) within 3 months after commissioning tests or other tests undertaken in accordance with clause 5.7.3 are completed. (e) For the purposes of clause 5.3.4(g), the technical information that a Network Service Provider must, if requested, provide to a Connection Applicant in respect of a proposed connection for a generating system includes: (1) the highest expected single phase and three phase fault levels at the connection point with the generating system not connected; (2) the clearing times of the existing protection systems that would clear a fault at the location at which the new connection would be connected into the existing transmission system or distribution system; (3) the expected limits of voltage fluctuation, harmonic voltage distortion and voltage unbalance at the connection point with the generating system not connected; (4) technical information relevant to the connection point with the generating system not synchronised including equivalent source impedance information, sufficient to estimate fault levels, voltage fluctuations, harmonic voltage distortion (for harmonics relevant to the generating system) and voltage unbalance; and (5) information relating to the performance of the national grid that is reasonably necessary for the Connection Applicant to prepare an application to connect, including:	*Proposed revised text* (b)(5) To *NEMMCO* ~~only, simulation source code in an unencrypted form suitable for at least one of the~~ and the relevant *Network Service Providers* (including the relevant *Transmission Network Service Provider),)*simulation code in object code form (ie machine code form) for software simulation products nominated by *NEMMCO* and the relevant *Network Service Providers* (including the relevant *Transmission Network Service Provider).* ~~and in a form that would allow conversion for use with other software simulation products.~~ *Proposed Revised Text* (g) Any person required to provide information under paragraphs (a) and (b)(4) and (b)(5)must also provide that information in a ~~non-confidential~~ *confidential* form for the purposes of clause 3.13.3(k) and 5.3.4 (g)(2). Note This revised clause is	manufacturers. This data must be provided to NEMMCO and the relevant Network Service Provider to enable understanding of the plant and to enable the building of computer based models in software systems used by NEMMCO and the relevant Network Service Provider. This data must be provided in confidence to NEMMCO and the relevant Network Service Provider to protect the Intellectual Property of the equipment manufacturers. Clause (b) (5) The computer program source code includes Intellectual Property of the equipment manufacturer in the computer programming of the modeling of the plant. This Intellectual Property is included in the commercial advantage of the manufacturer and therefore cannot be required, nor is it required to enable the generators to be modeled. The computer based model is required by NEMMCO and the relevant Network Service Providers to determine whether the proposed generating system meets the performance requirements. The building and testing of computer based models can require extensive investigation. The generating plant manufacturers should be requested to supply models in object code (ie computer machine code form), compatible with computer systems used by NEMMCO and the relevant Network System Supplier. Such object codes

(i) a model of the power system, including relevant considered projects and the range of expected operating conditions, sufficient to carry out load flow and dynamic simulations; and (ii) information on inter-regional and intra-regional power transfer capabilities and relevant plant ratings. (f) All information provided under this clause S5.2.4 must be treated as confidential information. (g) Any person required to provide information under paragraphs (a) and (b)(4) must also provide that information in a non confidential form for the purposes of clause 3.13.3(k) and 5.3.4(g)(2).	superfluous as the requirement is already included in (f).	would not enable "reverse engineering" to reveal the Intellectual Property of the plant. Subject to this requirement, the object code could be provided in a confidential form to market participants. The requirement to provide source code text in a form for one simulation product that could be converted to the form required for any other simulation product is impractical. The whole range of possible simulation products that could be selected by NEMMCO would not be known by the generation developer or generating equipment manufacturer. Clause (5) (g) This clause requires the information under 4(b) to be provided in a non-confidential form, which is not acceptable, nor practice elsewhere in the world. The requirement of this clause to provide detailed information on the generating unit must respect the requirement for protection of the Intellectual Property of the manufacturers of generation system plant. This plant includes the generating units and any associated equipment such as dynamic reactive plant. This clause is not consistent with clause (f) which stipulates that "All information provided under this clause S5.2.4 must be treated as *confidential information.*
[32] S5.2.5 Technical requirements Omit clause S5.2.5 and substitute: S5.2.5.1 Reactive power capability	No changes	S5.2.5.1 – as S5.1a4 is currently written around 'normal' voltage (though REGA and

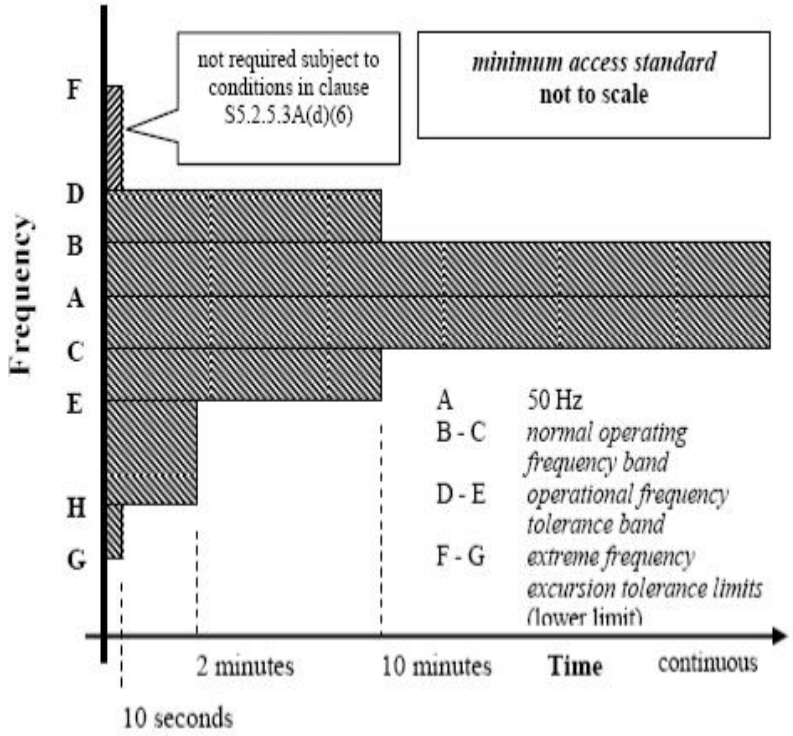
Automatic access standard (a) The automatic access standard is each generating system, operating at: (1) any level of active power output; and (2) any voltage at the connection point within the limits established under clause S5.1a.4 without a contingency event, must be capable of supplying and capable of absorbing, continuously at its connection point an amount of reactive power of at least the amount equal to the product of the rated active power of the generating unit or generating system and 0.395. Minimum access standard (b) The minimum access standard is no capability is required to supply or absorb reactive power at the connection point. Negotiated access standard (c) When negotiating a negotiated access standard the Generator and the Network Service Provider: (1) must, subject to any agreement under paragraph (d)(4), ensure that the reactive power capability of the generating system is sufficient to ensure that all relevant system standards are met before and after credible contingency events under normal and planned outage operating conditions of the power system, taking into account at least existing and considered projects; (2) may negotiate either a range of reactive power absorption and supply, or a range of power factor, at the connection point, within which the plant must be operated; and; (3) may negotiate a limit that describes how the reactive power capability varies as a function of active power output due to a design characteristic of the plant. (d) If the generating system is not capable of the level of performance established under paragraph (c)(1) the Generator, depending on what is reasonable in the circumstances, must: (1) pay compensation to the Network Service Provider for the provision of the deficit of reactive power (supply and absorption) from within the network; (2) install additional equipment connecting at the generating system ŝ connection point or another location, to provide the deficit of reactive power (supply and absorption), which equipment is deemed to be part of the generating system; (3) reach a commercial arrangement with a Registered Participant to provide the deficit of reactive power (supply and		Auswind are proposing that it should be changed to ‘nominal voltage ’) this is unlikely to be achievable when operating at +10% above normal voltage. Most wind turbines are rated on MW (real power) not on active power, consequently to meet the automatic access standard either they would need to be de-rated or auxiliary equipment such as capacitors and reactors may need to be provided. Cannot be agreed at any voltage level. Should be at a single nominal voltage and if no on-load tap changing facility provided at the agreed nominal tap of the final transformer between the generating unit(s) and the connection point

absorption); or (4) if the inability to meet the performance level only occurs for particular operating conditions, agree to and document as part of the proposed negotiated access standard, operational arrangements by which the plant can achieve an agreed level of performance for those operating conditions. (e) The Generator may select more than one option referred to in paragraph (d). General access standard (f) An access standard must record, the agreed value for rated active power and where relevant the method of determining the value. (g) The value for rated active power under paragraph (f) for a generating system must take into account the system's in-service generating units and additional reactive power equipment that is part of the generating system. (h) An access standard for consumption of energy by a generating system when not supplying or absorbing reactive power under an ancillary services agreement are to be established under rule S5.3.5 as if the Generator were a Market Customer.		
S5.2.5.2 Quality of electricity generated (a) For the purpose of this clause S5.2.5.2 in respect of a synchronous generating unit, AS 1359.101 and IEC 60034-1 are plant standards for harmonic voltage distortion. Automatic access standard (b) The automatic access standard is each generating system, when generating and when not generating, must not produce at any of its connection points for generation: (1) voltage fluctuation greater than the limits allocated by the Network Service Provider under clause S5.1.5(a); (2) harmonic voltage distortion greater than the emission limits specified by a plant standard under paragraph (a) or allocated by the Network Service Provider under clause S5.1.6(a); and (3) voltage unbalance greater than the limits allocated by the Network Service Provider in accordance with clause S5.1.7(c). Minimum access standard (c) The minimum access standard is each generating system, when generating and when not generating, must not produce at	No changes	Accept

any of its connection points for generation: (1) voltage fluctuations greater than limits determined under rule S5.1.5(b); (2) harmonic voltage distortion more than the lesser of the emission limits determined by the relevant Network Service Provider under clause S5.1.6(b) and specified by a plant standard under paragraph (a); and (3) voltage unbalance more than limits determined under clause S5.1.7(c). Negotiated access standard (d) Subject to clause S5.1.7(d), a negotiated access standard negotiated under this clause S5.2.5.2 must not prevent the Network Service Provider meeting the system standards or contractual obligations to existing Network Users.		
S5.2.5.3 Generating unit response to frequency disturbances (a) For the purposes of this clause S5.2.5.3: ‘normal operating frequency band’, ‘operational frequency tolerance band’ or ‘extreme frequency excursion tolerance limits’ is a reference to the widest range specified for that term for any condition (including an “island” condition) in the frequency operating standards that apply to the region in which the generating unit is located. ‘stabilisation time’ and ‘recovery time’ mean the longest times allowable for system frequency to remain outside the operational frequency tolerance band and the normal operating frequency band, respectively, for any condition (including and “island” condition) in the frequency operating standards that apply to the region in which the generating unit is located. ‘transient frequency limit’ and ‘transient frequency time’ mean the values of 47.5 Hz and 9 seconds, respectively, or such other values determined by the Reliability Panel. Automatic access standard (b) The automatic access standard is each generating system including all operating generating units must be capable of continuous uninterrupted operation for frequencies in the		

following ranges: (1) the lower bound of the extreme frequency excursion tolerance limits to the lower bound of the operational frequency tolerance band for at least the stabilisation time; (2) the lower bound of the operational frequency tolerance band to the lower bound of the normal operating frequency band, for at the recovery time including any time spent in the range under subparagraph (1); (3) the normal operating frequency band for an indefinite period; (4) the upper bound of the normal operating frequency band to the upper bound of the operational frequency tolerance band, for at least the recovery time including any time spent in the range under subparagraph (5); and (5) the upper bound of the operational frequency tolerance band to the upper bound of the extreme frequency excursion tolerance limits for at least the stabilisation time, provided that the rate of change of frequency is between –4 Hz and 4 Hz per second for more than 0.25 seconds. [Note: The automatic access standard is illustrated in the following diagram. To the extent of any inconsistency between the diagram and paragraph (b), paragraph (b) prevails.] continuous A 50 Hz B - C normal operating frequency band D - E operational frequency tolerance band F -G extreme frequency G E C A B D F 2 minutes 10 minutes Time automatic access standard not to scale Frequency Minimum access standard		Automatic diagram has reference to S5.2.5.3A(d) (6) which does not exist.

(c) The minimum access standard is each generating system including all operating generating units must be capable of continuous uninterrupted operation for frequencies in the following ranges: (1) the lower bound of the extreme frequency excursion tolerance limits to the transient frequency limit for at least the transient frequency time; (2) the transient frequency limit to the lower bound of the operational frequency tolerance band for at least the stabilisation time; (3) the lower bound of the operational frequency tolerance band to the lower bound of the normal operating frequency band for at least the recovery time including any time spent in the ranges under subparagraphs (1) and (2); (4) normal operating frequency band for an indefinite period; and (5) upper bound of the normal operating frequency band to the upper bound of the operational frequency tolerance band for at least the recovery time including any time spent in the ranges under paragraph (e), provided the rate of change of frequency is between -1 Hz and 1 Hz per second for more than one second. (d) The minimum access standard in respect of a generating system including all operating generating units that: (1) is part of a generating system comprised of generating units with a combined nameplate rating of 30 MW or more; or (2) does not have a protection system to trip the generating unit if the frequency exceeds a level agreed with NEMMCO, is the generating unit must be capable of continuous uninterrupted operation for frequencies in the range of the upper bound of the operational frequency tolerance band to the upper bound of the extreme frequency excursion tolerance limits (including islanded conditions) for at the transient frequency time, provided the rate of change of frequency is between -1 Hz and 1 Hz per second for more than one second. [Note: The minimum access standard is illustrated in the following diagram. To the extent of any inconsistency between the diagram and paragraph (d), paragraph (d) prevails.]		If the Tasmanian frequency standards are reviewed to match the mainland then this wording is okay, however while there remains a significant difference in the lower bound of the extreme frequency tolerance limit – this clause will remain a barrier to most wind generation connecting to Tasmania. We recommend an urgent review of the Tasmanian frequency standards. There are very few turbines designed to ride through to 46 Hz. Most Standards require capability to 47 Hz – the protection on most machines is set at this limit. This diagram refers to S5.2.5.3A(d)(6) which does not exist. It does not define point H which should be the transient frequency limit ' at 47.5 Hz It has 10 seconds at the transient frequency time instead of the defined 9 seconds.



Negotiated access standard
2 minutes 10 minutes Time minimum access standard not to scale Frequency 10 seconds not required subject to conditions in clause S5.2.5.3A(d)(6).

(e) A negotiated access standard can be accepted by the Network Service Provider provided that NEMMCO and the Network Service Provider agree that:
(1) the negotiated access standard is as close as practicable to the automatic access standard while respecting the need to protect the plant from damage;
(2) the frequency would be unlikely to fall below the lower bound of the operational frequency tolerance band as a result of over-frequency tripping of generating units; and
(3) there would be no material adverse impact on quality of

2 minutes 10 minutes Time minimum access standard not to scale Frequency 10 seconds not required subject to conditions in clause S5.2.5.3A(d)(6).
Clause S2.5.3A(d)(6) does not exist and it is not obvious which is the relevant clause.

supply to other Network Users or on inter-regional or intra-regional power transfer capability. (f) In the event of any inconsistency between paragraph (e)(2) and the minimum access standard referred to in paragraphs (c) or (d), the minimum access standard prevails. (g) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.3.		
S5.2.5.4 Generating system response to voltage disturbances Automatic access standard (a) The automatic access standard is each generating system including all operating generating units must be capable of continuous uninterrupted operation during the occurrence voltage at the connection point in the range of: (1) over-voltages for the durations permitted under clause S5.1a.4; (2) 90% to 110% of normal voltage continuously; (3) 80% to 90% of normal voltage for a period of at least 10 seconds; and (4) 70% to 80% of normal voltage for a period of at least 2 seconds. Minimum access standard (b) The minimum access standard is each generating system including all operating generating units must be capable of continuous uninterrupted operation for voltages at the connection point in the range of 90% to 110% of normal voltage, provided that the ratio of voltage to frequency (as measured at the connection point and expressed as percentage of normal voltage and a percentage of 50 Hz) does not exceed: (1) 115% for more than two minutes; or (2) 110% for more than 10 minutes. Negotiated access standard (c) In negotiating a negotiated access standard, each generating system including all operating generating units must be capable of continuous uninterrupted operation for the range of voltages specified in the automatic access standard except where NEMMCO and the Network Service Provider agree that: (1) the negotiated access standard is as close as practicable to the automatic access standard while respecting the need to	S5.2.5.4 Generating system response to voltage disturbances Automatic access standard (a) The automatic access standard is each generating system including all operating generating units must be capable of continuous uninterrupted operation during the occurrence voltage at the connection point in the range of: (1) over-voltages for the durations permitted under clause S5.1a.4; (2) 90% to 110% of ~~normal~~ nominal voltage continuously; (3) 80% to 90% of ~~normal~~ nominal voltage for a period of at least 10 seconds; and (4) 70% to 80% of ~~normal~~ nominal voltage for a period of at least 2 seconds. Minimum access standard (b) The minimum access standard is each generating system including all operating generating units must be capable of continuous uninterrupted operation for voltages at the connection point in the range of 90% to 110% of ~~normal~~ nominal voltage, provided that the ratio of voltage to frequency (as measured at the connection point and expressed as percentage of ~~normal~~ nominal voltage and a percentage of 50 Hz) does not exceed: (1) 115% for more than two minutes; or (2) 110% for more than 10 minutes.	DISAGREE Reference should be to NOMINAL voltage not NORMAL voltage. The NORMAL voltage is arbitrary and can (and often does) change as the network grows or where the system configuration changes. The use of NOMINAL voltage allows for proper specification of equipment without undue impact on equipment costs and allows for system-induced changes to NORMAL voltages. (see also comments above for Curve S5.1a.4) The Minimum Access standard calls for 110% of normal voltage for continuously. At various locations around the network (eg Redcliffs or Mt Beauty in Victoria), the 220kV voltage can be as high as 1.09PU. Thus the Minimum Access standard requires generation to be able to operate continuously at 120% of NOMINAL. This would impose a heavy financial burden on new generation connecting to such locations

protect the plant from damage; (2) the generating plant that would be tripped, as a result of any voltage excursion within levels specified by the automatic access standard is not more than 100 MW or a greater limit based on what NEMMCO and the Network Service Provider both consider to be reasonable in the circumstances; and (3) there would be no material adverse impact on the quality of supply to other Network Users or on inter-regional or intra-regional power transfer capability. (d) In carrying out assessments of proposed negotiated access standards under this clause S5.2.5.4, NEMMCO and the Network Service Provider must take into account, without limitation: (1) the expected performance of existing networks and network developments that are considered projects; (2) the expected performance of existing generating plant and generation projects that are considered projects, and (3) any corresponding performance standard (or where no performance standard has been registered, the access standard) that allows generating plant to trip for voltage excursions in ranges specified under the automatic access standards. (e) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.4. General access standard (f) The access standard must include any operational arrangements necessary to ensure the generating system including all operating generating units will meet its agreed performance levels under abnormal network or generating system conditions.		General Access - does not allow for operation of units even if small amount (MW) without the statcon in service if ride through is dependent on the Statcon.
S5.2.5.5 Generating system response to disturbances following contingency events (a) In this clause S5.2.5.5: (1) a fault includes without limitation: (i) a short circuit fault of the relevant type; and (ii) a fault of the relevant type resulting from reclosure onto a fault by the operation of automatic reclose equipment; and		Disagree The requirement to ride through Transmission Faults is less onerous than Distribution Faults but distribution faults have less impact on overall system security than transmission faults.

