Roaring 40s
THINKING ENERGY

Dr John Tamblyn
Chairman
Australian Energy Market Commission
22/06/06

Re: Proposed Technical Standards for Wind Generation

Dear Dr Tamblyn

Thank you for the opportunity to participate in the Australian Energy Market Commission review of the technical standards for wind generation.

Roaring 40s is a renewable energy project developer and asset owner, with a portfolio of projects in Australia and overseas. Roaring 40s specific comments in relation to the proposed changes to the Rules are provided in Attachment A to this letter.

General comments in relation to the proposed changes are:

i) The concept of generating system is a powerful one. It should provide the opportunity for a generator to design plant behind a connection point to provide the required performance at a connection point under a pre-defined range of conditions at that connection point.

ii) This understanding of a generating system is not consistently supported by the wording of some of the clauses in the proposed changes. There are still too many instances where performance standards are required for performance that cannot be directly measured at the connection point.

iii) The inconsistencies associated with this partial implementation of the generating system concept leave some of the most contentious issues under the current regime unresolved:
   a. Modelling validation;
   b. Control system tuning requirements;
   c. Testing requirements
   d. Technology limitations/control philosophy limitations

iv) The voltage disturbance definition does not provide adequate certainty. There is still reliance on the arbitrary benchmark of S5.1a.4 for TOV (temporary over voltage) and the requirements for UV (under voltage), though removed, are now not explicitly stated.

v) We have not commented on the suitability of the Tasmanian Power System Frequency Operating Standards in this analysis as we do

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not feel that this is an appropriate for this forum.

vi) If the changes are implemented as proposed, it is very unlikely that any wind turbines currently on the market can be installed in Tasmania due to the onerous frequency requirements proposed.

In Roaring 40s opinion, the technical requirements that wind turbines should be required to meet should reflect the technical requirements demanded by the European and American marketplace. For Australian developers to demand special wind turbine capabilities, considering the size and current status of the market, is difficult. The proposed changes to the Rules do not seem to take into account the capabilities of the majority of wind turbine models on the market.

Regards,

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ATTACHMENT A – PROPOSED RULE CHANGES ROARING 40'S COMMENTS

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
2.9.2(d)	(d) Provided those terms and conditions are reasonably related to ensuring *power system security*, *reliability of supply* or the quality of *network service* to other *Network Users*, or are consistent with the *market objective*, *NEMMCO* may impose such terms and conditions on any registration as *NEMMCO* sees appropriate.	In the context of new generation, it is conceivable that NEMMCO might need to register Generators on a conditional basis. This is because NEMMCO's overriding responsibility is to ensure power system security, so it is appropriate that NEMMCO has the power to apply conditions to registration that ensure that that objective can be met. It is also appropriate to give NEMMCO the power to apply conditions to registration that ensure reliability of supply and the quality of network service since these are necessary to ensure that the interests of Network Users are protected. Rather than include a provision that specifically applies to Generators (thereby creating an implication that NEMMCO cannot impose conditions on the registration of other applicants, it is appropriate that a generic power to impose conditions (albeit a conditional power) be inserted.	This clause should be deleted. The clause gives NEMMCO unrestricted powers to insist on possibly unreasonable requirements. If there was a quick and effective dispute resolution process this clause may be less unacceptable. The investment risk that a developer assumes due to clauses such as this may reduce the number of developments. The requirements must be stated before the registration process.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
5.3.7A	**5.3.7A Submission of Performance Standards** (a) The *Network Service Provider* and the *Connection Applicant* must jointly advise *NEMMCO* when a proposed *connection agreement* has been negotiated between them and submit to *NEMMCO* the proposed *performance standards* for assessment by *NEMMCO.* (b) The *Network Service Provider* must forward to *NEMMCO* a copy of the proposed *connection agreement* and relevant technical details of the proposed *plant* and *connection*, including, as applicable: (1) details of all proposed *performance standards* that form part of the terms and conditions of the proposed *connection agreement*; (2) in relation to *generating plant*, the arrangements for updating the information required in accordance with clause S5.2.4(b); (c) Following receipt of the information referred to in clauses 5.3.7A(b) and S5.2.4 (if applicable) *NEMMCO* must assess whether, in its reasonable opinion, each proposed *performance standard*: (1) satisfies the technical requirements set out in schedules 5.1, 5.2, 5.3 and 5.3a subject to any *derogation* applicable to the *plant* to which the proposed *performance standards* apply; (2) is drafted to enable, in *NEMMCO's* reasonable opinion, a compliance program to be instituted and maintained in respect of the *performance standard* under clause 5.12(c); and (3) can be complied with, based on the information provided to *NEMMCO* by the *Network Service Provider* and the *Connection Applicant*,	.	NEMMCO doesn't require commercial details of the connection agreement. Disclosure should be limited to technical and operational issues. This should be limited to information submitted in the Generator Performance Standards and the modelling information. Generator Performance Standards should be able to stand alone and not be affected by the commercial terms in a connection agreement. The clause requires amendment to reflect this distinction.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(d) *NEMMCO*, or in respect of a matter concerning the quality of *supply* to *Network Users*, *NEMMCO* in consultation with the relevant *Network Service Provider*, must, when assessing the proposed *performance standard*for a particular requirement based on any provision of schedules 5.1, 5.2, 5.3 and 5.3a, require a *Connection Applicant* to meet or exceed the *minimum access standard* but must not require the *Connection Applicant* to exceed the relevant *automatic access standard* for that requirement. (e) A *Generator* must forward to *NEMMCO* prior to registration relevant *metering installation* details of the proposed *plant* and *connection*, including: (1) the proposed *metering installation*; (2) arrangements for the *Metering Provider* to obtain physical access to the *metering installation.* (f) NEMMCO must, within 20 *business days* of the receipt of the information referred to in clause 5.3.7A(e), advise the relevant *Network Service Provider* and *Generator* whether the proposed *metering installation* is acceptable for those *metering installations* associated with those *connection points* that are classified as *metering installation* types 1, 2, 3 and 4 as specified in schedule 7.2.		
5.3.10	**5.3.10 Acceptance of Performance Standards for Generating Plant that is Altered** (a) A *Generator* must not commission altered *generating plant* until the *Generator* has satisfied *NEMMCO* that clause 5.3.9 has been complied with and each amended *performance standard* submitted: (1) either meets the *automatic access standard* applicable to the relevant technical requirement or, if the *performance standard* does not meet the *automatic access standard*, it would not be rejected if clauses 5.3.4A(a) and 5.3.4A(d) were	This clause is required to set out the procedure and tests to be applied in determining whether to accept or reject proposed performance standards submitted on alteration of generating plant.	Any alteration to an existing generating system with a current Connection Agreement should require the performance of the plant post modification to meet its existing performance standard. If this is not the case equipment would seldom be "commissioned" after an alteration.