(2) fault type 'means one or more of the following: (i) a three-phase fault; (ii) a two phase to ground fault; (iii) a phase to phase fault; and (iv) a phase to ground fault. Automatic access standard (b) The automatic access standard is: (1) each generating system including all operating generating units must remain in continuous uninterrupted operation for a disturbance caused by event that is: (i) a credible contingency event; (ii) a three phase fault in a transmission system cleared by all relevant primary protection systems; (iii) a two phase to ground, phase to phase or phase to ground fault in a transmission system cleared in: (A) the longest time expected to be taken for a relevant breaker fail protection system to clear the fault; or (B) if a protection system referred to subparagraph (A) is not installed, the greater of the time specified in column 4 of Table S5.1a.2 (or if none is specified, 430 milliseconds) and the longest time expected to be taken for all relevant primary protection systems to clear the fault; and (iv) a three phase, two phase to ground, phase to phase or phase to ground fault in a distribution network cleared in: (A) the longest time expected to be taken for the breaker fail protection system to clear the fault; or (B) if a protection system referred to in subparagraph (A) is not installed, the greater of 430 milliseconds and the longest time expected to be taken for all relevant primary protection systems to clear the fault, provided that the event is not one that would disconnect the generating unit from the power system by removing network elements from service; and (2) subject to any changed power system conditions or energy source availability beyond the Generator's reasonable control, each generating system including all operating generating units, in respect of the fault types described in subparagraphs (1)(ii) to (iv), must deliver to the network: (i) to assist the maintenance of power system voltages during the application of the fault, capacitive reactive current of at least the greater of its pre-disturbance reactive current and 4% of the maximum continuous current of the generating system including	Suggested Re-wording Automatic access standard (b) The automatic access standard is: (1) each generating system including all operating generating units must remain in continuous uninterrupted operation for a disturbance caused by event that is: (i) a credible contingency event; (ii) a three phase fault in a transmission <u>or distribution</u> system cleared by all relevant primary protection systems; (iii) a two phase to ground, phase to phase or phase to ground fault in a transmission <u>or distribution</u> system cleared in: (A) the longest time expected to be taken for a relevant breaker fail protection system to clear the fault; or (B) if a protection system referred to subparagraph (A) is not installed, the greater of the time specified in column 4 of Table S5.1a.2 (or if none is specified, 430 milliseconds) and the longest time expected to be taken for all relevant primary protection systems to clear the fault; and ~~(iv) a three phase, two phase to ground, phase to phase or phase to ground fault in a distribution network cleared in:~~ ~~(A) the longest time expected to be taken for the breaker fail protection system to clear the fault; or~~ ~~(B) if a protection system referred to in subparagraph (A) is not installed, the greater of 430 milliseconds and the longest time~~	If power system security is the issue then the Distribution Faults should be no more onerous than Transmission Faults. Thus S5.2.5.5 (b) (1) (iv) should refer to 3-phase faults cleared by all relevant primary protection systems and two-phase-ground faults cleared by Breaker Fail protection system.

all operating generating units (in the absence of a disturbance) for each 1% reduction (from its pre-fault level) of connection point voltage during the fault; and (ii) after disconnection of the faulted element, reactive power sufficient to ensure that the connection point voltage is within the range for continuous uninterrupted operation under clause S5.2.5.4 (iii) from 100 milliseconds after disconnection of the faulted element, active power of at least 95% of the level existing just prior to the fault. Minimum access standard (c) The minimum access standard is: (1) each generating system including all operating generating units must remain in continuous uninterrupted operation for the disturbance caused by an event that is (i) a credible contingency event; (ii) a single phase to ground, phase to phase or two phase to ground fault in a transmission system cleared in the longest time expected to be taken for all relevant primary protection systems to clear the fault unless NEMMCO and the Network Service Provider agree that: (A) the total reduction of generation in the power system due to that fault would not exceed 100 MW; (B) there is unlikely to be an adverse impact on quality of supply to other Network Users; and (C) there is unlikely to be a material adverse impact on inter-regional or intra-regional power transfer capability, (iii) a single phase to ground, phase to phase or two phase to ground fault in a distribution network, cleared in the longest time expected to be taken for all relevant primary protection systems to clear the fault, unless NEMMCO and the Network Service Provider agree that: (A) the total reduction of generation in the power system due to that fault would not exceed 100 MW; (B) there is unlikely to be an adverse impact on quality of supply to other Network Users; and (C) there is unlikely to be a material adverse impact on inter-regional or intra-regional power transfer capability, provided that the event is not one that would disconnect the generating unit from the power system by removing network elements from service; and	~~expected to be taken for all relevant primary protection systems to clear the fault,~~ provided that, in the case of distribution systems, the event is not one that would disconnect the generating unit from the power system by removing network elements from service; and (2) subject to any changed power system conditions or energy source availability beyond the Generator's reasonable control, each generating system including all operating generating units, in respect of the fault types described in subparagraphs (1)(ii) to (iv), must ~~deliver to the network~~: (i) supply or absorb to or from the network, to assist the maintenance of power system voltages during the application of the fault, capacitive reactive current of at least the greater of its pre-disturbance reactive current and 4% of the maximum continuous current of the generating system including all operating generating units (in the absence of a disturbance) for each 1% reduction (from its pre-fault level) of connection point voltage during the fault up to its rated current; and (ii) supply or absorb to or from the network, after disconnection of the faulted element, reactive power sufficient to ensure that the connection point voltage is within the range for continuous uninterrupted operation under clause S5.2.5.4 (iii) deliver to the network, from 100 milliseconds after disconnection of the faulted element, active power of at least 95% of the level existing just prior to the fault.	S5.2.5.5 (b) (2) (i) needs to be completely re-worded. At present it requires the generator to put out 400% of its output in the event of a three-phase fault (Voltage = 0%) at or close to the point of connection (POC). S5.2.5.5 (b) (2) (ii) Comment The text requires reactive power to be "delivered "after disconnection of the faulted element. Consistent with sub-paragraphs (i) and (ii) this implies a transfer of reactive power from the generating system to the transmission or distribution system. Under some system conditions, this could case system over-voltages outside the requirements of S5.1a.4 and consequent damage of the generating system plant, the transmission and generating system plant and customer equipment. In a distribution system voltages in excess of +6% are unacceptable due to the impact on customers. NEMMCO is applying transmission control philosophy to the distribution system - this is inappropriate. NEMMCO must take into account the requirements of the DNSP when considering a negotiated access standard for a distribution network.

(2) subject to any changed power system conditions or energy source availability beyond the Generator's reasonable control after disconnection of the faulted element, each generating system must, in respect of the fault types described in subparagraphs (1)(ii) and (iii), deliver to the network, active power and reactive power sufficient to ensure that the connection point voltage is within the range for continuous uninterrupted operation agreed under clause S5.2.5.4. Negotiated access standard (d) In carrying out assessments of proposed negotiated access standards under this clause S5.2.5.5, the Network Service Provider and NEMMCO must take into account, without limitation: (1) the expected performance of: (i) existing networks and network developments that are considered projects; (ii) existing generating plant and generation projects that are considered projects; and (iii) control systems and protection systems, including auxiliary systems and automatic reclose equipment; and (2) the expected range of power system operating conditions. (e) A proposed negotiated access standard may be accepted if the connection of the plant at the proposed access level would not cause other generating plant or loads to trip as a result of an event, when they would otherwise not have tripped for the same event. (f) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.5. General access standard (g) The access standard must include any operational arrangements to ensure the generating system including all operating generating units will meet its agreed performance levels under abnormal network or generating system conditions.	Re-word Minimum Access Standard (c) (2) subject to any changed power system conditions or energy source availability beyond the Generator's reasonable control after disconnection of the faulted element, each generating system must, in respect of the fault types described in subparagraphs (1)(ii) and (iii), deliver to the network~~,~~ active power and supply or absorb reactive power sufficient to ensure that the connection point voltage is within the range for continuous uninterrupted operation agreed under clause S5.2.5.4.	The advice received on clause (i) questioned whether this is technically possible for any machine as it describes a requirement for unlimited delivery of current up to 400% of rated current. Minimum access standard should be clear that reactive power may be required as either supply or absorb.
S5.2.5.6 Quality of electricity generated and continuous uninterrupted operation Each generating plant must be capable of continuous uninterrupted operation at distortion levels up to the maximum voltage fluctuation, harmonic voltage distortion and voltage unbalance conditions outlined in S5.1a5, S5.1a6 and S5.1a7 of	No change	Accept

the system standards.		
S5.2.5.7 Partial load rejection (a) For the purposes of this clause S5.2.5.7 'minimum load' means the generating unit output level measured in sent out megawatts (MW). Automatic access standard (b) The automatic access standard is each generating unit must be capable of continuous uninterrupted operation during and following a loading level reduction directly imposed from the power system in less than 10 seconds from a fully or partially loaded condition provided that the loading level reduction is less than 30 percent of the generating unit's nameplate rating and the loading level remains above minimum load. Minimum access standard (c) The minimum access standard is each generating unit must be capable of continuous uninterrupted operation during and following a loading level reduction directly imposed from the power system in less than 10 seconds from a fully or partially loaded condition provided that the load reduction is less than 5 percent of the generating unit's nameplate rating and the loading level remains above minimum load. Negotiated access standard (d) If, in accordance with clause 5.3.4A of the Rules, the Generator and the Network Service Provider determine a negotiated access standard is to apply, the Network Service Provider must consult NEMMCO to ensure that the negotiated access standard does not materially adversely affect system security. General access standard (e) The actual partial load rejection performance must be recorded in the connection agreement.	Delete this clause	It was intended that this standard be replaced by the rate of change of frequency requirement. This technical standard cannot be measured or recorded as the conditions necessary to activate this on a generating unit cannot be created at the terminals of the generating unit. This clause is only meaningful when dealing with units that have a controlled energy source into a prime mover, such as steam technology. The TSRG agreed to remove it and replace it with frequency rate of change as that was more controllable - easy to measure and understand and could be provided for different rates of change. Recommend: Delete this clause. Otherwise this will clash with the Rate of change of frequency requirements.
S5.2.5.8 Protection of generating units from power system disturbances	S5.2.5.8 Protection of generating ~~units~~ systems from power system	Agreed subject to understanding the references

Minimum access standard (a) The minimum access standard is: (1) subject to subparagraphs (2) and (3), for each generating system that is required by a Generator or Network Service Provider to be automatically disconnected from the power system in response to abnormal conditions arising from the power system, the relevant protection system or control system must not disconnect the generating system for: (i) conditions for which it must remain in continuous uninterrupted operation; or (ii) conditions it must withstand under the Rules; and (2) each generating system with a nameplate rating of 30MW or more, or generating system comprised of generating units with combined nameplate rating of 30 MW or more, connected to a transmission system must have facilities to automatically and rapidly reduce its generation: (i) by at least half if the frequency at the connection point exceeds a level nominated by NEMMCO (not less that the upper limit of the operational frequency tolerance band) and the duration above this frequency exceeds a value nominated by NEMMCO where the reduction may be achieved: (A) by reducing the output of the generating unit within three seconds, and holding the output at the reduced level until the frequency returns to within the normal operating frequency band; or (B) by disconnecting the generating unit from the power system within one second; or (ii) in proportion to the difference between the frequency at the connection point and a level nominated by NEMMCO (not less than the upper limit of the operational frequency tolerance band), such that the generation is reduced by at least half, within three seconds of the frequency reaching the upper limit of the extreme frequency excursion tolerance limits. Negotiated access standard (b) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.8. General access standard (c) NEMMCO or the Network Service Provider may require that an access standard include a requirement for the generating system	disturbances There is no subparagraph (3). Also the draft determination refers to subparagraph (4) as which also doesn t exist	

to automatically disconnect whenever the part of the network to which it is connected has been disconnected from the national grid, forming an island that supplies a Customer. (d) The access standard must include specification of conditions for which the generating unit or generating system must trip and must not trip. (e) Notwithstanding clauses S5.2.5.3, S5.2.5.4, S5.2.5.5 and S5.2.5.6, a generating system may be automatically disconnected from the power system under any of the following conditions: (1) in accordance with an ancillary services agreement between the Generator and NEMMCO; (2) where a load that is not part of the generating system has the same connection point as the generating system and NEMMCO and the Network Service Provider agree that the disconnection would in effect be under-frequency load shedding; (3) where the generating system is automatically disconnected under paragraph (b) or S5.2.5.9; (4) where the generating system is automatically disconnected under clause S5.2.5.10 due to a failure of the generating plant; or (5) in accordance with an agreement between the Generator and a Network Service Provider (including an agreement in relation to an emergency control scheme under clause S5.1.8) to provide a service that NEMMCO agrees is necessary to maintain or restore power system security in the event of a specified contingency event. (f) The Network Service Provider is not liable for any loss or damage incurred by the Generator or any other person as a consequence of a fault on either the power system, or within the Generator's facility.		
S5.2.5.9 Protection systems that impact on power system security Automatic access standard (a) The automatic access standard is: (1) subject to clauses S5.1.9(k) and S5.1.9(l), primary protection systems must be provided to disconnect from the power system any faulted element in the generating system and in protection zones that include the connection point within the applicable fault clearance time determined under clause S5.1.9(a)(1); (2) each primary protection system must have sufficient	No change	Accept

redundancy to ensure that a faulted element within its protection zone is disconnected from the power system within the applicable fault clearance time with any single protection element (including any communications facility upon which that protection system depends) out of service; and (3) breaker fail protection systems must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary protection system within the applicable fault clearance time determined under clause S5.1.9(a)(1). (b) In relation to an automatic access standard under this clause S5.2.5.9, the Generator must provide redundancy in the primary protection systems under paragraph (a)(2) and provide breaker fail protection systems under paragraph (a)(3) if NEMMCO or the Network Service Provider consider that a lack of these facilities could result in: (1) a material adverse impact on power system security or quality of supply to other Network Users; or (2) a reduction in inter-regional or intra-regional power transfer capability, through any mechanism including: (1) consequential tripping of, or damage to, other network equipment or facilities of other Network Users, that would have a power system security impact; or (2) instability that would not be detected by other protection systems in the network. Minimum access standard (c) The minimum access standard is: (1) subject to clauses S5.1.9(k) and S5.1.9(l), protection systems must be provided to disconnect from the power system any faulted element within the generating system and in protection zones that include the connection point within the applicable fault clearance time determined under clause S5.1.9(a)(2); and (2) if a fault clearance time determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a breaker fail protection system must be provided to clear from the power system any fault within that protection zone that is not cleared by the circuit breakers controlled by the primary protection system within the applicable fault clearance time determined under clause S5.1.9(a)(3). Negotiated access standard (d) NEMMCO must advise on matters relating to negotiated		

access standards under this clause S5.2.5.9. General access standard (e) The Network Service Provider and the Generator must cooperate in the design and implementation of protection systems to comply with this clause S5.2.5.9, including cooperation on: (1) the use of current transformer and voltage transformer secondary circuits (or equivalent) of one party by the protection system of the other; (2) tripping of one party's circuit breakers by a protection system of the other party; and (3) co-ordination of protection system settings to ensure inter-operation. (f) The protection system design referred to in paragraph (c) must: (1) be coordinated with other protection systems already existing in the power system or to be provided as part of a considered project; (2) avoid consequential disconnection of other Network Users ' facilities; and (3) take into account existing obligations of the Network Service Provider under connection agreements with other Network Users.		
S5.2.5.10 Protection to trip plant for unstable operation Automatic access standard (a) The automatic access standard is: (1) each synchronous generating unit must have a protection system to disconnect it promptly when a condition that would lead to pole slipping is detected in order to prevent pole slipping or other conditions where the generating unit causes active power, reactive power or voltage at the connection point to become unstable as assessed in accordance with the power system stability guidelines established under clause 4.3.4(h); and (2) each generating unit that is not a synchronous generating unit must have a protection system to disconnect it promptly for conditions where the active power, reactive power or voltage at the connection point become unstable as assessed in accordance with the power system stability guidelines established under clause 4.3.4(h). Minimum access standard (b) The minimum access standard is each generating unit must	No change	Accept

not cause a voltage disturbance at the connection point due to sustained unstable behaviour of more than the maximum level specified in Table 7 of Australian Standard AS/NZS 61000.3.7:2001. Negotiated access standard (c) If the Network Service Provider and the Generator agree, a protection system may also trip any other part of the generating system in order to cease the instability. (d) Notwithstanding paragraph (c), a protection system must be provided in the access standard to trip the affected generating unit where: (1) the Network Service Provider considers it necessary to prevent consequential tripping of, or damage to, other generating units, network equipment or other Network Users 'facilities, or (2) NEMMCO considers it necessary to prevent unstable operation having an adverse impact on power system security. (e) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.10		
S5.2.5.11 Frequency control (a) For the purpose of this clause S5.2.5.11: 'maximum operating level means in relation to: (1) a non-scheduled generating unit, the maximum sent out generation consistent with its nameplate rating; (2) a scheduled generating unit, the maximum sent out generation (but not emergency generation) consistent with its registered bid and offer data; (3) a non-scheduled generating system, the combined maximum sent out generation consistent with the nameplate ratings of its in-service generating units; and (4) a scheduled generating system, the maximum combined sent out generation (but not emergency generation) of its in-service generating units, consistent with its registered bid and offer data. 'minimum operating level 'means in relation to: (1) a non-scheduled generating unit, its minimum sent out generation for continuous stable operation; (2) a scheduled generating unit, its minimum sent out generation for continuous stable operation consistent with its registered bid and offer data; (3) a non-scheduled generating system, the combined minimum		

operating level of its in-service generating units; and (4) a scheduled generating system, the minimum combined sent out generation of its in-service generating units, consistent with its registered bid and offer data. ‘system frequency ’means the frequency of the transmission system or distribution system to which the generating unit or generating system is connected; ‘pre-disturbance level ’means in relation to a generating unit and a frequency disturbance, the generating unit's level of output just before the system frequency first exceeds the upper or lower limit of the normal operating frequency band during the frequency disturbance. Automatic access standard (b) The automatic access standard is: (1) each generating system’s active power transfer to the power system must not: (i) increase in response to a rise in system frequency; or (ii) decrease in response to a fall in system frequency; (2) each generating system must be capable of automatically reducing its active power transfer to the power system: (i) whenever the system frequency exceeds the upper limit of the normal operating frequency band; (ii) by an amount that equals or exceeds the least of: (A) 20% of its maximum operating level times the frequency difference between system frequency and the upper limit of the normal operating frequency band; (B) 10% of its maximum operating level; and (C) subject to the system frequency recovering gradually, the difference between the generating unit's pre-disturbance level and minimum operating level, but zero if the difference is negative; and (iii) sufficiently rapidly for the Generator to be in a position to offer measurable amounts of lower services to the spot market for market ancillary services; and (3) each generating system must be capable of automatically increasing its active power transfer to the power system: (i) whenever the system frequency falls below the lower limit of the normal operating frequency band; (ii) by the amount that is equal or exceeds the least of:		The wording for S5.2.5.11 (b) (1) i & ii would exclude all Hydro units as they have an inherent issue with transient response caused by the “water-column ”effect. The wording should be changed to distinguish between the inherent short-term transient change and the longer-term governor-controlled frequency response S5.2.5.11 (b) (3) Comment This clause is contrary to the intent to make the NER technology independent. Renewable resources and in particular wind

(A) 20% of its maximum operating level times the percentage frequency difference between the lower limit of the normal operating frequency band and system frequency; (B) 5% of its maximum operating level; and (C) subject to the frequency recovering gradually, one third of the difference between the generating unit's maximum operating level and pre-disturbance level, but zero if the difference is negative; and (iii) sufficiently rapidly for the Generator to be in a position to offer measurable amounts of raise services to the spot market for market ancillary services. Minimum access standard (c) The minimum access standard is for each generating system, active power transfer to the power system must not: (1) increase in response to a rise in system frequency; and (2) decrease more than 2% per Hz in response to a fall in system frequency. Negotiated access standard (d) A Generator proposing a negotiated access standard in respect of paragraph (c)(2) must demonstrate to NEMMCO that the proposed increase and decrease in active power transfer to the power system are as close as practicable to the automatic access standard for that plant. (e) The negotiated access standard must record the agreed values for maximum operating level and minimum operating level, and where relevant the method of determining the values and the values for a generating system must take into account its in-service generating units. (f) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.11. General access standard requirements (g) Each control system used to satisfy this clause S5.2.5.11 must be adequately damped. (h) The amount of a relevant market ancillary service for which the plant may be registered must not exceed the amount that would be consistent with the performance standard registered in respect of this requirement.	Clause S5.2.5.11(c)~~The minimum access standard is for each generating system, active power transfer to the power system must not:~~ For each generating system under relatively stable input energy, active power transfer to the power system must not:	generation could only satisfy this condition if they were operated below the potential level for a particular wind speed. This would be an uneconomic use of plant and would unnecessarily distort operation and raise the costs for supply of electricity. This requirement is impossible for generation dependent on natural events ie sunlight or wind. –This automatic standard cannot be achieved by wind farms. As Table 4.1.2 of the Draft Determination listed this amendment. It appears to have been accidentally omitted from the draft rules. Support change with this phrase added to clause (c).
S5.2.5.12 Impact on network capability Automatic access standard	Suggest:	S5.2.5.12 Comment

(a) The automatic access standard is each generating system must have plant capabilities and control systems, sufficient not to reduce any inter-regional or intra-regional power transfer capability below the level that would apply if the generating system were disconnected. Minimum access standard (b) The minimum access standard is the generating system must have plant capabilities and control systems and operational arrangements sufficient to ensure there is no reduction in: (1) the ability to supply Customer load as a result of a reduction in power transfer capability; (2) power transfer capabilities into a region by more than the combined sent out generation of its generating units ; and (3) power transfer capabilities into another region by more than the lesser of 15 per cent of the combined nameplate rating of its generating units and 30 MW, unless NEMMCO considers that the connection of that generating system is likely to result in a net improvement in supply reliability across all regions, Negotiated access standard (c) In carrying out assessments of proposed negotiated access standards under this clause S5.2.5.11, the Network Service Provider and NEMMCO must take into account, without limitation: (1) the expected performance of: (i) existing networks and network developments that are considered projects; (ii) existing generating plant and generation projects that are considered projects; (iii) control systems and protection systems, including automatic reclose equipment; and (2) the expected range of power system operating conditions. (d) The negotiated access standard must include operational arrangements, including curtailment of generation if necessary, to the satisfaction of NEMMCO, to ensure that the generating plant is operated in a way that meets at least the minimum access standard under abnormal network and generating system conditions, so that power system security can be maintained. (e) A negotiated access standard under this clause S5.2.5.11 must detail the plant capabilities, control systems and operational arrangements that will be maintained by the Generator, notwithstanding that change to the power system, but not changes to the generating system, may reduce the efficacy of the	(a) The automatic access standard is each generating system must have plant capabilities and control systems, sufficient such that when connected, it does not to reduce any inter-regional or intra-regional power transfer capability to significantly below the level that would apply if the generating system were not ~~dis~~connected.	In general all generation can cause a small negative offset to the transfer capability. The increase in local generation in the region is generally larger than that offset and hence reliability is not reduced within the region. However these words provide no reasonability test on the reduction. The IRPC have recently agreed levels that should be taken as being significant. These words need to reflect that decision. One comment we received interpreted this clause as: To meet the load supply requirements of the NER , disconnected generation must be replaced with an alternative source and cannot be disconnected without replacement as implied by the text. It should be that a generator, when connected cannot reduce the transfer capabilities (inter and intra) by a significant amount over the amount that exists without the generating system connected. –The intention being to retain the regional reliability.

plant capabilities, control systems and operational arrangements over time. (f) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.11. General access standard (g) If a Network Service Provider considers that power transfer capabilities of its network would be increased through provision of additional control system facilities to a generating system (such as a power system stabiliser), the Network Service Provider and the Generator may negotiate for the provision of such additional control system facilities as a commercial arrangement.		
S5.2.5.13 Control systems and stability (a) For the purpose of this clause S5.2.5.12: 'settling time' means in relation to a step response test or simulation of a control system, the time measured from initiation of a step change in an input quantity to the time when the magnitude of error between the output quantity and its final settling value remains less than 10% of: (1) if the sustained change in the quantity is less than half of the maximum change in that output quantity, the maximum change induced in that output quantity; and (2) otherwise, the sustained change induced in that output quantity. 'rise time' means in relation to a step response test or simulation of a control system, the time taken for an output quantity to rise from 10% to 90% of the maximum change induced in that quantity by a step change of an input quantity. Automatic access standard (b) The automatic access standard is: (1) each generating system must have plant capabilities and control systems sufficient to ensure that: (i) power system oscillations, for the frequencies of oscillation of the generating unit against any other generating unit, are adequately damped; (ii) operation of the generating system does not degrade the damping of any critical mode of oscillation of the power system; and	Clause S5.2.5.13(a)(1) if the sustained change in the quantity is less than half of the maximum change in that output quantity, the maximum change induced in that output quantity; ~~and~~ or (2) otherwise, the sustained change induced in that output quantity.	

(iii) operation of the generating system does not cause instability (including hunting of tap-changing transformer control systems) that would adversely impact other Registered Participants. (2) each control system must have: (i) for the purposes of disturbance monitoring and testing, permanently installed and operational, monitoring and recording facilities for key variables including each input and output; and (ii) facilities for testing the control system sufficient to establish its dynamic operational characteristics. (3) each synchronous generating system must have an excitation control system that: (i) regulates voltage at the connection point or another agreed location in the power system (including within the generating system) to within 0.5% of the setpoint; (ii) is able to operate the stator continuously at 105% of nominal voltage with rated active power output; (iii) regulates voltage in a manner that helps to support network voltages during faults and does not prevent the Network Service Provider from achieving the requirements of clause S5.1a.3 and S5.1a.4; (iv) allows the voltage setpoint to be continuously controllable in the range of at least 95% to 105% of normal voltage at the connection point or the agreed location, without reliance on a tap-changing transformer; (v) has limiting devices to ensure that a voltage disturbance does not cause the generating unit to trip at the limits of its operating capability; (vi) has an excitation ceiling voltage of at least 2 times the excitation required to achieve generation at nameplate rating for rated power factor, rated speed and nominal voltage; (vii) has settling times for a step change of voltage setpoint or voltage at the location agreed under subparagraph (i) of: (A) generated voltage less than 2.5 seconds for a 5% voltage disturbance with the generating unit not synchronised; (B) active power, reactive power and voltage less than 5.0 seconds for a 5% voltage disturbance with the generating unit synchronised, from an operating point where the voltage disturbance would not cause any limiting device to operate; and (C) in respect of each limiting device, active power, reactive power and voltage less than 7.5 seconds for a 5% voltage disturbance with the generating unit synchronised, when operating into a limiting device from an operating point where a voltage disturbance of 2.5% would just cause the limiting device	Clause S5.2.5.13(b)(3)(iv) allows the voltage setpoint to be continuously controllable in the range of at least 95% to 105% of ~~normal~~ nominal voltage at the connection point or the agreed location, without reliance on a tap-changing transformer;	(i) ėach input 'may not be achievable in modern digital controllers.

to operate; (viii) is able to increase field voltage from rated field voltage to the excitation ceiling voltage in less than 0.5 second; (ix) has a power system stabiliser with sufficient flexibility to enable damping performance to be maximised, with characteristics as described in paragraph (c); and (x) has reactive current compensation settable for boost or droop; and (4) each generating system, other than one comprised of synchronous generating units, must have a voltage control system that: (i) regulates voltage at the connection point or an agreed location in the power system (including within the generating system) to within 0.5% of its setpoint; (ii) regulates voltage in a manner that helps to support network voltages during faults and does not prevent the Network Service Provider from achieving the requirements of clauses S5.1a.3 and S5.1a.4; (iii) allows the voltage setpoint to be continuously controllable in the range of at least 95% to 105% of normal voltage at the connection point or agreed location in the power system, without reliance on a tap changing transformer; (iv) has limiting devices to ensure that a voltage disturbance does not cause the generating unit to trip at the limits of its operating capability; (v) with the generating system connected to the power system, has settling times for active power, reactive power and voltage due to a step change of voltage setpoint or voltage at the location agreed under clause subparagraph (i), of less than: (A) 5.0 seconds for a 5% voltage disturbance with the generating system connected to the power system, from an operating point where the voltage disturbance would not cause any limiting device to operate; and (B) 7.5 seconds for a 5% voltage disturbance with the generating system connected to the power system, when operating into any limiting device from an operating point where a voltage disturbance of 2.5% would just cause the limiting device to operate; (vi) has reactive power rise time, for a 5% step change in the voltage set point, of less than 2 seconds; (vii) has a power system stabiliser with sufficient flexibility to enable damping performance to be maximised, with characteristics as described in paragraph (c); and (viii) has reactive current compensation.	Clause S5.2.5.13(b)(4)(iii) allows the voltage setpoint to be continuously controllable in the range of at least 95% to 105% of ~~normal~~ nominal voltage at the connection point or the agreed location, without reliance on a tap-changing transformer;	

(c) A power system stabiliser provided under paragraph (b) must have: (1) for a synchronous generating unit, measurements of rotor speed and active power output of the generating unit as inputs, and otherwise measurements of power system frequency and active power output of the generating unit as inputs; (2) two washout filters for each input, with ability to bypass one of them if necessary; (3) sufficient (and not less than two) lead-lag transfer function blocks (or equivalent number of complex poles and zeros) with adjustable gain and time-constants, to compensate fully for the phase lags due to the generating plant; (4) an output limiter, which for a synchronous generating unit is continually adjustable over the range of –10% to +10% of stator voltage; (5) monitoring and recording facilities for key variables including inputs, output and the inputs to the lead-lag transfer function blocks; and (6) facilities to permit testing of the power system stabiliser in isolation from the power system by injection of test signals, sufficient to establish the transfer function of the power system stabiliser. Minimum access standard (d) The minimum access standard is: (1) each generating system must have plant capabilities and control systems, including if appropriate, a power system stabiliser, sufficient to ensure that: (i) power system oscillations, for the frequencies of oscillation of the generating unit against any other generating unit, are adequately damped; (ii) operation of the generating unit does not degrade: (A) any mode of oscillation that is within 0.3 nepers per second of being unstable, by more than 0.01 nepers per second; and (B) any other mode of oscillation to within 0.29 nepers per second of being unstable; and (iii) operation of the generating unit does not cause instability (including hunting of tap-changing transformer control systems) that would adversely impact other Registered Participants; (2) each generating system comprised of generating units with combined nameplate rating of 30 MW or more must have facilities for testing its control systems sufficient to establish their dynamic		