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	applied at the time the submission of *performance standards* is received by *NEMMCO*; (2) is drafted to enable, in *NEMMCO's* reasonable opinion, a compliance program to be instituted and maintained in respect of the *performance standard* under clause 5.12(c); and (3) can be complied with, based on the information provided to *NEMMCO*.		
5.7.3(a)	(a) Each *Generator* must, prior to the *Generator* implementing a compliance program in accordance with clause ~~4.15(b)~~5.12(b), provide evidence to any relevant *Network Service Provider* with which that *Generator* has a *connection agreement* and *NEMMCO* that each of its *generating units* 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 unit*.	This change is required to ensure that correct referencing is applied.	This clause should be amended to refer to "Generating system" should be included for consistency. The performance standards should be defined at the connection point of the generating system.
5.7.3(c)	(c) If, prior to the *Generator* implementing a compliance program in accordance with the requirements of clause ~~4.15(b)~~5.12(b), a performance test or monitoring of in-service performance demonstrates that a *generating unit* 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 unit* then the *Generator* must:	This change is required to ensure that correct referencing is applied.	This clause should be amended to refer to "Generating system" should be included for consistency. The performance standards should be defined at the connection point of the generating system.
5.7.6(a1)	(a1) If *NEMMCO* reasonably considers that: (1) the analytical 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*,	This clause gives NEMMCO a right to require an NSP to exercise its power to request testing to determine analytical parameters for modelling purposes. This is necessary because NEMMCO has a responsibility for power system security, and ability to ensure power system security is strongly affected by the quality of models used to determine stability	This clause should not include words such as "NEMMCO reasonably considers". It is too vague. This clause should be amended to refer to "Generating system" should be included for consistency. The performance standards should be defined at the connection point of the generating system.

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	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 clause 5.7.6(a). *NEMMCO* may witness such tests.	limits.	
5.7.6(h)	(h) 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.	This amendment adds NEMMCO and NSP to list of parties to bear their own costs for testing. (NSP previously only implied).	If NEMMCO request further testing carried out under 5.7.6(a1) is should be undertaken at NEMMCO's cost.
5.10	**5.10 Performance Standards – transitional arrangements** **5.10.1 Submission of Performance Standards on or about the Performance Standards Commencement Date** (a) A *Generator*, *Customer* or *Market Network Service Provider* who, at the *performance standards commencement date*, engages in the activity of owning, controlling or operating *plant* must, within 30 days of the *performance standards commencement date*, submit to *NEMMCO* proposed *performance standards* for that *plant*, to be: (1) in the case of a person who is registered as a *Generator* in relation to that *plant* - in accordance with schedule 5.2; (2) in the case of a person who is registered as a *Customer* in relation to that *plant* - in accordance with schedule 5.3; or (3) in the case of a person who is registered as a *Market Network Service Provider* in relation to that *plant* -in accordance with schedule 5.3a. (b) A *Network Service Provider* must, on request by a person who has made a submission under clause 5.10.1(a), 5.10.1(c) or 5.10.1(d) whose *facility* is connected to the *Network Service Provider's network*, provide that person with all performance data and other information	Clause 5.10.1(b) has been rewritten from 4.13.(b). The words "confidential information" have been removed because some of the information required is considered elsewhere in the Rules to be "confidential information", but nevertheless may need to be provided. Clause 5.10.1(c) is required to correct an anomaly in the current Rules where people with signed connection agreements who were not Registered Participants at the time of the last changes to the Code (preceding the change to Rules), but who subsequently became registered, are not covered by the process to create performance standards either under chapter 5 or chapter 4. This clause ensures that performance standards will now be recorded for these Participants. Clause 5.10.1(e) is required as a transitional arrangement for the introduction of the new process where performance standards are assessed before the connection agreement is signed.	Roaring 40s support the NGF proposed derogation and comments below. A derogation is a more appropriate manner to deal with transitional changes with a sunset date.

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	reasonably required by that person to satisfy its obligations under clauses 5.10.1(a), 5.10.1(c) and 5.10.1(d). (c) A person who, at the *performance standards commencement date*: (1) was not registered as a *Generator*, *Customer* or *Market Network Service Provider*; and (2) was either; (i) party to a *connection agreement*; or (ii) negotiating a *connection agreement*, the negotiation of which was not subject to clause 5.3.4A; and (3) who subsequent to the *performance standards commencement date*, but prior to the date this clause 5.10.1 became effective ("effective date"), registered as a *Generator*, *Customer* or *Market Network Service Provider*, must, within 30 days of the *effective date*, submit to NEMMCO proposed *performance standards* for that *plant* in accordance with clause 5.10.1(e). (d) A person who at the *effective date* was not registered as a *Generator*, *Customer* or *Market Network Service Provider*, but was party to a *connection agreement* must, within 30 days of the *effective date*, submit to *NEMMCO* proposed *performance standards* for that *plant* in accordance with clause 5.10.1(e). (e) The *performance standards* required to be submitted under clause 5.10.1(c) and (d) must be in accordance with: (1) schedule 5.2 if they are to be registered by a *Generator* in relation to relevant *plant*,; (2) schedule 5.3 if they are to be registered by a *Customer* in relation to relevant *plant*,; or		These requirements are overly complicated and requires claritication. The AEMC should provide a list of parameters/clauses that need to be addressed by participants to allow consistent responses under clause 5.10.2.

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	(3) schedule 5.3a if they are to be registered by a *Market Network Service Provider* in relation to relevant *plant*. **5.10.2 Submission of Performance Standards where the Technical Requirements Change** (a) If, subsequent to the establishment of the *performance standards* a technical requirement against which those *performance standards* were assessed changes, or has changed in any respect, or a new technical requirement is inserted into the *Rules*, the relevant *Generator*, *Customer* or *Market Network Service Provider* must submit to *NEMMCO* a proposed *performance standard* for each of the changed technical requirements. (b) A *Network Service Provider* must, on request by a person who has made a submission under clause 5.10.2 whose *facility* is *connected* to the *Network Service Provider's network*, provide that person with all performance data and other information reasonably required by that person to enable it to satisfy its clause 5.10.2(a) obligations. **5.10.3 Standard of Proposed Performance Standards** A proposed *performance standard* submitted by a *Generator* or *person* under clauses 5.10.1 or 5.10.2 must be at a standard at least equal to: (a) where there is already a relevant registered *performance standard*, that registered *performance standard;* (b) where there is no relevant registered *performance standard*, the relevant technical requirement set out in the relevant *connection agreement;* and (c) where there is no relevant registered *performance standard* and no relevant technical requirement in the *connection agreement*, the relevant design performance of the *plant*.	The existing Rules are deficient in that they do not deal with the situation where the technical requirements change. It is important that Generators address any changes in the technical requirements to ensure system security, reliability and quality of supply are maintained. Clause 5.10.2 is inserted to correct this omission. This clause is required so that the performance standards submitted are not of a lesser standard than what currently is agreed or if there is no agreement, then what is technically achievable by the plant.	

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5.11	**5.11 Acceptance of Performance Standards** **5.11.1 Acceptance of Performance Standards lodged at or about the Performance Standards Commencement Date or in response to a change in the Technical Requirements** *(a)* Following receipt of a proposed set of *performance standards* under clauses 5.10.1(a), 5.10.1(c), 5.10.1(d) 5.10.2(a) or 5.11.1(g), *NEMMCO* must assess whether, in its reasonable opinion, each proposed *performance standard:* (1) satisfies clause 5.10.3 and the technical requirements set out in schedules 5.1, 5.2, 5.3 and 5.3a as at the *performance standards commencement date* subject to any *derogation* applicable to the *plant* to which the proposed *performance standards* apply; (2) is drafted to enable, in *NEMMCO's* reasonable opinion, a compliance program to be instituted and maintained in respect of the *performance standard* under clause 5.12(c); and (3) can be complied with, based on the information provided to *NEMMCO* by the *Network Service Provider* and the *Connection Applicant.* (b) In respect of a submission under clause 5.10.1(a), 5.10.1(c), 5.10.1(d), 5.10.2, or 5.11.1(b) to 5.11.1(l) shall apply to *NEMMCO* and the person making the submission except that the references to the "*performance standards commencement date*" shall be read as referring to the date that the changes to the technical requirements, being the changes referred to in clause 5.10.2, take effect in each relevant circumstance. (c) To the extent of any inconsistency between: (1) a *performance standard* determined in	Clause 5.11 reiterates the existing clause 4.14 with the necessary amendments. Clause 5.11.1(a1) deals with the situation regarding the requirement to lodge performance standards when the technical requirements change. The intent of this clause is that existing process of registering performance standards is continued for subsequent changes to performance standards (including the current proposals).	Given Clause 5.10, where requirement is not expected to exceed previous requirements, this clause is acceptable. The clause should only refer to technical and operational parts of agreement Better wording to clarify this distinction should be adopted.

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	accordance with a derogation in force at the *performance standards commencement date* and a *performance standard* determined in accordance with: (i) the technical requirements set out in schedules 5.1, 5.2, 5.3 and 5.3a; (ii) the *connection agreement* applicable to the *plant* to which the *performance standard* applies; or (iii) the design performance of the *plant* at the *performance standards commencement date*, the *performance standard* determined in accordance with the derogation will prevail; (2) a *performance standard* determined in accordance with an existing *connection agreement* and a *performance standard* determined in accordance with: (i) the technical requirements set out in schedules 5.1, 5.2, 5.3 and 5.3a; or (ii) the design performance of the *plant* at the *performance standards commencement date*, the *performance standard* determined in accordance with the *connection agreement* will prevail; and (3) a *performance standard* determined in accordance with the design performance of the *plant* at the *performance standards commencement date* and a *performance standard* determined in accordance with the technical requirements set out in schedules 5.1, 5.2, 5.3 and 5.3a, the *performance standard* determined in accordance with the design		

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	performance of the *plant* will prevail. (d) *NEMMCO* must, if it assesses that a proposed *performance standard*: (1) meets the criteria set out in clause 5.11.1(a), accept the proposed *performance standard*; or (2) does not meet the criteria set out clause 5.11.1(a), reject the proposed *performance standard*. (e) *NEMMCO* must advise the person who submitted a proposed *performance standard*, under clause 5.10.1(a) or 5.10.1(c), 5.10.1(d) or 5.10.2 or 5.11.1(g) of its decision to accept or reject the proposed *performance standard* under clause 5.11.1(d), within 60 *business days* of submission of the proposed *performance standard* to *NEMMCO* in accordance with clause 5.10.1(a), 5.10.1(c), 5.10.1(d), 5.10.2 or 5.11.1(g) (as the case may be). (f) If *NEMMCO* rejects a proposed *performance standard* under clause 5.11.1(d)(2), *NEMMCO* must, when advising the person under clause 5.11.1(e), also provide the person with detailed reasons for its decision. (g) If *NEMMCO* rejects a proposed *performance standard* under clause 5.11.1(d)(2), the person who submitted the proposed *performance standard* to *NEMMCO* must, within 20 *business days* of the date on which *NEMMCO* made its decision to reject the proposed *performance standard*, resubmit an amended proposed *performance standard* under clause 5.10.1(a), 5.10.1(c), 5.10.1(d) or 5.10.2 (as the case may be), taking *NEMMCO's* comments into consideration. (h) If, 11 months from the date that a person is required under clause 5.10.1(a), 5.10.1(c), 5.10.1(d) or 5.10.2 (as the case may be) to submit a proposed *performance standard* a *performance standard* has not been approved under clause 5.11.1(d)(1), the *performance standard* for the *plant* to which the proposed *performance standard* related is deemed to be (in order of priority):		

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	(1) the technical characteristics set out in the relevant *connection agreement* or, in the case of a submission made under clause 5.10.2, if there is an existing *performance standard* registered with *NEMMCO*, that *performance standard*; (2) if a *derogation* is in place, the *connection agreement* subject to the technical characteristics set out in the relevant *derogation*; or (3) the connection requirements of the *connection point* determined under schedule 5.2, 5.3 or 5.3a as applicable to the *plant* and where there is an *automatic access standard* for a technical requirement, that standard. (i) For the purposes of clause 5.11.1, *NEMMCO* must accept a *performance standard* materially based on and consistent with a *derogation* applicable to the *plant* to which the *performance standard* applies. (j) A person whose proposed *performance standard* is rejected under clause 5.11.1(d)(2) may dispute *NEMMCO's* decision to reject the proposed *performance standard* and will be taken to be a *Connection Applicant* for the purposes of the dispute. (k) If a dispute arising under clause 5.11.1(j) is not resolved in accordance with clause 8.2.4 within 60 *business days*, notwithstanding any other provision in clause 8.2, the *Adviser* must refer the dispute for resolution to a *DRP* for determination in accordance with clauses 8.2.6A to 8.2.6D. (l) *NEMMCO*, or in respect of a matter concerning the quality of *supply* to *Network Users*, *NEMMCO* in consultation with the relevant *Network Service Provider*, must, when determining the applicable per*formance standard* for a particular requirement based on any provision of schedules 5.1, 5.2, 5.3 and 5.3a, require a person to meet or exceed the *minimum access standard* but must not require that person to exceed the relevant		

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	automatic access standard for that requirement. **5.11.2 Access to Information for Assessment of Proposed Performance Standards** (a) *NEMMCO* may request that a person who has submitted a proposed *performance standard* in accordance with clauses 5.3.7A (1), 5.10.1(a), 5.10.1(c), 5.10.2, 5.10.3, 5.10.2 or 5.11.1(g) provides additional supporting information including, without limitation, an up-to-date version of the *connection agreement*, to facilitate *NEMMCO's* assessment of the *performance standard* submitted. (b) A person who receives a request from *NEMMCO* under clause 5.11.2(a) must comply with the request within 5 *business days* of the request or such further time as agreed by *NEMMCO*. (c) If a clause 5.11.2(a) request relates to a clause 5.3.7A(a) submission, *NEMMCO* must make the request within 5 *business days* of receiving the information referred to in clauses 5.3.7A(b) and S5.2.4. (d) A *connection agreement* submitted under clause 5.11.2(b) or 5.3.7A(b) is *confidential information*. (e) *Performance standards* and proposed *performance standards* are *confidential information*. **5.11.3 Register of Performance Standards** (a) This clause 5.11.3(a) does not apply to *generating plant*. An *automatic access standard* or, if the procedures in clause 5.3.4A have been followed, a *negotiated access standard* included in a *connection agreement*, is taken to be the *performance standard* applicable to the *connected plant* for the relevant technical requirement. If there is no *automatic access standard* and no *minimum access standard* for a technical requirement, the *access standard* set out in schedule 5.1, 5.3 or 5.3a (as the case may be) that is relevant to that technical requirement is taken to be the *performance standard* applicable to the *connected*	This clause is required to ensure NEMMCO has access to the information it requires to assess proposed performance standards. Appropriate safeguards are inserted to ensure that certain information is regarded as confidential information and so attracts the protection that the Rules afford such information. Clause 5.11.3(a) is a reworking of clause 5.3.4A(g). It has been amended so that it does not apply to generators. This is because there is now a specific regime that applies to the determination of performance standards for generators. The text of the original 5.3.4A(g) has been amended in 5.11.3(a) to cover the situation where there are mandatory technical requirements. This situation was not dealt with by the original text of	