operational characteristics. (3) each generating unit or generating system must have facilities: (i) where the connection point nominal voltage is 100 kV or more, to regulate voltage in a manner that does not prevent the Network Service Provider from achieving the requirements of clauses S5.1a.3 and S5.1a.4; (ii) where the connection point nominal voltage is less than 100 kV, to regulate voltage or reactive power or power factor in a manner that does not prevent the Network Service Provider from achieving the requirements of clauses S5.1a.3 and S5.1a.4, and sufficient to achieve the performance agreed in respect of clauses S5.2.5.1, S5.2.5.2, S5.2.5.3, S5.2.5.4, S5.2.5.5, S5.2.5.6 and S5.2.5.12;	DELETE Clause 5.2.5.13(d)(3)(ii)	DNSPs do no want generators to regulate voltage, this should not be part of the minimum standards
(4) each synchronous generating unit, that is part of a generating system comprised of generating units with a combined nameplate rating of 30 MW or more, must have an excitation control system that: (i) regulates voltage at the connection point or an agreed location in the power system (including within the generating system), to within 0.5% of its setpoint or, where the connection point nominal voltage is less than 100 kV, regulates voltage, power factor or reactive power as agreed with the Network Service Provider and NEMMCO; (ii) has excitation ceiling voltage of at least 1.5 times the excitation required to achieve generation at the nameplate rating for rated power factor, rated speed and nominal voltage ; (iii) subject to coordination under paragraph (i), has a settling time of less than 5.0 seconds for a 5% voltage disturbance with the generating unit synchronised, from an operating point where such a voltage disturbance would not cause any limiting device to operate; and (iv) has over and under excitation limiting devices sufficient to ensure that a voltage disturbance does not cause the generating unit to trip at the limits of its operating capability; and	Proposed text (i) regulates voltage, power factor or reactive power at the connection point or at an agreed location in the power system (including within the generating system) ~~within 0.5% of its setpoint or, where the connection point nominal voltage is less than 100kV, regulates voltage, power factor or reactive power~~ as agreed with the Network Service Provider and NEMMCO.	S5.2.5.13 (4) (i) Comment The choice of 100kV is arbitrary and does not reflect the range of system conditions that can occur for systems, particularly in rural areas. The criterion should be required performance of the NSP, not an arbitrary voltage level.
(5) each generating system comprised of generating units with combined nameplate rating of 30 MW or more and which are not synchronous generating units, must have a control system that: (i) regulates voltage at the connection point or an agreed location in the power system (including within the generating system) to within 0.5% of its setpoint or, where the connection point nominal voltage is less than 100 kV, regulates voltage, power	Proposed text (i) regulates voltage, power factor or reactive power at the connection point or at an agreed location in the power	S5.2.5.13 (5) (i) Comment The choice of 100kV is arbitrary and does

factor or reactive power as agreed with the Network Service Provider and NEMMCO; (ii) subject to coordination under subparagraph (i), has a settling time less than 7.5 seconds for a 5% voltage disturbance with the generating unit electrically connected to the power system from an operating point where such a voltage disturbance would not cause any limiting device to operate; and (iii) has limiting devices to ensure that a voltage disturbance would not cause the generating unit to trip at the limits of its operating capability.	system (including within the generating system) ~~within 0.5% of its setpoint or, where the connection point nominal voltage is less than 100kV, regulates voltage, power factor or reactive power~~ as agreed with the Network Service Provider and NEMMCO.	not reflect the range of system conditions that can occur for systems, particularly in rural areas. The criterion should be required performance of the NSP, not an arbitrary voltage level.
Negotiated access standard (e) If a generating system cannot meet the automatic access standard, the Generator must demonstrate why that standard could not be reasonably achieved and proposed a negotiated access standard. (f) The negotiated access standard proposed by the Generator under paragraph (e) must be the highest level that the generating system can reasonably achieve, including by installation of additional dynamic reactive power equipment, and through optimising its control systems. (g) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.13.	Delete subparagraphs (e) and (f)	The process of establishing a negotiated access standard should be free and all parties should act in good faith to achieve the best overall result for the long term benefit of consumers. Subparagraphs (e) and (f) act against this principle and are contrary to the whole concept of 'negotiated standards ".
General access standard (h) A limiting device provided under paragraphs (b) and (c) must: (1) not detract from the performance of any power system stabiliser; and (2) be coordinated with all protection systems. (i) The Network Service Provider may require that the design and operation of the control systems of a generating unit or generating system be coordinated with the existing voltage control systems of the Network Service Provider and of other Network Users, in order to avoid or manage interactions that would adversely impact on the Network Service Provider and other Network Users. (j) Any requirements imposed by the Network Service Provider under paragraph (i), must be recorded in the access standard. (k) The assessment of impact of the generating units on power system stability and damping of power system oscillations shall be in accordance with the power system stability guidelines established under clause 4.3.4(h).		

S5.2.5.14 Active power control (a) The automatic access standard is a generating system comprised of generating units with a combined nameplate rating of 30 MW or more, must have an active power control system capable of: (1) for each scheduled generating unit or, if subject to aggregation approved by NEMMCO under rule 3.8.3, the scheduled generating system: (i) maintaining and changing its active power output in accordance with its dispatch instructions; and (ii) ramping its active power output linearly from one dispatch level to another, and (2) subject to the energy source availability, for each nonscheduled generating unit or non-scheduled generating system: (i) automatically reducing or increasing its active power output within five minutes, at a constant rate, to below the level specified in an instruction electronically issued by a control centre, subject to subparagraph(iii), (ii) automatically limiting its active power output, to below the level specified in subparagraph (i); and (iii) not changing its active power output within five minutes by more than the raise and lower amounts specified in an instruction electronically issued by a control centre. Minimum access standard (b) The minimum access standard is a generating system comprised of generating units with combined nameplate rating of 30 MW or more, must have an active power control system capable of: (1) for each scheduled generating unit or, if subject to aggregation approved by NEMMCO under clause 3.8.3, the scheduled generating system, maintaining and changing its active power output in accordance with its dispatch instructions; (2) for each non-scheduled generating system: (i) reducing its active power output, within five minutes, to or below the level required to manage network flows that is specified in a verbal instruction issued by the control centre; (ii) limiting its active power output to or below the level specified in subparagraph (i); (iii) subject to energy source availability, ensuring that the change of active power output in a five minute period does not	Clause S5.2.5.14(a)(2) (i) automatically reducing or increasing its active power output within five minutes, at a constant rate, to or below the level specified in an instruction electronically issued by a control centre, subject to subparagraph(iii), (ii) automatically limiting its active power output, to or below the level specified in subparagraph (i); and	

exceed a value specified in a verbal instruction issued by the control centre; and (iv) being upgraded to receive electronic instructions from the control centre and respond within five minutes. Negotiated access standard (c) A negotiated access standard may provide that if the number or frequency of verbal instructions becomes difficult for a control centre to manage, NEMMCO may require the Generator to upgrade its facilities to receive electronic instructions and act within five minutes of those instructions. (d) The negotiated access standard must document to NEMMCO's satisfaction any operational arrangements necessary to manage network flows that may include a requirement for the generating system to be operated in a manner that prevents its output changing within five minutes by more than an amount specified by a control centre. (e) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.14. General access standard requirements (f) Each control system used to satisfy the requirements of paragraphs (a) and (b) must be adequately damped.		
[33] S5.2.6 Monitoring and Control Requirements Omit clause S5.2.6 and substitute: S5.2.6.1 Remote Monitoring Automatic access standard (a) The automatic access standard is each: (1) scheduled generating unit; (2) non-scheduled generating unit with a nameplate rating of 30 MW or more; or (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more, must have remote monitoring equipment to transmit to NEMMCO's control centres in real time in accordance with rule 4.11, the quantities that NEMMCO reasonably requires to discharge its market and power system security functions set out in Chapters 3 and 4. (b) The quantities referred to under paragraph (a) that NEMMCO may request include: (1) in respect of each scheduled generating unit or non-scheduled	S5.2.6.1 (a) (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more, must have remote monitoring equipment to transmit to NEMMCO's control centres in ~~real time~~ data sampled at the SCADA scan time as specified by NEMMCO in accordance with rule 4.11, the quantities that NEMMCO reasonably requires to discharge its market and	S5.2.6.1 (a) (3) refers to REAL TIME transmission of data. This is incorrect as NEMMCO has very little real time data (if any). The wording should be changed to something like "transmit to NEMMCO's control centres data sampled at the SCADA scan time as specified by NEMMCO "

generating unit with a nameplate rating of 30 MW or more: (i) current, voltage, active power and reactive power in respect of generating unit stators or power conversion systems (as applicable); (ii) the status of all switching devices that carry the generation, tap-changing transformer tap position; and (iii) aggregate active power if subject to aggregation approved by NEMMCO under rule 3.8.3; (2) in respect of each non-scheduled generating system that includes a generating unit with a nameplate rating of less than 30 MW: (i) its connected status, tap-changing transformer tap position and voltages; (ii) active power and reactive power aggregated for groups of identical generating units; and (iii) either the numbers of identical generating units operating or the operating status of each non-identical generating unit; (3) in respect of each auxiliary supply system with capacity of 30 MW or more associated with a generating unit or generating system, active power and reactive power; (4) in respect of reactive power equipment that is part of a generating system but not part of a particular generating unit, its reactive power, (5) in respect of each wind farm: (i) wind speed; (ii) wind direction; and (iii) ambient temperature; and (6) any other quantity that NEMMCO reasonably requires to discharge its market and power system security functions as set out in Chapters 3 and 4. Minimum access standard (c) The minimum access standard is each: (1) scheduled generating unit or, (2) scheduled generating system, if subject to aggregation approved by NEMMCO under clause 3.8.3; or (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more, must have remote monitoring equipment to transmit to NEMMCO's control centres in real time: (1) the active power output of the generating unit, scheduled generating system or non-scheduled generating system (as applicable);	power system security functions set out in Chapters 3 and 4. "transmit to NEMMCO's control centres data sampled at the SCADA scan time as specified by NEMMCO " S5.2.6.1 (c) (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more, must have remote monitoring equipment to transmit to NEMMCO's control centres in ~~real time~~ data sampled at the SCADA scan time as specified by	

(2) if connected to a transmission system, the reactive power output of the generating unit, scheduled generating system or non-scheduled generating system (as applicable); and (3) if a wind farm: (i) number of units operating; (ii) wind speed; and (iii) wind direction, in accordance with rule 4.11. Negotiated access standard (d) NEMMCO may advise on matters relating to negotiated access standards under this clause S5.2.6.1.	NEMMCO	
S5.2.6.2 Communications Equipment Automatic access standard (a) The automatic access standard is a Generator must: (1) provide and maintain two separate telephone facilities using independent telecommunications service providers, for the purposes of operational communications between the Generator's responsible operator under clause 4.11.3(a) and NEMMCO ś control centre; and (2) provide electricity supplies for remote monitoring equipment and remote control equipment installed in relation to its generating system capable of keeping such equipment available for at least three hours following total loss of supply at the connection point for the relevant generating unit. Minimum access standard (b) The minimum access standard is a Generator must: (1) provide and maintain a telephone facility for the purposes of operational communications between the Generator's responsible operator under clause 4.11.3(a) and NEMMCO ś control centre; and (2) provide electricity supplies for remote monitoring equipment and remote control equipment installed in relation to its generating system capable of keeping such equipment available for at least one hour following total loss of supply at the connection point for the relevant generating unit. Negotiated access standard (c) A negotiated access standard must include, where the Network Service Provider or NEMMCO reasonably requires that a back-up telephone facility be independent of commercial	No change	Accept

telephone service providers, the Network Service Provider must provide and maintain the separate facility on a cost-recovery basis only through the charge for connection. (d) A negotiated access standard must include that a Generator must provide communications paths (with appropriate redundancy) from the remote monitoring equipment or remote control equipment installed for each of its generating systems as appropriate, to a communications interface in a location reasonably acceptable to the Network Service Provider at the relevant generation facility. (e) Communications systems between the communications interface under paragraph (d) and the control centre must be the responsibility of the Network Service Provider unless otherwise agreed by the Generator and the Network Service Provider. (f) A negotiated access standard must include that the Generator provide accommodation and secure power supplies for communications facilities provided by the Network Service Provider under this clause S5.2.6.2. (g) NEMMCO may advise on matters relating to negotiated access standards under this clause S5.2.6.2.		
[34] S5.2.7 – S5.2.9 Omit clauses S5.2.7 - S5.2.9 and substitute: S5.2.7 Power station auxiliary supplies In cases where a generating system takes its auxiliary supplies via a connection point through which its generation is not transferred to the network, the access standards must be established under clause S5.3.5 as if the Generator were a Market Customer.	No change	Accept
S5.2.8 Fault current Automatic access standard (a) The automatic access standard is: (1) the contribution of the generating system to the fault current on the connecting network through its connection point must not exceed the lesser of: (i) three times the combined maximum continuous current of the operating generating units of the generating system; and (ii) the contributing level that will ensure that the total fault current can be safely interrupted by the circuit breakers of the connecting network and safely carried by the connecting network for the duration of the applicable breaker fail protection system	S5.2.8 Fault current Automatic access standard (a) The automatic access standard is~~:~~ ~~(1)~~ the contribution of the generating system to the fault current on the connecting network through its connection point must not exceed ~~the lesser of:~~ ~~(i) three times the combined~~	S5.2.8 Fault Currents Automatic Access Standards (a) (1) (i) The basis for 'three times "is arbitrary and not justified. The only requirement should be as in (ii) ie operate within plant limits

fault clearance times, as specified for the relevant connection point by the Network Service Provider; (2) a generating system's connected plant must be capable of withstanding fault current through the connection point up to the higher of: (i) the level specified in clause S5.2.4(e)(1); and (ii) the highest level of current at the connection point that can be safely interrupted by the circuit breakers of the connecting network and safely carried by the connecting network for the duration of the applicable breaker fail protection system fault clearance times, as specified by the Network Service Provider; and (3) a circuit breaker provided to isolate a generating unit or generating system from the network must be capable of breaking, without damage or restrike, the maximum fault currents that could reasonably be expected to flow through the circuit breaker for any fault in the network or in the generating unit or generating system, as specified in the connection agreement. Minimum access standard (b) The minimum access standard is: (1) the generating system does not need to limit fault current contribution; (2) a generating system's connected plant must be capable of withstanding fault current through the connection point up to the level specified in clause S5.2.4(e)(1); (3) a circuit breaker provided to isolate a generating unit or generating system from the network must be capable of breaking, without damage or restrike, the maximum fault currents that could reasonably be expected to flow through the circuit breaker for any fault in the network or in the generating unit or generating system, as specified in the connection agreement. Negotiated access standard (c) In negotiating a negotiated access standard, the Network Service Provider must consider alternative network configurations in the determination of the applicable fault current level and must prefer those options that maintain an equivalent level of service to other Network Users and which, in the opinion of the Generator, impose the least obligation on the Generator. (d) In carrying out assessments of proposed negotiated access	~~maximum continuous current of the operating generating units of the generating system; and~~ ~~(ii)~~ the contributing level that will ensure that the total fault current can be safely interrupted by the circuit breakers of the connecting network and safely carried by the connecting network for the duration of the applicable breaker fail protection system fault clearance times, as specified for the relevant connection point by the Network Service Provider;	

standards under this clause S5.2.8, the Network Service Provider must take into account, without limitation: (1) the expected performance of existing networks and network developments that are considered projects; (2) the expected performance of existing generating plant and generation projects that are considered projects; and (3) the expected range of power system operating conditions. (e) The Network Service Provider is not liable for any loss or damage incurred by the Generator or any other person as a consequence of a fault on either the power system, or within the Generator's facility.		
[35] S5.3.1 Information In clause S5.3.1(b), omit "5.3.2(d) "and substitute "5.3.2(f) ".	No change	Accept
[36] S5.3.4 Settings of protection and control systems In clause S5.3.4, omit "5.3.4A(b) "wherever occurring and substitute "5.3.4(c) ".	No change	Accept
[37] S5.3a.1 Provision of information In clause S5.3a.1(b), omit "5.3.2(d) "and substitute "5.3.2(f) ".	No change	Accept
[38] S5.3a.2 Application of settings In clause S5.3a.2, omit "5.3.4A(b) "wherever occurring and substitute "5.3.4(c) ".	No change	Accept
[39] S5.3a.4.1 Remote Monitoring In clause 5.3a.4.1(c), omit "5.3.4(b) "and substitute "5.3.4(c) ".	No change	Accept
[40] S5.3a.14 Protection of market network services from power system disturbances In clause S5.3a.14, omit "5.3.4(b) "and substitute "5.3.4(c) ".	No change	Accept
[41] S5.5.2 Technical Details to Support Application for Connection and Connection Agreement In clause S5.5.2, omit the paragraph "Preliminary system planning data "and substitute: This data is required for submission with the application to connect, to allow the Network Service Provider to prepare an offer of terms for a connection agreement and to assess the requirement for, and effect of, network augmentation or extension options. Such data is normally limited to the items	No change	Accept

denoted as Standard Planning Data (S) in the Generating System Model Guidelines Generating System Design Data Sheet, Generating System Setting Data Sheet and in schedules 5.5.3 to 5.5.5.		
[42] S5.5.4 – S5.5.7 Technical Details to Support Application for Connection and Connection Agreement Omit S5.5.4 – S5.5.6 and substitute: S5.5.4 Schedules 5.5.3 to 5.5.5 cover the following data areas: (a) schedule 5.5.3 - Network Plant Technical Data. This comprises fixed electrical parameters. (b) schedule 5.5.4 - Plant and Apparatus Setting Data. This comprises settings which can be varied by agreement or by direction of the Network Service Provider or NEMMCO. (c) schedule 5.5.5 - Load Characteristics. This comprises the estimated design parameters of loads. The documents and schedules applicable to each class of Registered Participant are as follows: (a) Generators: the Generating System Model Guidelines, Generating System Design Data Sheet and Generating System Setting Data Sheet; (b) Customers and Network Service Providers: schedules 5.5.3 and 5.5.4; and (c) Customers: schedule 5.5.5.	No change	Accept
S5.5.5 A Generator that connects a generating system, that is not a synchronous generating unit, must be given exemption from complying with those parts of the Generating System Model Guidelines Generating System Design Data Sheet and Generating System Setting Data Sheet that are determined by the Network Service Provider to be not relevant to such generating systems, but must comply with those parts of schedules 5.5.3, 5.5.4, and 5.5.5 that are relevant to such generating systems, as determined by the Network Service Provider.	No change	Accept
S5.5.6 A Generator that connects a synchronous generating unit equal to or smaller than 30 MW or a number of synchronous generating units totalling less than 30 MW to a connection point to a distribution network will usually be required to submit less registered system planning data and less registered data than is	Clause S5.6.5 ……but other data must be supplied if <u>reasonably</u> required by the Network Service Provider or NEMMCO.	