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	plant for that technical requirement. (b) From the *performance standards commencement date*, *NEMMCO* must establish, maintain and update a register of the *performance standards* applicable to *plant*. *NEMMCO* must record on the register *performance standards* once they are accepted by *NEMMCO* under clauses 5.3.7B(a) or 5.11.1(d) or deemed to be *performance standards* under clause 5.11.1(h). (c) If a person becomes aware that the information utilised to obtain the acceptance of a *performance standard* is incorrect or incomplete in a material respect, that person must immediately notify *NEMMCO* of the details. If *NEMMCO* receives such a notice, or itself considers that the information used is incorrect or incomplete in a material respect, *NEMMCO* may recommence an assessment of that *performance standard* and clauses 5.3.7A, 5.3.7B, 5.10 and 5.11 and 5.12 shall apply and operate as if a submission had been made under clause 5.3.7A or 5.10 (as the case may be). This clause 5.11.3(e) operates notwithstanding that the relevant *performance standard* is registered. (d) A *performance standard* may be amended at any time by agreement between *NEMMCO*, the relevant *Registered Participant* and *Network Service Provider* provided it does not adversely affect *power system security*.	5.3.4A(g). Clause 5.11.3(b) imposes an obligation on NEMMCO to establish and maintain a register of performance standards. Clause 5.11.3(c) imposes an obligation on persons to notify NEMMCO if information on which a proposed performance standard was assessed is found to be incorrect. This clause is necessary to ensure that in such cases NEMMCO is made aware of the situation and so can react in the appropriate manner. Clause 5.11.3(d) is inserted to introduce flexibility into the performance standard regime to change performance standards if agreed by all relevant parties.	
5.12	**5.12 Performance Standard Compliance** (a) A *Registered Participant* must: (1) ensure that its *plant* meets or exceeds each applicable *performance standard*; (2) ensure that its *plant* is not likely to cause a material adverse effect on *power system security*; and (3) immediately ensure that its *plant* ceases to be	Amendments are required to ensure appropriate referencing.	Roaring 40s support the NGF comments. This should be assessed at time of connection and not be a continuous requirement, potentially requiring upgrades to plant in the future

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	likely to cause a material adverse effect on *power system security*, if: (i) the *Registered Participant* reasonably believes that its *plant* is likely to cause a material adverse effect on *power system security*; or (ii) *NEMMCO* advises the *Registered Participant* that the *Registered Participant's plant* is likely to cause a material adverse effect on *power system security*. (b) A *Registered Participant* who engages in the activity of planning, owning, controlling or operating *plant* to which a *performance standard* applies must, within 6 months of the later of the date of the acceptance of the *performance standard* by *NEMMCO* or the commencement of operation of the *plant*, institute and maintain a compliance program under clause 5.12(c). (c) A compliance program instituted and maintained in accordance with clause 5.12(b) must: (1) monitor the performance of the *plant* in accordance with the compliance program; (2) ensure that the *plant* complies with the relevant *performance standards*; (3) be in accordance with *good electricity industry practice*; and (4) provide reasonable assurance of ongoing compliance with each applicable *performance standard*. (d) The *AER* may request that a *Registered Participant* who is required to institute and maintain a compliance program under clause 5.12(b) or 5.7.4(a1), deliver to the *AER*: (1) the compliance program records setting out the		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	results of the performance monitoring conducted under clause 5.12(f); and (2) any other records maintained under clause 5.7.3 or 5.7.4, if applicable. (e) Each Registered Participant must maintain the compliance program records and any other records developed or maintained under clause 5.7.3 or 5.7.4 for 7 years and deliver such records to the *AER* under clause 5.12(d) within 2 *business days* of the date of a request or such further period as the *AER* requires. (f) A *Registered Participant* who engages in the activity of planning owning, controlling or operating *plant* to which a *performance standard* applies must immediately notify *NEMMCO* if: (1) the *Registered Participant* becomes aware that the *plant* is breaching a *performance standard* applicable to the *plant*; or (2) the *Registered Participant* reasonably believes that the *plant* is likely to breach a *performance standard* applicable to the *plant.* (g) A clause 5.12(f) notice must detail: (1) the reason for actual or likely non-conformance of the *plant* with the relevant *performance standard*; (2) the actual or likely time of commencement of non-conformance of the *plant* with the relevant p*erformance standard*; (3) the expected duration of non-conformance of the *plant* with the relevant *performance standard*; and (4) the expected performance of the *plant* in comparison with the relevant *performance standard*. (h) A *Registered Participant* who has notified *NEMMCO*		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	under clause 5.12(f) must notify *NEMMCO* that its *plant* has returned to compliance with the *performance standard* immediately following the return of the *plant* to compliance. (i) Subject to clause 5.12(g), if: (1) a *Registered Participant* notifies *NEMMCO* in accordance with clause 5.12(f); or (2) *NEMMCO* otherwise reasonably believes that the *plant* of a *Registered Participant* in respect of which a *performance standard* applies is in breach of that *performance standard*, *NEMMCO* must, determine the period of time within which a *Registered Participant* must rectify a *performance standard* breach under clause 5.12(j), and advise the *Registered Participant* of that period. (j) When determining the period of time within which a *Registered Participant* must rectify a *performance standard* breach under clause 5.12(i), *NEMMCO* must take into consideration: (1) the time necessary, in *NEMMCO's* reasonable opinion, to provide the *Registered Participant* with the opportunity to remedy the breach; and (2) the need to act to remedy the breach given the nature of the breach. (k) If *plant* remains in breach of a *performance standard* for a period of time greater than that advised under clause 5.12(i), *NEMMCO* must notify the *AER* of the breach. (l) The effectiveness of a compliance program established under clause 5.12(b) must be taken into consideration in any proceeding against a *Registered Participant* for a breach of clause 5.12(a). (m) Any clause 5.7.3(c) obligation imposed on a *Generator* ceases to operate upon commencement of a compliance program by the *Generator* under this clause 5.12.		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
S5.1.7(c) and (d)	(c) A *Network Service Provider* must include conditions in *connection agreements* to ensure that each *Generator* will balance the voltage generated in each phase of its *generating units* and, when not generating, the current drawn in each phase, so as to achieve average levels of negative sequence voltage at each of the *generating unit connection points* due to phase imbalances within the *generating plant* not more than: (1) *Automatic access standard*: the values set out in Table S5.1a.1 and clause S5.1a.7; (2) *Minimum access standard*: 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. (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 *automatic access standard* 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*.		This is an NSP planning obligation not the generators. Any requirements on generator should be in S5.2 (as they are). This clause should deal with the allowable amount of negative sequence voltage on the network. Clause (d) is unacceptable, again because it creates high investment risk.
S5.2.4	**S5.2.4 Provision of information** (a) ~~The~~ A *Generator* or person who has negotiated a proposed *connection agreement* for *connection* of a *generating system* and advised *NEMMCO* of this under clause 5.3.7A(a) must promptly on request by *NEMMCO* or the *Network Service Provider* provide all data ~~of the kinds~~ specified in schedule 5.5 ~~reasonably required by NEMMCO of the Network Service Provider~~ or the *Generating System Model Guidelines, Generating System Design Data Sheet*, or *Generating System Setting Data Sheet* about its *generating systems*. (b) ~~Three months before first *synchronisation* a *Generator*~~	The term "scheduled" generating unit has been changed to "generating system comprised of generating units with combined nameplate rating of 30 MW or more" to extend the clause to cover large non-scheduled generating systems (eg some wind farms). The term *generating system* has also been extended to cover reactive power equipment. The obligation in clause S5.2.4(a) has been extended to an intending Generator	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	~~must, in respect of each proposed *scheduled generating unit*, provide~~ In respect of an existing or proposed *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 5.3.7A(a), 5.3.9(b). 5.10.1(a), 5.10.1(c) or 5.10.1(d); (2) three months before commissioning of a *generating system* or planned alteration to a *generating system ;* and (3) 5 *business days* before commissioning of an unplanned alteration to a *generating system;* the *Generator*, or person required under the Rules to register as the *Generator*, 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*) ~~and any relevant *Distribution Network Service Provider*~~ with the following information about the ~~*generating unit's*~~ *control systems* ~~for *frequency* control and *voltage* control~~ of the *generating system*: (i) a set of functional block diagrams, including all functions between feedback signals and *generating unit* 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	that has entered into a connection agreement, because the information is required before registration. The references to schedules S5.5.1 and S5.5.2 have been changed to refer to the documents to be made under clause S5.5.7. The requirement for information in S5.2.4(b) has been extended to cover control systems that are applied to the generating system (as well as those applying to the generating unit), and including controls of such things as Statcoms and SVCs that contribute to the performance of the generating system.	

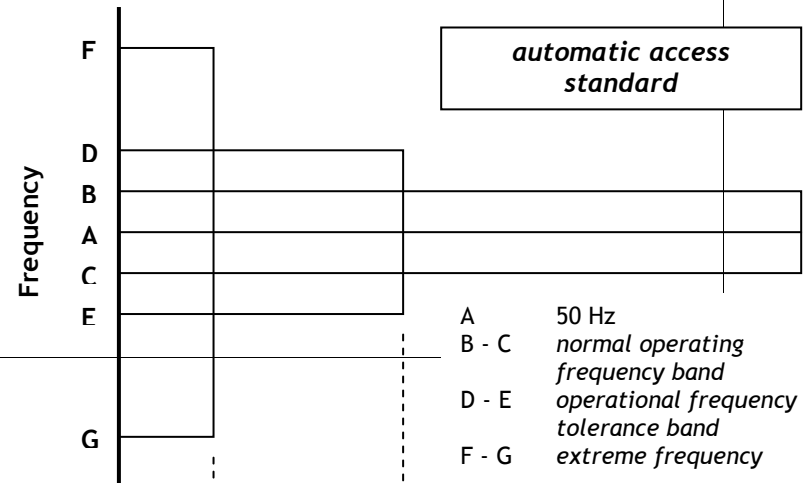
Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(5) to *NEMMCO* only, simulation source code in an unencrypted form suitable for at least one of the software simulation products nominated by *NEMMCO* and in a form that would allow conversion for use with other software simulation products by *NEMMCO*, sufficient for *NEMMCO* and *Network Service Providers* to perform load flow and dynamic simulation studies. ~~The information provided must be updated within 3 months after commissioning tests or other tests undertaken in accordance with clause 5.7.3 of the *Rules* are completed. The *connection agreement* must record the process for subsequently changing this information. Conformance with the requirements described in this clause is the responsibility of the *Generator* and is subject to the provisions of clause 5.7.3(f) of the *Rules* for each *generating unit*.~~ (b1) The information provided under clause S5.2.4(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. (b2) The *Generator* must update the information provided under clause S5.2.4(b) within 3 months after commissioning tests or other tests undertaken in accordance with clause 5.7.3 are completed. (c) For the purposes of clause 5.3.2(d) ~~of the *Rules*~~, the	Clause S5.2.4(c) covers the information that the NSP is required to give to the	The information supplied should refer to the Generating System performance, not the performance of the Generating Units. The verification testing of the performance of the Generating System should be undertaken at the connection point, not on individual Generating Units. It is agreed that the Generating System performance models need to model all aspects of a wind farm, including the Wind Farm Control System capabilities. It should be recognised, however, that the suppliers of wind turbines have not yet developed these models to the extent required by this clause, and enforcement of this clause will delay wind farm development in Australia. The clause should reflect the reality of the current situation and allow for it.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of the proposed *connection* for a *generating unit* includes: (1) the highest expected single phase and three phase fault levels at the *connection point* with the *generating unit* not *synchronised*; (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 unit* not *synchronised*; (4) technical information relevant to the *connection point* with the *generating unit* 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) ~~any other~~ information ~~or data not being *confidential information*~~ relating to the performance of the ~~*Network Service Provider's facilities*~~ *national grid* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*, including, without limitation: (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	Connection Applicant if requested. It has been extended to cover power system modelling information necessary to perform assessments required under clause S5.2.5.	

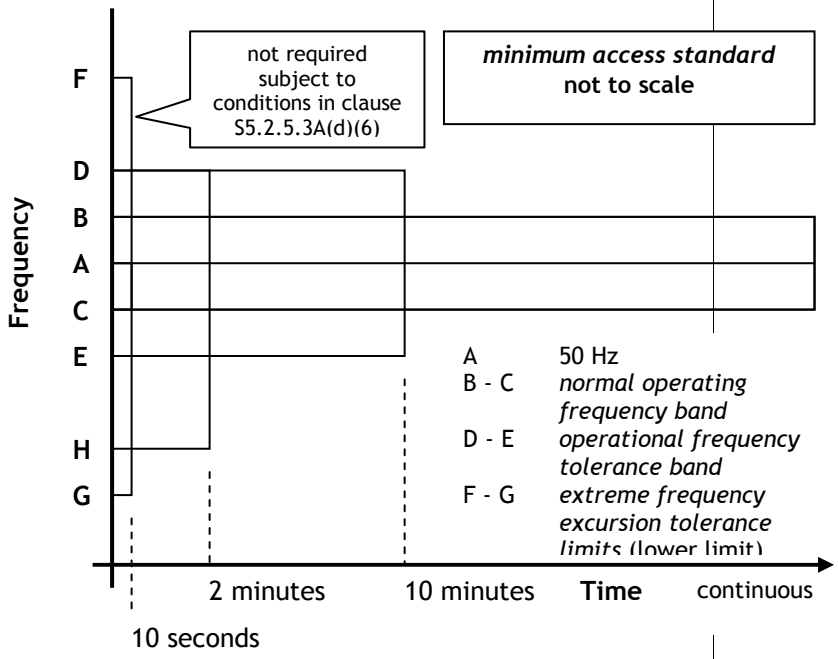
Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	intra-regional power transfer capabilities and relevant *plant* ratings. ~~except where the *Connection Applicant* agrees the *Network Service Provider* may provide alternative or less detailed technical information in satisfaction of this clause S5.2.4(c).~~ (d) All information provided under this clause S5.2.4 must be treated as *confidential information*.	Clause S5.2.4(d) reiterates the requirement from clause 5.3.8 that recipients must treat information provided as confidential.	
S5.2.5.1	**Reactive power capability** ~~For the purpose of this clause S5.2.5.1:~~ ~~*'rated active power output'* means the 'Rated MW (Generated)' (as defined in schedule 5.5.1) for the relevant *synchronous generating unit*; and~~ ~~*'nominal voltage'* means the 'Nominal *voltage* at *connection* to *Network*' (as defined in schedule 5.5.1) at the *connection point* for the relevant *synchronous generating unit*.~~ (a) *Automatic access standard*: Each ~~*synchronous generating unit*~~ or *generating system*, while operating at any level of *active power output* and any voltage at the *connection point* within the limits established under clause S5.1a.4 without a *contingency event*, must be capable of~~(1)~~ 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* ~~*output*~~ of the *generating unit* or *generating system* ~~at *nominal voltage*~~ and 0.395~~(2) absorbing at its *connection point* an amount of *reactive power* of at least the amount that would be absorbed equal to the product of the *rated active power output* of the *generating unit* at *nominal voltage* and 0.395.~~ (b) *Minimum access standard*: No capability is required~~ment~~ to supply or absorb *reactive power* at the *connection point.*	The definition of rated active power has been replaced to remove reference to Schedule 5.5.1, and remove technology-specific wording. Reference to S5.5.1 has been removed because this schedule is to be replaced and the replacement documents may no longer contain that reference.	As S5.1a.4 is written around 'normal' 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 normal 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.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(c) When negotiating an *access standard* t~~T~~he *Generator* and the *Network Service Provider:* (1) ~~may in accordance with clause 5.3.4A of the *Rules*, negotiate a~~ must, subject to any agreement under clause S5.2.5.1(d)(4), ensure that the *reactive power capability* of the *generating unit* or *generating system* is sufficient to ensure that all relevant *system standards* are met before and after ~~under system normal and~~*credible contingency events* ~~operating conditions~~ 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~~ *active power output* due to a design characteristic of the *plant*. (d) ~~The *Generator* may reach a commercial arrangement with the *Network Service Provider* or a *Registered Participant* for the provision of *reactive power capability* sufficient to ensure the *Generator's* obligation under this clause is met.~~If the proposed *generating system* is not capable of the level of performance established under clause S5.2.5.1(c)(1), the *Network Service Provider* may: (1) require the *Generator* to pay compensation to the *Network Service Provider* for the provision of the deficit of *reactive power* (supply and absorption) from within the *network*; (2) allow the *Generator* to install additional equipment *connecting* at the *generating system's connection point* or another location, to provide the deficit of *reactive power* (supply and	Sub-clauses (2) and (3) specify greater details about what can be negotiated and this will mean that alternative methods of providing reactive power capability more economically will be explicitly available. The automatic access standard has been extended to apply to any technology, and not just to synchronous plant, and to apply to generating systems. The basis of negotiation has been amended to clarify it, and provide flexibility in the way that reactive power is specified.	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	absorption), which equipment is deemed to be part of the *generating system*; (3) allow the *Generator* to reach a commercial arrangement with a *Registered Participant* to provide the deficit of *reactive power* (supply and 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 *access standard*, operational arrangements by which the *plant* can achieve an agreed level of performance for those operating conditions. (e) The *access standard* must record, the agreed value for *rated active power* and where relevant the method of determining the value. The value for a *generating system* must take into account its in-service *generating units* and additional *reactive power* equipment that is part of the *generating system*. (f)~~(e)~~ The *access standards* for consumption of *energy* by a ~~*Generator*~~*generating system* when not supplying or absorbing *reactive power* under an *ancillary services agreement* ~~are to be determined in accordance with~~are to be established under clause S5.3.5 ~~of schedule 5.3~~ as if the *Generator* were a *Market Customer*.		
S5.2.5.3A	**Generating unit response to frequency disturbances** (a) For the purposes of clause S5.2.5.3A, a reference to "*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. (b) A*utomatic access standard*: Each *generating unit* must be capable of *continuous uninterrupted operation* for frequencies in the following ranges provided that the rate	Clause S5.2.5.3A(a) is required to clarify which of the various values of the frequency standard terms applies in a particular situation. Note that many frequency bands and limits in Tasmania are different compared with those in the other regions. The automatic access standard is based on the existing mandatory standard, but more	In general the Rules should not quote specific frequencies or rates of change of frequencies but should rely on the frequency operating standards as determined for each region. This in turn suggests that some standardisation on the requirements for these operating