indicated in the Generating System Model Guidelines Generating System Design Data Sheet and Generating System Setting Data Sheet. In general these data will be limited to confirmation of the preliminary system planning data, marked (S), but other data must be supplied if required by the Network Service Provider or NEMMCO. Codes: S = Standard Planning Data D = Detailed Planning Data R = Registered Data (R1 pre-connection, R2 post-connection)		
S5.5.7 (a) NEMMCO must, subject to clause S5.7.7(b), develop and publish in accordance with the Rules consultation procedures: (1) a Generating System Design Data Sheet describing, for relevant technologies, the generating system design parameters of generating units and generating systems including, plant configurations, impedances, time constants, non-linearities, ratings and capabilities, to be provided under clauses S5.2.4 and S5.5, (2) a Generating System Setting Data Sheet describing, for relevant generation and control system technologies, the protection system and control system settings of generating units and generating systems including, without limitation, configurations, gains, time constants, delays, deadbands, nonlinearities and limits, to be provided under clauses S5.2.4 and S5.5; and (3) Generating System Model Guidelines, describing, for relevant generation and control system technologies, NEMMCO's requirements when developing mathematical models for generating units and generating systems, including, without limitation, the impact of their control systems and protection systems on power system security. (b) When developing and publishing the Generating System Design Data Sheet, Generating System Setting Data Sheet and Generating System Model Guidelines under paragraph (a), NEMMCO must have regard to the purpose of developing and publishing the sheets and guidelines which is to: (1) allow generating units and generating systems to be mathematically modelled by NEMMCO and relevant Registered		Earlier this year, NEMMCO published a series of documents on generator registration including one entitled "Wind Farm Model Guidelines and Checklist". This document was published prior to any Rule change to mandate such documents and was NOT developed in accordance with the Rules consultation process. Upon finalisation of this Rule change, NEMMCO must be instructed to subject this document to a full rules consultation process.

Participants in load flow and dynamic stability assessments with sufficient accuracy to permit: (i) the power system operating limits for ensuring power system security to be quantified with the lowest practical safety margins; (ii) proposed access standards and performance standards of generating units and generating systems to be assessed; and (iii) settings of control systems and protection systems of generating units, generating systems and networks to be assessed and quantified for maximum practical performance of the power system; and (2) identify for each type of data its category in terms of clause S5.5.2. (c) Any person may submit a request (with written reasons) to NEMMCO to amend the Generating System Design Data Sheet, Generating System Setting Data Sheet or the Generating System Model Guidelines developed and published by NEMMCO under paragraph (a) and NEMMCO must conduct the Rules consultation procedures in relation to the request. (d) NEMMCO can make amendments requested under paragraph (c) or otherwise to the Generating System Design Data Sheet, Generating System Setting Data Sheet or the Generating System Model Guidelines without conducting the Rules consultation procedures if the amendment is minor or administrative in nature. (e) NEMMCO may at the conclusion of the Rules consultation procedures under paragraph (c) or otherwise under paragraph (d), amend the relevant data sheet or guidelines (if necessary)		
[43] Schedules 5.5.1 and 5.5.2 Omit schedules 5.5.1 and 5.5.2	No change	Accept
[44] Schedule 5.5.3 In Schedule 5.5.3, omit the words "Technical Details of generating units as per schedules 5.5.1, 5.5.2 ".	No change	Accept
[45] S5.6 Terms and Conditions of Connection agreements Omit S5.6(c1) and substitute: (c1) details of each access standard agreed between the Network Service Provider and the Registered Participant and all related conditions of agreement resulting from the application of any access provisions contained in schedule 5.1 for Network Service Providers, or schedule 5.2 for Generators, or schedule 5.3 for Customers, or schedule 5.3a for Market Network Service Providers;	No change	Accept

[46] Clause 7.3.1 Metering Installation components In clause 7.3.1(f), omit "5.3.7(e) "and substitute "5.3.7(g) ".	No change	Accept
[47] Clause 8.6.2 Exceptions Omit clause 8.6.2(m) and substitute: (m) (modelling): the disclosure, use or reproduction of data held by NEMMCO or a Network Service Provider for the purpose of modelling the operation of the power system, to the extent reasonably necessary to enable a Connection Applicant to develop an application to connect but does not include information provided in accordance with clauses S5.2.4(a), (b)(4) and (b)(5); or (n) the disclosure of a performance standard to a Network Service Provider for the purpose of establishing a compliance monitoring program, or if connection at that performance standard, in NEMMCO's opinion, affects, or is likely to affect, the performance of that Network Service Provider's network.	No change	Accept
[48] Clause 9.7.2(d) Application for Connection In clause 9.7.2(d), omit "5.3.2(c) "and substitute "5.3.2(e) ".	No change	Accept
[49] Clause 9.7.2(e) Application for Connection In clause 9.7.2(e), omit "5.3.7(a)(2) "and substitute "5.3.7(a) ".	No change	Accept
[50] Schedule 9A3 –Jurisdictional Derogations Granted to Generators References to schedule 5.5.1 In schedule 9A3, omit "schedule 5.5.1 "and substitute "Generating System Setting Data Sheet ".	No change	Accept
[51] Clause 9.37.10 Reactive power capability (clause S5.2.5.1 of schedule 5.2) In clause 9.37.10, omit "schedule 5.5.1 "and substitute "Generating System Setting Data Sheet ".	No change	Accept
[52] Clause 9.37.20 Frequency control (clause S5.2.5.11 of schedule 5.2) In clause 9.37.20, omit clause "S5.2.5.11(d) "and substituting "S5.2.5.11(b)(3) ".	No change	Accept
[53] Chapter 10 Glossary In Chapter 10, insert in alphabetical order, the following definitions:	No change	Accept

access standard Either an automatic access standard or a negotiated access standard for a particular technical requirement as recorded in a connection agreement.		
adequately damped In relation to a control system, when tested with a step change of a feedback input or corresponding reference, or otherwise observed, any oscillatory response at a frequency of: (a) 0.05 Hz or less has a damping ratio of at least 0.4; (b) between 0.05 Hz and 0.6 Hz has a halving time of 5 seconds or less (equivalent to a damping coefficient –0.14 nepers per second or less); and (c) 0.6 Hz or more has a damping ratio of at least 0.05 in relation to a minimum access standard and a damping ratio of at least 0.1 otherwise.	No change	Accept
considered project (a) In respect of a generating system, a project that meets the following criteria: (1) an offer to connect has been made and the Network Service Provider considers in its reasonable opinion that if the offer to connect were accepted that the project might materially affect the Connection Applicant's proposed generating system; or (2) a connection agreement has been entered into. (b) In respect of a transmission network augmentation, a project that meets the following criteria: (1) the Network Service Provider has acquired the necessary land and easements; (2) the Network Service Provider has obtained all necessary planning and development approvals; (3) as applicable: (i) the augmentation project has passed the regulatory test; or (ii) in respect of a new small transmission network asset, an intention to proceed with the project has been published in the Network Service Provider's Annual Planning Report; or (iii) in respect of a funded augmentation the arrangements have been made for its funding; and (4) construction has either commenced or the Network Service Provider has set a firm date for it to commence. (c) In respect of a distribution network augmentation, a project that meets the following criteria:	Add to "considered Project definition (a)(3) (2) the Connection Applicant has obtained all necessary planning and development approvals;	

(1) the Network Service Provider has acquired the necessary land and easements; (2) the Network Service Provider has obtained all necessary planning and development approvals; and (3) construction has either commenced or the Network Service Provider has set a firm date for it to commence.		
continuous uninterrupted operation In respect of a generating system including all operating generating units operating during a power system disturbance, not disconnecting from the power system and, after clearance of any associated electrical fault, delivering active power and reactive power in accordance with its performance standards, with all essential auxiliary and reactive plant remaining in service, so as to not exacerbate or prolong the disturbance for other connected plant.	continuous uninterrupted operation In respect of a generating system including all operating generating units operating during a power system disturbance, not disconnecting from the power system and, after clearance of any associated electrical fault, delivering active power and supplying or absorbing reactive power in accordance with its performance standards, with all essential auxiliary and reactive plant remaining in service, so as to not exacerbate or prolong the disturbance for other connected plant.	Reactive power may need to be supplied or absorbed rather than "delivered"
Generating System Design Data Sheet The data sheet published by NEMMCO under clause S5.5.7(a)(1).	No change	Accept
Generating System Model Guidelines The guidelines published by NEMMCO under clause S5.5.7(a)(3).	No change	Accept
Generating System Setting Data Sheet The data sheet published by NEMMCO under clause S5.5.7(a)(2).	No change	Accept
nominal voltage The design voltage level, nominated for a particular location on the power system, such that power lines and circuits that are electrically connected other than through transformers have the same nominal voltage regardless of operating voltage and normal voltage	~~No change~~ nominal voltage The design voltage level, nominated for a particular location on the power system, such that power lines and circuits that are electrically connected other than through transformers have the same nominal voltage regardless of operating voltage ~~and normal voltage~~	~~Accept~~ Delete reference to "normal voltage" and adjust definition of nominal voltage
non-scheduled generating system A generating system comprising non-scheduled generating units.		
~~normal voltage~~	~~No change~~ DELETE DEFINTION	~~Accept~~ definition not needed

~~In respect of a connection point, its nominal voltage or such other voltage up to 10% higher or lower than nominal voltage, as approved by NEMMCO, for that connection point at the request of the Network Service Provider who provides connection to the power system.~~		
rated active power (a) In relation to a generating unit, the maximum amount of active power that the generating unit can continuously deliver at the connection point when operating at its nameplate rating. (b) In relation to a generating system, the combined maximum amount of active power that its in-service generating units can deliver at the connection point, when its in-service generating units are operating at their nameplate ratings.	No change	Accept
scheduled generating system A generating system comprising scheduled generating units.	No change	Accept
[54] Chapter 10 Glossary In Chapter 10, omit the current corresponding definitions and substitute the following definitions: generating system A system comprising one or more generating units and includes auxiliary or reactive plant that is located on the Generator ś side of the connection point and is necessary for the generating system to meet its performance standards.	No change	Accept
Generator A person who engages in the activity of owning, controlling or operating a generating system that is connected to, or who otherwise supplies electricity to, a transmission or distribution system and who is registered by NEMMCO as a Generator under Chapter 2 and, for the purposes of Chapter 5 (other than clause 5.10), the term includes a person who is required to, or intends to register in that capacity.	No change	Accept
nameplate rating The maximum continuous output or consumption in MW of an item of equipment as specified by the manufacturer, or as subsequently modified.	No change	Accept
reliability	No change	Accept

(a) In respect of equipment, the probability of its performing its function adequately for the period of time intended under the operating conditions encountered. (b) In respect of supply, the probability that it is sufficient to satisfy the demand for that supply, taking into account available generation, power transfer capability and other demand.		
In the definition of "performance standard", omit "5.3.4A(g)" and substitute "5.3.4A(i)".	No change	Accept
[55] Chapter 11 Savings and Transitional Rules After rule 11.4 insert: 11.5 Rules consequent on making the National Electricity Amendment (Technical Standards for Wind Generation and other Generator Connection) Rule 2006 11.5.1 Definitions Subject to this rule 11.5, in this rule 11.5: Amending Rule means the National Electricity Amendment (Technical Standards for Wind Generation and other Generator Connection) Rule 2006. commencement date means the date on which the Amending Rule commences operation. new Chapter 5 means Chapter 5 of the Rules immediately in force after the commencement date old Chapter 5 means Chapter 5 of the Rules immediately in force prior to the commencement date.	No change	Accept
11.5.2 Provision of information under S5.2.4 in registration in application (a) The Amending Rule that requires a person who is applying to be a Registered Participant to submit information in relation to clause S5.2.4 for the purposes of clause 2.9.2 does not apply to any person who has, in accordance with clause 2.9.1: (1) submitted an application to be registered as a Registered Participant; (2) commenced a process for submitting further information in relation to the application referred to in subparagraph (1); or (3) has submitted further information in relation to the application referred to subparagraph (1), and, at the commencement date, has not been registered by NEMMCO in	No change	Accept

accordance with clause 2.9.2 as a Registered Participant. (b) A person registered in accordance with this clause 11.5.2 is taken to be registered in accordance with the requirements of the Rules as amended by the Amending Rule.		
11.5.3 Access standards made under the old Chapter 5 (a) Any automatic access standard or negotiated access standard that applied to a generating unit or generating system under the old Chapter 5 continues to apply to that system or unit as if the Amending Rule had not been made. (b) Unless a Generator and a Network Service Provider otherwise agree, a negotiated access standard that is the subject of a negotiating process as at the commencement date, is to be negotiated in accordance with the old Chapter 5, as if the Amending Rule had not been made.	No change	Accept
11.5.4 Modifications to plant by generators A Generator who at the commencement date has proposed to modify a plant and has commenced negotiations under the old Chapter 5 is to continue the negotiating process in accordance with the old Chapter 5 as if the Amending Rule had not been made.	No change	Accept
11.5.5 Technical Details to Support Application for Connection and Connection Agreement (a) Subject to paragraph (b), any action taken by NEMMCO for the purpose of developing and publishing an initial Generating System Design Data Sheet, an initial Generating System Setting Data Sheet and initial Generating System Model Guidelines prior to the commencement date is taken to satisfy the equivalent actions under clause S5.5.7. (b) If NEMMCO develops and publishes the initial Generating System Design Data Sheet referred to in paragraph (a), after the commencement date, and the content of the data sheet is substantially the same as schedule 5.5.1 of the Rules as in force immediately before the commencement date, NEMMCO is taken to have satisfied the Rules consultation procedures for the purposes of S5.5.7 (c) If NEMMCO develops and publishes the initial Generating System Setting Data Sheet referred to in paragraph (a), after the commencement date, and the content of the data sheet is substantially the same as schedule 5.5.2 of the Rules as in force	No change	Accept

immediately before the commencement date, NEMMCO is taken to have satisfied the Rules consultation procedures for the purposes of S5.5.7.		

Manufacturer Rule change suggestions – Addendum to Submission.

Schedule 1 Amendment of National Electricity Rules

Rule change	Comment	Agree/ Disagree – Reason Vestas Alternative Wording
[3] Clause 3.13.3(k) Standing Data Omit clause 3.13.3(k) –(q) and substitute: (k) Subject to rule 5.3.8(a), a Registered Participant may request from NEMMCO: (1) registered bid and offer data; (2) information that is reasonably required by the Registered Participant to carry out power system studies (including, without limitation, load flow and dynamic simulations) for planning and operational purposes including: (i) historical information relating to the operating conditions of the power system; (ii) information and data provided to NEMMCO under paragraphs (f) and (g) and clause S5.2.4(g); (iii) information and data described in the Generating System Model Guidelines, Generating System Design Data Sheet, and Generating System Setting Data Sheet in accordance with clause S5.2.4(g); (iv) information and data described in schedules 5.5.3 and 5.5.4; and (3) operation and maintenance procedures and practices for transmission network or distribution network operation, developed for the purposes of schedule 5.1 sufficient to enable the Registered Participant to carry out power system modelling under normal, outage and emergency conditions, (l) Where NEMMCO holds information requested under paragraph (k), it must be provided to the Registered Participant as soon as practicable. (m) NEMMCO may provide information of the type described in paragraph (k) to persons other than Registered Participants on request, for the purpose of undertaking research or providing advice to Registered Participants or potential investors in the power system. (n) Where special approvals or exemptions have been granted by NEMMCO, including approval to aggregate generating units, market network services or loads for central dispatch, or exemptions from central dispatch, details of such special arrangements must be	Vestas: Confidential information provided to NEMMCO by a registered participant should not be made available to other registered participants. Vestas: Should be no mention of Model Guidelines in the rules, or if mentioned, as an advisory note only and not enforceable.	(k) Subject to rule 5.3.8(a), and unless the request contravenes a pre-existing Confidentiality Agreement between NEMMCO and a third party registered participant or information nominated as confidential by a third party registered participant, a Registered Participant may request from NEMMCO:

published by NEMMCO. (o) NEMMCO must determine and publish intra-regional loss factors in accordance with clause 3.6.2 by 1 April each year and whenever changes occur. (p) Network Service Providers must advise NEMMCO of their distribution loss factors, duly authorised by the appropriate Jurisdictional Regulator, and NEMMCO must publish such distribution loss factors in accordance with clause 3.6.3(i). (q) NEMMCO must publish on a quarterly basis details of: (1) interconnector transfer capability; and (2) the discrepancy between interconnector transfer capability and the capacity of the relevant interconnector in the absence of outages on the relevant interconnector only, for each day of the preceding quarter for all interconnectors. Statement of opportunities (r) By 31 October in each year, NEMMCO must prepare and publish at a reasonable charge to cover the cost of production, a statement of opportunities, including at least the following information for the subsequent 10 year period: (1) projections of aggregate MW demand and energy requirements for each region; (2) generating capabilities of existing generating units and generating units for which formal commitments have been made for construction or installation; (3) planned plant retirements; (4) a summary of network capabilities and constraints based upon Annual Planning Reports; and (5) operational and economic information about the market to assist planning by Scheduled Generators and Market Participants and potential Scheduled Generators and Market Participants. (s) If after the publication of the most recent statement of opportunities, significant new information becomes available to NEMMCO relating to: (1) the matters covered by paragraphs (r)(1),(2) and (3); or (2) the matters covered by clause 5.6.5(c)(8) and (9); NEMMCO must, as soon as practicable, publish that information in a descriptive form that is consistent with the statement of opportunities. (t) In preparing a statement of opportunities NEMMCO may seek the assistance of the Inter-regional Planning Committee. (u) As soon as practicable after a Scheduled Generator, Market Participant or Network Service Provider becomes aware of any information required for publication by NEMMCO under paragraph	Vestas: General comment. The terms ‘reasonable’ and ‘reasonably’ are used throughout the Rules. Use of these terms introduces uncertainty to the interpretation of the Rules and represents a risk for participants, especially Generators seeking a connection agreement. Suggest these terms be removed from the Rules.	

(r), that information must be provided to NEMMCO by that Scheduled Generator, Market Participant or Network Service Provider.		
[8] Clause 5.1.3 Principles Omit clause 5.1.3 and substitute: 5.1.3 Principles This Chapter is based on the following principles relating to connection to the national grid: (a) All Registered Participants should have the opportunity to form a connection to a network and have access to the network services provided by the networks forming part of the national grid. (b) The terms and conditions on which connection to a network and provision of network service is to be granted are to be set out in commercial agreements on reasonable terms entered into between a Network Service Provider and other Registered Participants. (c) The technical terms and conditions of connection agreements regarding standards of performance must be established at levels at or above the minimum access standards set out in schedules 5.1, 5.2, 5.3 and 5.3a, with the objective of ensuring that the power system operates securely and reliably and in accordance with the system standards set out in schedule 5.1a. (d) A Registered Participant or person intending to become a Registered Participant may request connection of a facility, modification of a connection, or alteration of connected plant at a standard below an automatic access standard if the connection, modification to the connection, or alteration of connected plant does not adversely affect: (1) power system security; (2) reliability of supply in relation to the connection of a generating system; or (3) the quality of supply to other Network Users. (e) In some jurisdictions separate agreements may be required for connection services and use of system services. (f) The operation of the Rules should result in the achievement of: (1) long term benefits to Registered Participants in terms of costs and reliability of the national grid; and (2) open communication and information flows between Registered Participants themselves, and between Registered Participants and NEMMCO, relating to connections while ensuring the security of confidential information belonging to competitors in the market.	Vestas: Replace ‘may request connection of ’with ‘should be allowed to connect to ’ Vestas: Agree importance of confidentiality of information Declaring that information is confidential is not sufficient to protect the rights of the parties	(2) open communication and information flows between Registered Participants themselves, and between Registered Participants and NEMMCO, relating to connections while ensuring the security of confidential information belonging to competitors in the market and protected under Confidentiality Agreements between NEMMCO

	that are source of that confidential information. What are the consequences of information being declared as being "confidential"? Will the Rules outline that? Further, there is discrepancy between this provision and accompanying comment and the practical effect that 3.13(k1) is likely to have. What enforcement rights in relation to infringement (ie failure to keep information confidential) are there?	and Registered Participants.
[16] Clause 5.3.4 Application for connection After 5.3.4(f), insert: (g) For the purposes of clause 5.3.2(f), where the performance or operation of plant that is the subject of an application to connect could in the reasonable opinion of the Network Service Provider, be materially affected by another project, the Network Service Provider must provide to the Connection Applicant the following information about the other project sufficient to identify the extent of the impact: (1) if an application to connect has been received in respect of the other project, information of the types specified in schedule 5.4 but not clauses S5.4(d) or S5.4(i), consistent with the application to connect of the other project; and (2) if an offer to connect has been made in respect of the other project, information of the types specified in clauses S5.2.4(g), and S5.5, consistent with the offer to connect of the other project.	Vestas: Concerned about potential risk of disclosure of confidential IP to third party via this clause.	(g) For the purposes of clause 5.3.2(f), where the performance or operation of plant that is the subject of an application to connect could in the reasonable opinion of the Network Service Provider, be materially affected by another project, the Network Service Provider must provide to the Connection Applicant the following information about the other project sufficient to identify the extent of the impact: (1) if an application to connect has been received in respect of the other project, information of the types specified in schedule 5.4 but not clauses S5.4(d) or S5.4(i), consistent with the application to connect of the other project and while observing any pre existing Confidentiality Agreements between parties; and (2) if an offer to connect has been made in respect of the other project, information of the types specified in clauses S5.2.4(g), and S5.5, consistent with the offer to connect of the other project and while observing any pre existing Confidentiality Agreements between parties.
[20] Clauses 5.3.7 – 5.3.8 Omit clauses 5.3.7 and 5.3.8 and substitute: 5.3.7 Finalisation of connection agreements (a) If a Connection Applicant wishes to accept an offer to connect, the Connection Applicant must negotiate a connection agreement	Vestas: No comment	

with each relevant Network Service Provider identified in accordance with clause 5.3.3(b)(2) and, in doing so, must use its reasonable endeavours to negotiate in good faith with all parties with which the Connection Applicant must negotiate such a connection agreement. (b) The connection agreement must include proposed performance standards with respect to each of the technical requirements identified in schedules 5.2, 5.3 and 5.3a and each proposed performance standard must have been established in accordance with the relevant technical requirement. (c) The proposed performance standards must be based on the automatic access standard or, if the procedures in clause 5.3.4A have been followed, the negotiated access standard. (d) The provision of connection by any Network Service Provider may be made subject to gaining environmental and planning approvals for any necessary augmentation or extension works to a network. (e) Where permitted by the applicable law in the relevant participating jurisdiction, the connection agreement may assign responsibility to the Connection Applicant for obtaining the approvals referred to in paragraph (d) as part of the project proposal and the Network Service Provider must provide all reasonable information and may provide reasonable assistance for a reasonable fee to enable preparation of applications for such approvals. (f) Subject to paragraph (e), each connection agreement must be based on the offer to connect as varied by agreement between the parties. (g) The Network Service Provider responsible for the connection point and the Registered Participant must jointly advise NEMMCO that a connection agreement has been entered into between them and forward to NEMMCO relevant technical details of the proposed plant and connection, including, as applicable: (1) details of all performance standards that form part of the terms and conditions of the connection agreement; (2) if a Generator, the arrangements for updating the information required in accordance with clause S5.2.4(b);		

(3) the proposed metering installation; (4) arrangements for the Metering Provider to obtain physical access to the metering installation; and (5) the terms upon which a Registered Participant is to supply any ancillary services under the connection agreement. (h) NEMMCO must, within 20 business days of receipt of the notice under clause 5.3.7(g), advise the relevant Network Service Provider and the Registered Participant of whether the proposed metering installation is acceptable for those metering installations associated with those connection points which are classified as metering installation types 1, 2, 3 and 4 as specified in schedule 7.2. 5.3.8 Provision and use of information (a) The data and information to be provided under rule 5.3 must: (1) be prepared, given and used in good faith; (2) be treated as confidential information; and (3) not be disclosed or made available by the recipient to a third party except in the circumstances set out in clauses 5.3.2(c), and paragraphs (b),(c) and (d). (b) The data and information to be provided under this rule 5.3 may be disclosed between a Network Service Provider and NEMMCO for the purpose of enabling Network Service Providers or NEMMCO to: (1) assess the effect of the proposed facility or proposed alteration to generating plant (as the case may be) on the performance of the power system or another proposed facility or another proposed alteration; (2) determine the extent of any required augmentation or extension; or (3) advise NEMMCO of services described in clause 3.11.3(j). (c) Where a technical requirement in clauses S5.2.5, S5.2.6, S5.2.7 or S5.2.8 requires a Network Service Provider or a Generator (who is the Connection Applicant) to take into account a considered project when negotiating a negotiated access standard, the data and information to be provided under this rule 5.3 on the considered project may be disclosed by the Network Service Provider in a non confidential form to the Connection Applicant to the extent reasonably necessary for the Connection Applicant to determine a proposed negotiated access standard for that technical	Vestas: 7.2 content no comment Vestas: Vestas has concern relating to the provision of company IP and the subsequent disclosure to a third party. Solutions may include: 1. Supply of non-confidential information that satisfies 5.3 2. Supply of confidential information under an appropriate mutual agreement preventing disclosure to third parties Vestas: Declaring that information is confidential is not sufficient to protect the rights of the parties that are source of that confidential information. What are the consequences of information being declared as being "confidential"? Will the Rules outline that? Further, there is discrepancy between this provision and accompanying comment and the practical effect that 3.13(k1) is likely to have. What enforcement rights in relation to infringement (ie failure to keep information confidential) are there?	(b) The data and information to be provided under this rule 5.3 may be disclosed between a Network Service Provider and NEMMCO, providing the provisions of any pre existing Confidentiality Agreements or any information flagged as confidential are observed, for the purpose of enabling Network Service Providers or NEMMCO to:

requirement. (d) The data and information to be provided under rule 5.3 may only be disclosed by the recipient to a third party the disclosure is not to a Transmission Network Service Provider, only if it does not contain data and information from which the load characteristics described in clause S5.5.5 could be derived as an identifiable component. (e) A person intending to disclose information under paragraph (b) must first advise the relevant Connection Applicant of the extent of the disclosure. (f) If a Connection Applicant or Network Service Provider becomes aware of any material change to any information contained in or relevant to an application to connect then it must promptly notify the other party in writing of that change. (g) A Registered Participant must, within 5 business days of becoming aware that any information provided to NEMMCO in relation to a performance standard or other information of a kind required to be provided to NEMMCO under clauses 5.3.7(g)(1) or 5.3.7(g)(2) is incorrect, advise NEMMCO of the correct information. 5.3.9 Procedure to be followed by a Generator proposing to alter a Generating System (a) This clause 5.3.9 applies where a Generator proposes to alter: (1) a connected generating system; or (2) a generating system for which performance standards have been previously accepted by NEMMCO, in a manner that will affect the performance of the generating system relative to any of the technical requirements set out in clauses S5.2.5, S5.2.6, S5.2.7 and S5.2.8. (b) A Generator must submit to the Network Service Provider, with a copy to NEMMCO: (1) a description of the nature of the alteration and the timetable for implementation; (2) in respect of the generating system as altered: (i) details of the generating unit design data and generating unit setting data in accordance with schedule S5.5 or the Generating System Model Guidelines, Generating System Design Data Sheet,	Vestas: Acceptable if provided information is always non confidential Vestas: (d) may require re-wording to make sense Vestas: A definition of 'alter 'would	

or Generating System Setting Data Sheet; and (ii) the information described in clause S5.2.4(g); and (3) proposed amendments to the relevant performance standard being, for each relevant technical requirement for which the proposed alteration to the equipment will affect the performance of the generating system: (i) the applicable automatic access standard; or (ii) a proposed negotiated access standard. (c) For the purposes of subparagraph(b)(3), clause 5.3.4A applies to a submission by a Generator under this clause 5.3.9. (d) Without otherwise limiting subparagraph (b)(3), for the purposes of that clause, a proposed alteration to the equipment specified in column 1 of the table set out below is taken to affect the performance of the generating system relative to technical requirements specified in column 2, thereby necessitating a submission under subparagraph (b)(3): Column 1 (altered equipment) Column 2 (clause) machine windings S5.2.5.1, S5.2.5.2, S5.2.9 power converter S5.2.5.1, S5.2.5.2, S5.2.5.5, S5.2.5.12, S5.2.5.13, S5.2.9 reactive compensation plant S5.2.5.1, S5.2.5.2, S5.2.5.5, S5.2.5.12, S5.2.5.13 excitation control system S5.2.5.5, S5.2.5.12, S5.2.5.13 voltage control system S5.2.5.5, S5.2.5.12, S5.2.5.13 governor control system S5.2.5.11, S5.2.5.14 power control system S5.2.5.11, S5.2.5.14 protection system S5.2.5.3, S5.2.5.4, S5.2.5.5, S5.2.5.8, S5.2.5.9 auxiliary supplies S5.2.5.1, S5.2.5.2, S5.2.8 remote control and monitoring system S5.2.5.14, S5.2.6.1, S5.2.6.2 (e) The Network Service Provider may, as a condition of considering a submission made under paragraph (b), require payment of a fee to meet the reasonable costs anticipated to be incurred by it and any other Network Service Providers and NEMMCO in the assessment of the submission. (f) The Network Service Provider must require payment of such a fee under paragraph (e) if so requested by NEMMCO.	assist. Vestas: This clause has been historically written for synchronous generating units and do not directly apply to non synchronous generating units. Also, this is pertinent more for a single large generating unit rather than smaller generating units as part of an aggregated generation system where modifications do not affect the performance at the point of connection. Vestas: What is the fee amount to cover reasonable costs?	

(g) On payment of the required fee referred to paragraph (e), the Network Service Provider must pay such amounts as are on account of the costs anticipated to be incurred by the other Network Service Providers and NEMMCO as appropriate. (h) If the application of this clause 5.3.9 leads to a variation to an existing connection agreement the Network Service Provider and the Generator must immediately jointly advise NEMMCO. 5.3.10 Acceptance of Performance Standards for Generating Plant that is Altered (a) A Generator must not commission altered generating plant until Network Service Provider has advised the Generator that NEMMCO is satisfied in relation to the matters set out in paragraph (b). (b) NEMMCO must advise the Network Service Provider that is satisfied in relation to altered generating plant that: (1) that the Generator has complied with clause 5.3.9; and (2) that each amended performance standard submitted by the Generator either meets the automatic access standard applicable to the relevant technical requirement or, if the performance standard does not meet that standard, it would not be rejected if clauses 5.3.4A(b) and (f) were applied at the time the submission of performance standards is received by NEMMCO, and the Network Service Provider must advise the Generator that NEMMCO is satisfied in accordance with this paragraph (b).	Vestas: Is this arrangement reasonable? Vestas: original performance standard established prior to commissioning of generating system should be maintained for generator system insignificant alterations. Proposal: significant changes should be handled as modification to the original connection agreement. Vestas: It has been shown difficult to demonstrate compliance in earlier projects, due to compliance to áll 'test. Agree on general set of tests should be developed to establish what constitutes significant changes. Insignificant Alteration '= Generator form, fit, and function unchanged from original configuration	(a) A Generator must not commission significantly altered generating plant until Network Service Provider has advised the Generator that NEMMCO is satisfied in relation to the matters set out in paragraph (b). (b) NEMMCO must advise the Network Service Provider that is satisfied in relation to significantly altered generating plant that: (1) that the Generator has complied with clause 5.3.9; and (2) that each amended performance standard submitted by the Generator either meets the automatic access standard applicable to the relevant technical requirement or, if the performance standard does not meet that standard, it would not be rejected if clauses 5.3.4A(b) and (f) were applied at the time the submission of performance standards is received by NEMMCO, and the Network Service Provider must advise the Generator that NEMMCO is satisfied in accordance with this paragraph (b).
[28] Clause S5.2.1 Outline of requirements Omit clause S5.2.1 and substitute: S5.2.1 Outline of requirements (a) This schedule sets out details of additional requirements and conditions that Generators must satisfy as a condition of connection		

of a generating system to the power system. It does not apply to any generating system that is: (1) subject to an exemption from registration under clause 2.2.1(c); or (2) eligible for exemption under any guidelines issued under clause 2.2.1(c), and which is connected or intended for use in a manner the Network Service Provider considers is unlikely to cause a material degradation in the quality of supply to other Network Users. (b) This schedule also sets out the requirements and conditions, which (subject to clause 5.2.5 of the Rules) are obligations of Generators: (1) to co-operate with the relevant Network Service Provider on technical matters when making a new connection; and (2) to provide information to the Network Service Provider or NEMMCO. (c) The equipment associated with each generating system must be designed to withstand without damage the range of operating conditions which may arise consistent with the system standards. (d) Generators must comply with the performance standards and any attached terms or conditions of agreement agreed with the Network Service Provider or NEMMCO in accordance with a relevant provision of schedules 5.1 or 5.1a. (e) This schedule does not set out arrangements by which a Generator may enter into an agreement or contract with NEMMCO to: (1) provide additional services that are necessary to maintain power system security; or (2) provide additional services to facilitate management of the market. (f) This schedule provides for automatic access standards and the determination of negotiated access standard derived from minimum access standards which, once determined, must be record together with the automatic access standards in a connection agreement and registered with NEMMCO as performance standards.	Vestas: Information subject to confidentially concerns as noted previously Vestas: Compliance with 5.1a may be a problem	(b) This schedule also sets out the requirements and conditions, which (subject to clause 5.2.5 of the Rules) are obligations of Generators: (1) to co-operate with the relevant Network Service Provider on technical matters when making a new connection; and (2) subject to pre existing Confidentiality Agreements or any information flagged as confidential. to provide information to the Network Service Provider or NEMMCO.
[31] S5.2.4 Provision of information Omit clause S5.2.4 and substitute:	Vestas: 5.2.4(a)(2) Would prefer no mention of Model Guidelines in	