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	of change of *frequency* is less than 4 Hz per second: (1) the lower bound of the *extreme frequency excursion tolerance limits* to the lower bound of the *operational frequency tolerance band* for at least 2 minutes; (2) the lower bound of the *operational frequency tolerance band* to the lower bound of the *normal operating frequency band*, for at least 10 minutes including any time spent in the range under clause S5.2.5.3A(b)(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 10 minutes including any time spent in the range under clause S5.2.5.3A(b)(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 2 minutes. (c) The *automatic access standard* is illustrated in the following diagram. To the extent of any inconsistency between the diagram and clause S5.2.5.3A(b), clause S5.2.5.3A(b) prevails.  	explicit in terms of how the various frequencies are to be applied. The partial load rejection clause (S5.2.5.4) has been deleted, and instead, in S5.2.5.3A rate of change of frequency has been specified for automatic and minimum standards. This is more technology neutral than the partial load rejection concept, and is more appropriate for wind generation.	standards should be set but this should not be in the Rules. As it stands the requirements are far in excess of the capability of wind turbines and as such Roaring 40s cannot agree with the changes. In general the period when frequency could be in extreme frequency bands is too long.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(d) *Minimum access standard:* Each *generating unit* must be capable of *continuous uninterrupted operation* for frequencies in the following ranges provided the rate of change of *frequency* does not exceed 1 Hz per second: (1) lower bound of the *extreme frequency excursion tolerance limits* to 47.5 Hz for at least 10 seconds; (2) 47.5 Hz to lower bound of the *operational frequency tolerance band* for at least 2 minutes; (3) lower bound of the *operational frequency tolerance band* to the lower bound of the *normal operating frequency band* for at least 10 minutes including any time spent in the ranges under clauses S5.2.5.3A(d)(1) and (2); (4) *normal operating frequency band* for an indefinite period; (5) upper bound of the *normal operating frequency band* to the upper bound of the *operational frequency tolerance band* for at least 10 minutes including any time spent in the ranges under clause S5.2.5.3A(d)(6); and (6) in respect of a *generating unit* that: (i) is part of a *generating system* comprised of *generating units* with a combined *nameplate rating* of 30 MW or more; or (ii) does not have a *protection system* to trip the *generating unit* if the *frequency*	The minimum standard allows a relaxation of the durations for which the generating unit must operate. The value of 47.5 Hz comes from the IEC60034 standard as the minimum frequency level for continuous operation. **The value of 4 Hz/sec is based on expected performance in Tasmania for loss of high Basslink import.** Small generating systems that are fitted with settable trip relays are permitted to trip for over-frequencies above the upper bound of the operational frequency tolerance band. This will ensure that they do not trip for credible contingency events.	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	exceeds a level agreed with *NEMMCO*, 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 least 10 seconds. (d) The *minimum access standard* is illustrated in the following diagram. To the extent of any inconsistency between the diagram and clause S5.2.5.3A(d), clause S5.2.5.3A(d) prevails.  		In a small enough island, this would be inevitable for any generator. The provisions in (f) may make the minimum requirements artificial. Our concern is that yes, the minimum access provisions allow a narrower frequency capability but this may be over-ridden by (f) under the adverse impact provisions of point (3). The criteria for "adverse impact" needs to be clearly defined.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(f) A *negotiated access standard* can be accepted by the *Network Service Provider* provided that *NEMMCO* and the *Network Service Provider* agree that: (1) the proposed *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 *supply* to other *Network Users* or on *inter-regional* or *intra-regional power transfer capability*. (g) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.3A.	Clause S5.2.5.3A(f) provides a basis for negotiation to prevent power system performance being eroded.	
S5.2.5.3B	**Generating unit response to voltage disturbances** (a) *Automatic access standard*: Each *generating unit* must be capable of *continuous uninterrupted operation* during the occurrence voltage at the *connection point*: (1) in the range of over-voltages for the durations permitted under clause S5.1a.4; (2) in the range 90% to 100% of *normal voltage* continuously; (3) in the range 80% to 90% of *normal voltage* for a	The voltage-recovery conditions that were previously included in the automatic standard (but not in the minimum standard) have been merged with the voltage excursions clause S5.2.5.3B because withstanding a voltage disturbance should not rely on there being a fault. The previous mandatory standard for	Again this clause refers to the Generating Unit rather than the Generating System. 'Normal Voltage' should be more clearly defined and refer to one voltage set point and not a range of voltages. The requirements of S5.1a.4 far exceed the capability of most wind plant. This necessitates the provision of mitigations to compensate for an event that would produce voltages as defined in S5.1a.4. As more generating systems provide these mitigations the