S5.2.4 Provision of information (a) A Generator or person who is negotiating a connection agreement with a Network Service Provider must promptly on request by NEMMCO or the Network Service Provider provide all data in relation to that generating system, specified in: (1) schedule 5.5; (2) the Generating System Model Guidelines; (3) the Generating System Design Data Sheet, or (4) the Generating System Setting Data Sheet. (b) A Generator, or person required under the Rules to register as the Generator in respect of a generating system comprised of generating units with a combined nameplate rating of 30 MW or more, by the earlier of: (1) the date on which proposed performance standards or amendments to performance standards are submitted to NEMMCO under clause 5.3.9(b). (2) three months before commissioning of a generating system or planned alteration to a generating system; or (3) 5 business days before commissioning of an unplanned alteration to a generating system, must provide: (4) to NEMMCO and the relevant Network Service Providers (including the relevant Transmission Network Service Provider in respect of an embedded generating unit) with the following information about the control systems of the generating system: (i) a set of functional block diagrams, including all functions between feedback signals and generating system output; (ii) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits; and (iii) the characteristics of non-linear elements; and (5) to NEMMCO only, simulation source code in an unencrypted form suitable for at least one of the software simulation products nominated by NEMMCO and in a form that would allow conversion for use with other software simulation products by NEMMCO, sufficient for NEMMCO and Network Service Providers to perform load flow and dynamic simulation studies. (c) The information provided under paragraph (b) must: (1) encompass all control systems that respond to voltage or frequency disturbances on the power system, and which are either integral to the generating units or otherwise part of the generating system, including, without limitation, those applying to reactive power equipment that forms part of the generating system;	the rules, or if mentioned, as an advisory note only. In particular, a requirement to provide "all data..." is not acceptable due to intellectual property disclosure concerns. Vestas: Suggest reword (b) to improve grammar Vestas: Generators cannot provide unencrypted source code due to IP concerns. Vestas: NEMMCO should not nominate specific software simulation products. It is suggested that the Block Diagram is provided by the Generator, and then NEMMCO may produce the model in the software of their choice. Suggest (b)(5) be deleted in total	(a) A Generator or person who is negotiating a connection agreement with a Network Service Provider must promptly on request by NEMMCO or the Network Service Provider provide ~~all~~ data in relation to that generating system, specified in: (1) schedule 5.5; ~~(2) the Generating System Model Guidelines~~; (~~3~~ 2) the Generating System Design Data Sheet, or (~~4~~ 3) the Generating System Setting Data Sheet. Re-word (5) to NEMMCO only, , ~~simulation source code in an unencrypted form suitable for at least one of the software simulation products nominated by NEMMCO~~ power system block diagram in a form that would allow ~~conversion~~ development of a simulation model for use with other software simulation products by NEMMCO, sufficient for NEMMCO and Network Service Providers to perform load flow and dynamic simulation

(2) conform with the applicable models developed in accordance with the Generating System Model Guidelines, or an alternative model agreed with NEMMCO to be necessary to adequately represent the generating plant to carry out load flow and dynamic simulations. (d) The Generator must update the information provided under paragraph (b) within 3 months after commissioning tests or other tests undertaken in accordance with clause 5.7.3 are completed. (e) For the purposes of clause 5.3.4(g), the technical information that a Network Service Provider must, if requested, provide to a Connection Applicant in respect of a proposed connection for a generating system includes: (1) the highest expected single phase and three phase fault levels at the connection point with the generating system not connected; (2) the clearing times of the existing protection systems that would clear a fault at the location at which the new connection would be connected into the existing transmission system or distribution system; (3) the expected limits of voltage fluctuation, harmonic voltage distortion and voltage unbalance at the connection point with the generating system not connected; (4) technical information relevant to the connection point with the generating system not synchronised including equivalent source impedance information, sufficient to estimate fault levels, voltage fluctuations, harmonic voltage distortion (for harmonics relevant to the generating system) and voltage unbalance; and (5) information relating to the performance of the national grid that is reasonably necessary for the Connection Applicant to prepare an application to connect, including: (i) a model of the power system, including relevant considered projects and the range of expected operating conditions, sufficient to carry out load flow and dynamic simulations; and (ii) information on inter-regional and intra-regional power transfer capabilities and relevant plant ratings. (f) All information provided under this clause S5.2.4 must be treated as confidential information. (g) Any person required to provide information under paragraphs (a) and (b)(4) must also provide that information in a non confidential form for the purposes of clause 3.13.3(k) and 5.3.4(g)(2).	Vestas: Should be no mention of Model Guidelines in the rules, or if mentioned, as an advisory note only and not enforceable. Also, any reference to alternative models should be of a less prescriptive requirement Vestas: Information should not be updated unless a significant change has been incorporated Vestas: Generators should provide Block Diagrams, not models Vestas: The 3.13.3(k) Rule as drafted does not go far enough. Declaring that information is confidential is not sufficient to protect the rights of the parties that are source of that confidential information. What are the consequences of information being declared as being "confidential"? Will the Rules outline that?	studies.

	Further, there is discrepancy between this provision and accompanying comment and the practical effect that 3.13(k1) is likely to have. What enforcement rights in relation to infringement (ie failure to keep information confidential) are there?	
S5.2.5.2 Quality of electricity generated (a) For the purpose of this clause S5.2.5.2 in respect of a synchronous generating unit, AS 1359.101 and IEC 60034-1 are plant standards for harmonic voltage distortion. Automatic access standard (b) The automatic access standard is each generating system, when generating and when not generating, must not produce at any of its connection points for generation: (1) voltage fluctuation greater than the limits allocated by the Network Service Provider under clause S5.1.5(a); (2) harmonic voltage distortion greater than the emission limits specified by a plant standard under paragraph (a) or allocated by the Network Service Provider under clause S5.1.6(a); and (3) voltage unbalance greater than the limits allocated by the Network Service Provider in accordance with clause S5.1.7(c). Minimum access standard (c) The minimum access standard is each generating system, when generating and when not generating, must not produce at any of its connection points for generation: (1) voltage fluctuations greater than limits determined under rule S5.1.5(b); (2) harmonic voltage distortion more than the lesser of the emission limits determined by the relevant Network Service Provider under clause S5.1.6(b) and specified by a plant standard under paragraph (a); and (3) voltage unbalance more than limits determined under clause S5.1.7(c). Negotiated access standard (d) Subject to clause S5.1.7(d), a negotiated access standard negotiated under this clause S5.2.5.2 must not prevent the	Vestas: Suggest acceptance of equivalent International Standards as alternates to AS/NZS Vestas: Generators should not be held responsible for correcting system voltage unbalance Vestas: Suggest acceptance of equivalent International Standards as alternates to AS/NZS Vestas: Generators should not be held responsible for correcting system voltage unbalance	Minimum access standard (c) Equivalent International Standards shall be accepted for the minimum access standard. Where no standard can be identified the minimum access standard is each generating system, when generating and when not generating, must not produce at any of its connection points for generation: (1) voltage fluctuations greater than limits determined under rule S5.1.5(b); (2) harmonic voltage distortion more than the lesser of the emission limits determined by the relevant Network Service Provider under clause S5.1.6(b) and specified by a plant standard under paragraph (a); and (3) voltage unbalance more than limits determined under clause S5.1.7(c).

Network Service Provider meeting the system standards or contractual obligations to existing Network Users.	Vestas: (d) Not generators responsibility to secure NSPs meeting of system standards. At a minimum, a new negotiated access standard should be allowed.	
S5.2.5.6 Quality of electricity generated and continuous uninterrupted operation Each generating plant must be capable of continuous uninterrupted operation at distortion levels up to the maximum voltage fluctuation, harmonic voltage distortion and voltage unbalance conditions outlined in S5.1a5, S5.1a6 and S5.1a7 of the system standards.	Vestas: Suggest acceptance of equivalent International Standards as alternates to AS/NZS	S5.2.5.6 Quality of electricity generated and continuous uninterrupted operation Each generating plant must be capable of continuous uninterrupted operation at distortion levels up to the maximum voltage fluctuation, harmonic voltage distortion and voltage unbalance conditions outlined in S5.1a5, S5.1a6 and S5.1a7 of the system standards. Alternatively, International Standards may be acceptable as alternates to this requirement
S5.2.5.8 Protection of generating units from power system disturbances Minimum access standard (a) The minimum access standard is: (1) subject to subparagraphs (2) and (3), for each generating system that is required by a Generator or Network Service Provider to be automatically disconnected from the power system in response to abnormal conditions arising from the power system, the relevant protection system or control system must not disconnect the generating system for: (i) conditions for which it must remain in continuous uninterrupted operation; or (ii) conditions it must withstand under the Rules; and		
(2) each generating system with a nameplate rating of 30MW or more, or generating system comprised of generating units with combined nameplate rating of 30 MW or more, connected to a transmission system must have facilities to automatically and rapidly reduce its generation: (i) by at least half if the frequency at the connection point exceeds a level nominated by NEMMCO (not less that the upper limit of the operational frequency tolerance band) and the duration above this frequency exceeds a value nominated by NEMMCO where the reduction may be achieved: (A) by reducing the output of the generating unit within three seconds, and holding the output at the reduced level until the frequency returns to within the normal operating frequency band;	Vestas: Can the frequency level be stated rather than left to NEMMCO nomination? Is presently an open requirement. Vestas: Assuming this refers to active power, this clause is considered unacceptable. It is not possible to comply with three seconds using existing generating unit technology and communication/control system Vestas: Could disconnect if the one second requirement is extended.	(2) each generating system with a nameplate rating of 30MW or more, or generating system comprised of generating units with combined nameplate rating of 30 MW or more, connected to a transmission system must have facilities to automatically and rapidly reduce its active power generation: (i) by at least half if the frequency at the connection point exceeds TBD Hz and the duration above this frequency exceeds TBD seconds where the reduction may be achieved: (A) by reducing the output of the generating unit within three seconds, and holding the output at

or (B) by disconnecting the generating unit from the power system within one second; or (ii) in proportion to the difference between the frequency at the connection point and a level nominated by NEMMCO (not less than the upper limit of the operational frequency tolerance band), such that the generation is reduced by at least half, within three seconds of the frequency reaching the upper limit of the extreme frequency excursion tolerance limits. Negotiated access standard (b) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.8. General access standard (c) NEMMCO or the Network Service Provider may require that an access standard include a requirement for the generating system to automatically disconnect whenever the part of the network to which it is connected has been disconnected from the national grid, forming an island that supplies a Customer. (d) The access standard must include specification of conditions for which the generating unit or generating system must trip and must not trip. (e) Notwithstanding clauses S5.2.5.3, S5.2.5.4, S5.2.5.5 and S5.2.5.6, a generating system may be automatically disconnected from the power system under any of the following conditions: (1) in accordance with an ancillary services agreement between the Generator and NEMMCO; (2) where a load that is not part of the generating system has the same connection point as the generating system and NEMMCO and the Network Service Provider agree that the disconnection would in effect be under-frequency load shedding; (3) where the generating system is automatically disconnected under paragraph (b) or S5.2.5.9; (4) where the generating system is automatically disconnected under clause S5.2.5.10 due to a failure of the generating plant; or (5) in accordance with an agreement between the Generator and a Network Service Provider (including an agreement in relation to an emergency control scheme under clause S5.1.8) to provide a service that NEMMCO agrees is necessary to maintain or restore power system security in the event of a specified contingency event.	Note extreme changes in speed/power are particularly damaging to generating unit components Vestas: Can the frequency level be stated rather than left to NEMMCO nomination? Is presently an open requirement. Vestas: Comment: Rules would be greatly simplified if only one access standard was presented rather than minimum, negotiated, general, and automatic. What is the general access standard? Vestas: Generating units will continue to operate until an operating parameter goes out of range – island situation may not be recognised.	the reduced level until the frequency returns to within the normal operating frequency band; or (B) by disconnecting the generating unit from the power system within TBD seconds; or (ii) in proportion to the difference between the frequency at the connection point and TBD Hz, such that the generation is reduced by at least half, within three seconds of the frequency reaching the upper limit of the extreme frequency excursion tolerance limits.

(f) The Network Service Provider is not liable for any loss or damage incurred by the Generator or any other person as a consequence of a fault on either the power system, or within the Generator's facility.		
S5.2.5.14 Active power control (a) The automatic access standard is a generating system comprised of generating units with a combined nameplate rating of 30 MW or more, must have an active power control system capable of: (1) for each scheduled generating unit or, if subject to aggregation approved by NEMMCO under rule 3.8.3, the scheduled generating system: (i) maintaining and changing its active power output in accordance with its dispatch instructions; and (ii) ramping its active power output linearly from one dispatch level to another, and (2) subject to the energy source availability, for each nonscheduled generating unit or non-scheduled generating system: (i) automatically reducing or increasing its active power output within five minutes, at a constant rate, to below the level specified in an instruction electronically issued by a control centre, subject to subparagraph(iii), (ii) automatically limiting its active power output, to below the level specified in subparagraph (i); and (iii) not changing its active power output within five minutes by more than the raise and lower amounts specified in an instruction electronically issued by a control centre. Minimum access standard (b) The minimum access standard is a generating system comprised of generating units with combined nameplate rating of 30 MW or more, must have an active power control system capable of: (1) for each scheduled generating unit or, if subject to aggregation approved by NEMMCO under clause 3.8.3, the scheduled generating system, maintaining and changing its active power output in accordance with its dispatch instructions; (2) for each non-scheduled generating system: (i) reducing its active power output, within five minutes, to or below the level required to manage network flows that is specified in a verbal instruction issued by the control centre; (ii) limiting its active power output to or below the level specified in	Vestas: Increase is not possible due to wind variability Vestas: What maximum ramp rate is required? Generating units in a wind farm cannot provide an exactly continuous linear reduction, there will be some step changes. In an aggregated system, consecutive five minute requests may be problematic. Vestas: Generating unit performance is wind dependent, compliance cannot be guaranteed without knowledge of the range of possible power levels. Also note possible commercial implications due loss of production. Suggest reword to state 'below or above' Vestas: As per comments above Vestas: OK if within technical capability Vestas: As per comments above Vestas: As per comments above	Minimum access standard (b) The minimum access standard is a generating system comprised of generating units with combined nameplate rating of 30 MW or more, must have an active power control system capable of: (1) for each scheduled generating unit or, if subject to aggregation approved by NEMMCO under clause 3.8.3, the scheduled generating system, maintaining and changing to the limit of technical and energy source availability, its active power output in accordance with its dispatch instructions; (2) for each non-scheduled generating system:

subparagraph (i); (iii) subject to energy source availability, ensuring that the change of active power output in a five minute period does not exceed a value specified in a verbal instruction issued by the control centre; and (iv) being upgraded to receive electronic instructions from the control centre and respond within five minutes. Negotiated access standard (c) A negotiated access standard may provide that if the number or frequency of verbal instructions becomes difficult for a control centre to manage, NEMMCO may require the Generator to upgrade its facilities to receive electronic instructions and act within five minutes of those instructions. (d) The negotiated access standard must document to NEMMCO's satisfaction any operational arrangements necessary to manage network flows that may include a requirement for the generating system to be operated in a manner that prevents its output changing within five minutes by more than an amount specified by a control centre. (e) NEMMCO must advise on matters relating to negotiated access standards under this clause S5.2.5.14. General access standard requirements (f) Each control system used to satisfy the requirements of paragraphs (a) and (b) must be adequately damped.	Vestas: Potential difficulty with compliance with verbal command/request requirement. SCADA system is capable of unmanned operation, provision of 24hr manned control centre will have commercial implications. Vestas: comments as per MAS above Vestas: Prefer electronic instructions. Commercial implications to upgrade requirement Vestas: Output is dependent upon wind Vestas: Requirement should be interpreted wrt the generator, not the grid	(i) reducing its active power output, within five minutes at a maximum rate of TBD MW/sec, to or below the level required to manage network flows that is specified in a digital instruction issued by the control centre; (ii) limiting its active power output to or below the level specified in subparagraph (i); (iii) subject to energy source availability, ensuring that the change of active power output in a five minute period does not exceed a value specified in a digital instruction issued by the control centre; and (iv) being upgraded to receive electronic instructions from the control centre and respond within five minutes.
[33] S5.2.6 Monitoring and Control Requirements Omit clause S5.2.6 and substitute: S5.2.6.1 Remote Monitoring Automatic access standard (a) The automatic access standard is each: (1) scheduled generating unit; (2) non-scheduled generating unit with a nameplate rating of 30 MW or more; or (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more, must have remote monitoring equipment to transmit to NEMMCO's control centres in real time in accordance with rule 4.11, the quantities that NEMMCO reasonably requires to discharge its market and power system security functions set out in Chapters 3 and 4.	Vestas: would prefer to comply with relevant international standards for remote monitoring, or alternatively that the quantities referred to in b are considered the	

(b) The quantities referred to under paragraph (a) that NEMMCO may request include: (1) in respect of each scheduled generating unit or non-scheduled generating unit with a nameplate rating of 30 MW or more: (i) current, voltage, active power and reactive power in respect of generating unit stators or power conversion systems (as applicable); (ii) the status of all switching devices that carry the generation, tap-changing transformer tap position; and (iii) aggregate active power if subject to aggregation approved by NEMMCO under rule 3.8.3; (2) in respect of each non-scheduled generating system that includes a generating unit with a nameplate rating of less than 30 MW: (i) its connected status, tap-changing transformer tap position and voltages; (ii) active power and reactive power aggregated for groups of identical generating units; and (iii) either the numbers of identical generating units operating or the operating status of each non-identical generating unit; (3) in respect of each auxiliary supply system with capacity of 30 MW or more associated with a generating unit or generating system, active power and reactive power; (4) in respect of reactive power equipment that is part of a generating system but not part of a particular generating unit, its reactive power, (5) in respect of each wind farm: (i) wind speed; (ii) wind direction; and (iii) ambient temperature; and (6) any other quantity that NEMMCO reasonably requires to discharge its market and power system security functions as set out in Chapters 3 and 4.	explicit requirements. 4.11 requirements should be subject to negotiation. Vestas: This should not apply to individual generating units in an aggregated generation system Vestas: For the avoidance of doubt, the information should be for the generation system (Point Of Connection), not for individual generating devices. Also, sensor data will be sourced from installed measurement equipment, not individual WTG	
Minimum access standard (c) The minimum access standard is each: (1) scheduled generating unit or, (2) scheduled generating system, if subject to aggregation approved by NEMMCO under clause 3.8.3; or (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more, must have remote monitoring equipment to transmit to NEMMCO's control centres in real time:	Vestas: Existing systems provide time averaged information. What is	Minimum access standard (c) The minimum access standard is each: (1) scheduled generating unit or, (2) scheduled generating system, if subject to aggregation approved by NEMMCO under clause 3.8.3; or (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more,

(1) the active power output of the generating unit, scheduled generating system or non-scheduled generating system (as applicable); (2) if connected to a transmission system, the reactive power output of the generating unit, scheduled generating system or non-scheduled generating system (as applicable); and (3) if a wind farm: (i) number of units operating; (ii) wind speed; and (iii) wind direction, in accordance with rule 4.11. Negotiated access standard (d) NEMMCO may advise on matters relating to negotiated access standards under this clause S5.2.6.1.	the definition of "real time"? Vestas: For the avoidance of doubt, the information should be for the generation system (Point Of Connection), not for individual generating devices. Also, sensor data will be sourced from installed measurement equipment, not individual WTG	must have remote monitoring equipment with the capability to transmit continuously to NEMMCO's control centres: (1) the active power output of the generating unit, scheduled generating system or non-scheduled generating system (as applicable); (2) if connected to a transmission system, the reactive power output of the generating unit, scheduled generating system or non-scheduled generating system (as applicable); and (3) if a wind farm: (i) number of generating units operating; (ii) site wind speed; and (iii) site wind direction, in accordance with rule 4.11.
[41] S5.5.2 Technical Details to Support Application for Connection and Connection Agreement In clause S5.5.2, omit the paragraph "Preliminary system planning data" and substitute: This data is required for submission with the application to connect, to allow the Network Service Provider to prepare an offer of terms for a connection agreement and to assess the requirement for, and effect of, network augmentation or extension options. Such data is normally limited to the items denoted as Standard Planning Data (S) in the Generating System Model Guidelines Generating System Design Data Sheet, Generating System Setting Data Sheet and in schedules 5.5.3 to 5.5.5.	Vestas: Would prefer no mention of Model Guidelines in the rules, or if mentioned, as an advisory note only. Suggest "Block Diagram" or "Generating System Control Description" as replacement for "Model Guidelines" Vestas: Previously Block Diagrams were required, the change to requiring models will significantly increase project cost and potentially delay projects	This data is required for submission with the application to connect, to allow the Network Service Provider to prepare an offer of terms for a connection agreement and to assess the requirement for, and effect of, network augmentation or extension options. Such data is normally limited to the items denoted as Standard Planning Data (S) in the Generating System Control Description, ~~Generating System Model Guidelines~~ Generating System Design Data Sheet, Generating System Setting Data Sheet and in schedules 5.5.3 to 5.5.5.
[42] S5.5.4 – S5.5.7 Technical Details to Support Application for Connection and Connection Agreement Omit S5.5.4 – S5.5.6 and substitute: S5.5.4 Schedules 5.5.3 to 5.5.5 cover the following data areas: (a) schedule 5.5.3 - Network Plant Technical Data. This comprises fixed electrical parameters.	Vestas: Would prefer no mention of Model Guidelines in the rules, or if mentioned, as an advisory note only and not enforceable. Suggest "Block Diagram" or "Generating System Control Description" as replacement for "Model Guidelines"	

(b) schedule 5.5.4 - Plant and Apparatus Setting Data. This comprises settings which can be varied by agreement or by direction of the Network Service Provider or NEMMCO. (c) schedule 5.5.5 - Load Characteristics. This comprises the estimated design parameters of loads. The documents and schedules applicable to each class of Registered Participant are as follows: (a) Generators: the Generating System Model Guidelines, Generating System Design Data Sheet and Generating System Setting Data Sheet; (b) Customers and Network Service Providers: schedules 5.5.3 and 5.5.4; and (c) Customers: schedule 5.5.5.		(c) schedule 5.5.5 - Load Characteristics. This comprises the estimated design parameters of loads. The documents and schedules applicable to each class of Registered Participant are as follows: (a) Generators: the Generating System Control Description, Generating System Design Data Sheet and Generating System Setting Data Sheet; (b) Customers and Network Service Providers: schedules 5.5.3 and 5.5.4; and (c) Customers: schedule 5.5.5.
S5.5.5 A Generator that connects a generating system, that is not a synchronous generating unit, must be given exemption from complying with those parts of the Generating System Model Guidelines Generating System Design Data Sheet and Generating System Setting Data Sheet that are determined by the Network Service Provider to be not relevant to such generating systems, but must comply with those parts of schedules 5.5.3, 5.5.4, and 5.5.5 that are relevant to such generating systems, as determined by the Network Service Provider.	Vestas: Would prefer no mention of Model Guidelines in the rules, or if mentioned, as an advisory note only. Suggest 'Block Diagram 'or 'Generating System Control Description 'as replacement for 'Model Guidelines '	S5.5.5 A Generator that connects a generating system, that is not a synchronous generating unit, must be given exemption from complying with those parts of the Generating System Control Description, Generating System Design Data Sheet and Generating System Setting Data Sheet that are determined by the Network Service Provider to be not relevant to such generating systems, but must comply with those parts of schedules 5.5.3, 5.5.4, and 5.5.5 that are relevant to such generating systems, as determined by the Network Service Provider.
S5.5.7 (a) NEMMCO must, subject to clause S5.7.7(b), develop and publish in accordance with the Rules consultation procedures: (1) a Generating System Design Data Sheet describing, for relevant technologies, the generating system design parameters of generating units and generating systems including, plant configurations, impedances, time constants, non-linearities, ratings and capabilities, to be provided under clauses S5.2.4 and S5.5, (2) a Generating System Setting Data Sheet describing, for relevant generation and control system technologies, the protection system and control system settings of generating units and generating systems including, without limitation, configurations, gains, time constants, delays, deadbands, nonlinearities and limits,		

to be provided under clauses S5.2.4 and S5.5; and (3) Generating System Model Guidelines, describing, for relevant generation and control system technologies, NEMMCO's requirements when developing mathematical models for generating units and generating systems, including, without limitation, the impact of their control systems and protection systems on power system security. (b) When developing and publishing the Generating System Design Data Sheet, Generating System Setting Data Sheet and Generating System Model Guidelines under paragraph (a), NEMMCO must have regard to the purpose of developing and publishing the sheets and guidelines which is to: (1) allow generating units and generating systems to be mathematically modelled by NEMMCO and relevant Registered Participants in load flow and dynamic stability assessments with sufficient accuracy to permit: (i) the power system operating limits for ensuring power system security to be quantified with the lowest practical safety margins; (ii) proposed access standards and performance standards of generating units and generating systems to be assessed; and (iii) settings of control systems and protection systems of generating units, generating systems and networks to be assessed and quantified for maximum practical performance of the power system; and (2) identify for each type of data its category in terms of clause S5.5.2. (c) Any person may submit a request (with written reasons) to NEMMCO to amend the Generating System Design Data Sheet, Generating System Setting Data Sheet or the Generating System Model Guidelines developed and published by NEMMCO under paragraph (a) and NEMMCO must conduct the Rules consultation procedures in relation to the request. (d) NEMMCO can make amendments requested under paragraph (c) or otherwise to the Generating System Design Data Sheet, Generating System Setting Data Sheet or the Generating System Model Guidelines without conducting the Rules consultation procedures if the amendment is minor or administrative in nature. (e) NEMMCO may at the conclusion of the Rules consultation procedures under paragraph (c) or otherwise under paragraph (d), amend the relevant data sheet or guidelines (if necessary)	Vestas: The implications of this need to be carefully considered. Vestas: The mathematical models referenced here should have the same level of fidelity/accuracy as the power system mathematical model ie. the detail included should not be more than is appropriate. Detailed Mathematical models for design purposes could be provided under an appropriate confidentiality agreement. Vestas would like to see a requirement for proof of model accuracy (including relevance to the real world) and completeness Vestas would like to see a definition of minor (a change may not be considered minor to all parties).Alternatively, all changes should be subject to the consultation procedures.	(b) When developing and publishing the Generating System Design Data Sheet, Generating System Setting Data Sheet and Generating System Control Description under paragraph (a), NEMMCO must observe any pre existing Confidentiality Agreements, and have regard to the purpose of developing and publishing the sheets and guidelines which is to:
[47] Clause 8.6.2 Exceptions Omit clause 8.6.2(m) and substitute:		

(m) (modelling): the disclosure, use or reproduction of data held by NEMMCO or a Network Service Provider for the purpose of modelling the operation of the power system, to the extent reasonably necessary to enable a Connection Applicant to develop an application to connect but does not include information provided in accordance with clauses S5.2.4(a), (b)(4) and (b)(5); or (n) the disclosure of a performance standard to a Network Service Provider for the purpose of establishing a compliance monitoring program, or if connection at that performance standard, in NEMMCO ś opinion, affects, or is likely to affect, the performance of that Network Service Provider ś network.	Vestas: Confidential information should not be disclosed Suggest delete this exception in total Performance standards are between the Generator, the NSP and NEMMCO, not with all other NSPs. Specific permission should be sought for this to happen on a case by case basis as required Suggest delete this exception in total Vestas: This is subjective	

S5.1a.4 Power frequency voltage Except as a consequence of a *contingency event*, the *voltage* of *supply* at a *connection point* should not vary by more than 10 percent above or below its normal voltage, provided that the *reactive power* flow and the *power factor* at the *connection point* is within the corresponding limits set out in the *connection agreement*. As a consequence of a *credible contingency event*, the *voltage* of *supply* at a *connection point* should not rise above its normal voltage by more than a given percentage of normal voltage for longer than the corresponding period shown in Figure S5.1a.1 for that percentage. As a consequence of a *contingency event*, the *voltage* of *supply* at a *connection point* could fall to zero for any period. For the purposes of this *system standard*, "normal voltage" means, in relation to a *connection point*, its nominal *voltage* or such other *voltage* up to 10 percent higher or lower than the nominal *voltage*, as approved by *NEMMCO*, for that *connection point* at the request of the *Network Service Provider* who provides *connection* to the *power system*. The nominal *voltages* selected for new *facilities* and the intended operating *voltage* ranges for new and existing *facilities* should, wherever practicable, be *voltages* that are recognized by *Australian Standards* and for which potential *Connection Applicants* can reasonably obtain compatible *facilities*. For the purpose of this clause, the *voltage* of *supply* is measured as the *RMS phase voltage*.	S5.1a.4 Power frequency voltage Except as a consequence of a *contingency event*, the *voltage* of *supply* at a *connection point* should not vary by more than 10 percent above or below its ~~normal~~ nominal voltage, provided that the *reactive power* flow and the *power factor* at the *connection point* is within the corresponding limits set out in the *connection agreement*. As a consequence of a *credible contingency event*, the *voltage* of *supply* at a *connection point* should not rise above its ~~normal~~ nominal voltage by more than a given percentage of ~~normal~~ nominal voltage for longer than the corresponding period shown in Figure S5.1a.1 for that percentage. As a consequence of a *contingency event*, the *voltage* of *supply* at a *connection point* could fall to zero for any period. ~~For the purposes of this *system standard*, "normal voltage" means, in relation to a *connection point*, its nominal *voltage* or such other *voltage* up to 10 percent higher or lower than the nominal *voltage*, as approved by *NEMMCO*, for that *connection point* at the request of the *Network Service Provider* who provides *connection* to the *power system*.~~ The nominal *voltages* selected for new *facilities* and the intended operating *voltage* ranges for new and existing *facilities* should, wherever practicable, be *voltages* that are recognized by *Australian Standards* and for which potential *Connection Applicants* can reasonably obtain compatible *facilities*. For the purpose of this clause, the *voltage* of *supply* is measured as the *RMS phase voltage*.	The applicable Australian Standard used to specify equipment to be purchased, AS 60038—2000 Standard voltages, defines the voltages in terms of the nominal voltage. It also defines the level of the highest voltage for equipment for each nominal system voltage. For example equipment rated at a nominal voltage of 220kV has a "highest voltage for equipment level" of 245kV. The safety margin built into the "highest voltage for equipment level" concept should provide NEMMCO and the NSPs with the comfort they need of the ability of equipment to withstand the voltages likely on the system. For consistency with the standard, the Power Frequency Voltage requirement should be rewritten around nominal voltage. We are not aware of any connection points where NEMMCO has approved a normal voltage higher than the nominal voltage and hence such a change would not impact on any existing or planned connections.
S5.1.4 Magnitude of power frequency voltage A *Transmission Network Service Provider* must		

plan and design its *transmission system* and equipment for control of *voltage* such that the minimum steady state *voltage* magnitude, the maximum steady state *voltage* magnitude and variations in *voltage* magnitude are consistent with the levels stipulated in clause S5.1a.4 of the *system standards*. (a) The *Network Service Provider* must determine the *automatic access standard* for the *voltage* of *supply* at the *connection point* such that the *voltage* may vary in accordance with clause S5.1a.4 of the *system standards*. (b) The *Network Service Provider* must determine the *minimum access standard* for the *voltage of supply* at the *connection point* such that the *voltage* may vary: (1) as a consequence of a *credible contingency event* in accordance with clause S5.1a.4; and (2) otherwise, between 95 percent and 105 percent of the target *voltage*. (c) For the purposes of clause S5.1.4(b) the target *voltage* must be determined as follows: (1) if the *connection point* is connected to a *transmission line* (but not through a *transformer*), the *Network Service Provider* must determine the target *voltage* in consultation with *NEMMCO* taking into account the capability of existing *facilities* that are subject to that *supply voltage*; and (2) otherwise, *Network Users* that share the same *supply voltage* must jointly determine the target *voltage* which may be specified to vary with aggregate *loading level*; provided that at all times the *supply voltage* remains between 90 percent and 110 percent of the normal voltage determined in accordance with clause S5.1a.4 except as a consequence of a *contingency event.* (d) For the purposes of this clause, the *voltage* of *supply* is measured as the *RMS phase voltage.*	(3) otherwise, *Network Users* that share the same *supply voltage* must jointly determine the target *voltage* which may be specified to vary with aggregate *loading level*; provided that at all times the *supply voltage* remains between 90 percent and 110 percent of the ~~normal~~ nominal voltage determined in accordance with clause S5.1a.4 except as a consequence of a *contingency event.*	

Where the independent control of *voltage* at the *connection point* is possible without adverse impact on *voltage* control at another *connection point*, the *Network Service Provider* must make reasonable endeavors to meet the request. The target *voltage* and any agreement to a target range of *voltage* magnitude must be specified in the relevant *connection agreement*. The agreement may include a different target range in the *satisfactory operating state* and after a *credible contingency event* (and how these target ranges may be required to vary with *loading*). A *Network Service Provider* must ensure that each *facility* that is part of its *transmission network* or *distribution network* is capable of continuous uninterrupted operation in the event that variations in *voltage* magnitude occur due to faults external to the *facility*. The design of a *facility* should anticipate the likely time duration and magnitude of variations in the power-*frequency* phase *voltages* which may arise dependent on the nature and location of the fault.		