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	period of at least 10 seconds; and (4) in the range 70% to 80% of *normal voltage* for a period of at least 2 seconds. (b) *Minimum access standard*: Each *generating unit* must be capable of *continuous uninterrupted operation* for voltages at the *connection point* in the range 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. (c) Each *generating unit* 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 proposed *access standard* is as close as practicable to the *automatic access standard* while respecting the need to 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; 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) The *access standard* must include any operational arrangements necessary to ensure the *generating unit* will meet its agreed performance levels under abnormal *network* or *generating system* conditions. (e) In carrying out assessments of proposed *access standards* under clause S 5.2.5.3B, *NEMMCO* and the *Network*	over-voltages has been translated to the automatic standard. The previous standard referred to S5.1a.4 also for the under-voltage, which allows voltages to drop to zero for an indefinite period. It is not practical for generating plant to ride through such voltages. The clause has therefore been amended to include reasonable voltage bands for the automatic access standard. The minimum access standard has been relaxed to only require continuous operation with normal voltage plus or minus 10% at the connection point with allowance for frequency changes that affect magnetic flux levels. This will allow more flexibility to negotiate connection where tripping would not cause cascading failure of other generating units. Clauses (c) and (d) set the basis for negotiation and place strict conditions on the allowance of access standards below the automatic level, to ensure that power system security, reliability of supply (in terms of impact on transfer capability) and quality of supply are not put at risk.	magnitude of the event that must be applied to the power system becomes larger and larger and its likelihood smaller and smaller. This requirement is ill-defined and so should be redefined in terms that have some connection to a real network event. It may also be prudent to reconsider the voltage magnitudes defined in S5.1a.4 to better represent the worst case event. This may need to be done on a region by region basis. Clause S5.2.5.3B(c)(2) says that if the plant is larger than 100MW, the minimum access standard is the automatic access standard – this is not acceptable. Should be assessed on a case-by-case basis. There is one concern in (c) (2) where the largest plant to trip under a voltage excursion is limited to 100MW. This seems to be an arbitrary size. This should be assessed on a case by case basis. We suggest that the NER line up with international E.ON and/or FERC standards. The major manufacturers of wind turbines are compliant with these standards and developers will feel confident that these will comply with NER if equivalent.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	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*. (f) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.3B.		
S5.2.5.3C	**Generating unit response to disturbances following contingency events** (a) In clause S5.2.5.3C: (1) a fault includes without limitation: (A) a *short circuit fault* of the relevant type; and (B) a fault of the relevant type resulting from reclosure onto a fault by the operation of *automatic reclose equipment*; and (2) "fault type" means one or more of the following types: (A) three-phase fault; (B) two phase to ground fault; (C) phase to phase fault; and	In the new wording of S5.2.5.3C credible contingencies are explicitly listed as events for which the generating unit must continue to operate. The existing wording of clause S5.2.5.3 assumes that if a generating unit can operate continuously during a particular type of disturbance, it can operate continuously during disturbances considered less onerous.	Reclosure onto a fault is a new obligation – ride through of a single fault was the original standard. This is not part of the requirements for intermittent generation. Clause 4.2.3(b) defines a three-phase fault as non-credible. Clause 4.2.4 refers to credible events only in its definition of system security. Number of successive reclosures and if single pole or three pole reclosure is not defined. Delay between reclosure is not defined. Wind turbines with AGO should be able to meet automatic access. There is provision for tripping under islanding.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(D) phase to ground fault. (b) The *automatic access standard* is: (1) Each *generating unit* must remain in *continuous uninterrupted operation* for the disturbance caused by any of the events described below, provided that the event is not one that would disconnect the *generating unit* from the *power system* by removing *network elements* from service: (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 the longest time expected to be taken for a relevant *breaker fail protection system* to clear the fault or, if such protection 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 the longest time expected to be taken for the *breaker fail protection system* to clear the fault or, if such protection 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	In the current wording the automatic access standard is for riding through a fault on the transmission system with causes the voltage at the connection point to fall to zero for 175 ms. The 175 ms was a figure drawn from the back-up protection clearance time for a particular generating system, and has no relevance to any other location. Now, the underlying principle has been set, which can be applied to any location. Under the previous wording it was not technically possible for a distribution-connected generating system to meet the automatic access standard. This has now been changed to cover the distribution-connected plant explicitly. In the current wording backup protection clearance time has been substituted. It was felt that few generating units would be able to ride through a 3 phase fault at its connection point cleared in back-up protection time because the power system would likely become unstable for such a fault. Therefore, this has been relaxed in the automatic access standard to a 3 phase fault cleared by primary protection, but 2 phase and single phase faults cleared by	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	fault. (2) Each *generating unit* and *generating system* must, in respect of any fault of the types described in clause S5.2.5.3C(b)(1)(ii) to (iv), subject to any changed *power system* conditions or energy source availability beyond the *Generator's* reasonable control: (i) to assist the maintenance of *power system* voltages during the application of the fault, deliver to the *network* capacitive reactive current of at least the greater of its pre-disturbance reactive current and 4% of the maximum continuous current of the *generating unit* (in the absence of a disturbance) for each 1% reduction (from its pre-fault level) of *connection point* voltage during the fault; (ii) from 100 milliseconds after *disconnection* of the faulted element, deliver to the *network active power* of at least 95% of the level existing just prior to the fault; and (iii) after *disconnection* of the faulted element, deliver to the *network reactive power* sufficient to ensure that the *connection point* voltage is within the range for *continuous uninterrupted operation* under clause S5.2.5.3B. (c) The *minimum access standard* is: (1) Each *generating unit* must remain in *continuous uninterrupted operation* for the disturbance caused by any of the events described below, provided that the event is not one that would disconnect the *generating unit* from the *power system* by removing *network elements* from	breaker fail protection. The minimum standard has been amended to cover distribution-faults explicitly. The wording recognizes that in some cases it may be reasonable to allow small distribution-connected plant to trip for a distribution fault provided there is no material adverse impact on other Network Users. It has also been amended to be	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	service: (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; and (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*. (2) Each *generating system* must, in respect of any fault of the types described in clause S5.2.5.3C(c)(1)(ii) and (iii), subject to any changed *power system* conditions or energy source availability beyond the *Generator's* reasonable control after *disconnection* of the faulted element, deliver to the *network active*	based on actual operating times of all relevant primary protection systems, rather than a number out of a table in the system standards.	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	power and *reactive power* sufficient to ensure that the *connection point* voltage is within the range for *continuous uninterrupted operation* agreed under clause S5.2.5.3B. (d) In carrying out assessments of proposed *access standards* under clause S5.2.5.3C, the *Network Service Provider* and *NEMMCO* 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*; (3) the expected range of *power system* operating conditions; and (4) the expected performance of *control systems* and *protection systems*, including auxiliary systems and *automatic reclose equipmen*t. (e) The *access standard* must include any operational arrangements to ensure the *generating unit* will meet its agreed performance levels under abnormal network or *generating system* conditions (f) 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. (g) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.3C.		
S5.2.5.11	**Frequency control** ~~General:~~ (a) For the purpose of ~~this~~ clause S5.2.5.11:	Minor reformatting of the clause has been undertaken.	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	"*maximum operating level*" means, in relation to~~—a *generating unit*, the greater of its *nameplate rating* and its value for "PMAX" as described in schedule 5.5.1~~: (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~~—a *generating unit*, the greater of zero and its value for "PMIN" as described in schedule 5.5.1~~: (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~~electrical~~ frequency of the *transmission system* or *distribution system* to which the	The definitions have been clarified to remove reference to S5.5.1 and make the definitions stand alone. "Scheduled" removed from each of the clauses. This allows the automatic access standard to be applied to non-scheduled plant such as wind farms and to generating systems.	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	generating unit 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. (b) *Automatic access standard*: (1~~b~~) ~~A *Generator* must ensure that in respect of e~~Each ~~of its *scheduled generating* system's*units* (1) its~~ *active power* transfer to the *power system* must not ~~does not~~: (i) increase in response to a rise in *system frequency*; and (ii) ~~its *active power* transfer to the *power system* does not~~ decrease in response to a fall in *system frequency* ~~(3) any oscillatory behaviour in respect of its *active power* transfer to the *power system* (other than authorised power system stabiliser action) is damped with a damping ratio of more than 0.4.~~ (2~~c~~) ~~A *Generator* must ensure that e~~Each *generating system* ~~of its *scheduled generating units* is~~ must be capable of automatically reducing its *active power* transfer to the *power system*: (i~~1~~) whenever the *system frequency* exceeds the upper limit of the *normal operating frequency band*; (ii2) by an amount that equals or exceeds ~~is at~~ the least ~~the smallest~~ of: (A~~i~~) ~~twenty percent~~ 20% of its *maximum operating level* times the percentage *frequency* difference between *system*	Reference to damping of oscillations has been moved to new clause S5.2.5.14.	Wind turbines can not meet the automatic standard This clause is trying to guarantee that enough generating systems will have capability for provision of services under MASS. The automatic access standard should not embody the MASS requirements for fast and slow contingency service provision but should describe the system requirements. It may be that this means that there is only a minimum standard (which would become automatic) similar to that specified and that there is additional requirements for generating units registered for provision of FCAS.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	frequency and the upper limit of the *normal operating frequency band*; (B~~ii~~) ~~ten percent~~ 10% of its *maximum operating level*; and (C~~iii~~) subject to the *frequency* recovering gradually, the difference between the *generating unit's pre-disturbance level* and *minimum operating level*, but zero if the difference is negative. (iii) sufficiently rapidly for the *Generato*r to be in a position to offer measurable amounts of lower services to the *spot market* for *market ancillary services*. (3~~d~~) ~~A *Generator* must ensure that e~~Each ~~of its *scheduled* *generating units* *or generating system* is~~ must be capable of automatically increasing its ~~output~~ *active power* transfer to the *power system*: (i~~1~~) whenever the *system frequency* falls below the lower limit of the *normal operating frequency band*; (ii~~2~~) by the amount that is equal or exceeds the ~~at~~ least ~~the smallest~~ of: (A~~i~~) ~~twenty percent~~ 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~~ii~~) ~~five percent~~ 5% of its *maximum operating level*; and		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(C~~ii~~) 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*. (e) *Minimum access standard*: ~~(e) A *Generator* must ensure that at each of its *connection points* in relation to its *scheduled generating units*:~~ ~~(1) the *active power* transfer to the *power system* does not increase in response to a rise in *system frequency*;~~ ~~(2) the *active power* transfer to the *power system* does not decrease more than 2 percent per Hz in response to a fall in *system frequency*; and~~ ~~(3) any oscillatory behaviour of *active power* transfer to the *power system* (other than authorised power system stabiliser action) is damped with a damping ratio of more than 0.4.~~ 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*. (f) Each *control system* used to satisfy clause S5.2.5.11 must be *adequately damped*. (g) A *Generator* proposing a *negotiated access standard* in		.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	respect of clause S5.2.5.11(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*. (h) The *access standard* must record the agreed values for *maximum operating level* and *minimum operating level*, and where relevant the method of determining the values. The values for a *generating system* must take into account its in-service *generating units*. (i) 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. (j) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.11. ~~*Negotiated access standards:*~~ ~~(f) 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 ensure that the *negotiated access standard* is equal to the value determined by *NEMMCO* as unlikely to materially adversely affect *system security*.~~ ~~(g) The negotiation of access standards in relation to this clause S5.2.5.11 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.~~	In paragraph (i), a link has been made between the performance standards that are registered in respect of this clause and the eligibility of the generator to participate in market ancillary services for frequency control. This means that the performance is subject to the compliance monitoring requirements of clause 5.12. A basis for negotiation has been added.	
S5.2.5.13	**Control systems and stability~~Excitation control system~~** [Replace entirely with the following] (a) For the purpose of clause S5.2.5.13: '*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:	Some of the definitions used in this clause were not fully specified in the previous clause, and have been amended so that they apply to a test or a simulation, and "settling time" can be applied to	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(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; and '*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. (b) The *automatic access standard* is: (1) Each *generating unit* 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 unit* does not degrade the damping of any mode of oscillation of the *power system*; 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 *control system* must have: (i) permanently installed and operational monitoring and recording facilities for key variables including each input and output, for disturbance monitoring and testing purposes; and	responses that are largely oscillatory. The automatic and minimum standards have been written in terms of scheduled and non-scheduled plant. The mandatory requirements have been translated into the automatic access standard requirements. (The exception to this is ceiling voltage which is slightly higher in the automatic and slightly lower in the minimum standard than the original mandatory standard.) A power system stabiliser specification has been added for the automatic access standard. The existing version of this clause is written around synchronous generating units. The criteria for synchronous plant are well developed, and equivalent subclauses for asynchronous plant which will usually apply to wind farms have been added, rather than attempting to make the existing clauses non-technology specific. The clause was written previously with most of the requirements mandatory. The clause has been reworded as automatic and minimum access standards.	This is overly onerous for any generating system, but especially for wind turbines. This is another example where the philosophy of the impact of the generating system on the power system at the connection point are of greatest interest to the TNSP and NEMMCO. The performance standards should be specified and assessed at the Connection Point. It is simply not practical to have permanently installed equipment as described in (2) (i) on all generating units such as wind turbines.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(ii) facilities for testing the *control system* sufficient to establish its dynamic operational characteristics. (3) Each *synchronous generating unit* 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	The previous automatic access standard requirement from S5.2.5.12 not to cause instability that would adversely affect other Registered Participants has been moved to this clause, and has been included in both minimum and automatic access, because the causing of instability that would adversely affect other participants is not acceptable even at minimum access level.	

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	location agreed under clause S5.2.5.13(b)(3)(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 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 clause S5.2.5.13(d); and (x) has reactive current compensation		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	settable for boost or droop. (4) Each *generating unit*, other than a *synchronous generating unit*, 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 S5.2.5.13(b)(4)(i), of less than: (A) 5.0 seconds for a 5% voltage disturbance with the *generating unit connected* to the *power system*, from an		This clause is unacceptable. Clause (4) (i) makes it the responsibility of a Generator to regulate the voltage at "an agreed location" in the power system. This should not be the case. **The Generator should be responsible only for parameters over which it has full control.** (vii) The requirement for a PSS while possible is difficult to understand in terms of WTG technology. The requirements for a PSS are very specific and but only pertain to synchronous machines. Similarly the requirements under (iv), (v) and (vi) pertain more directly to synchronous generating units. There is often no direct equivalent control system nor is there any need for such control systems. We suggest

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	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 unit 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 clause S5.2.5.13(d); and (viii) has reactive current compensation. (c) The *minimum access standard* is: (1) Each *generating unit* 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 any mode of oscillation that is within 0.3 nepers per second of being unstable, by more than 0.01	In the minimum standard, the control system parameters are specified only for generating systems >30 MW, and taking into account the allowance for plant connected at voltages below 100 kV to have power factor control. Models are not required for plant less than 30 MW, and therefore it is not possible to assess (as part of the access standards) whether the plant is capable of complying with these performance levels. Allowance is made in the minimum standard for plant that is distribution-connected (<100 kV) to operate with power factor control or reactive power control instead of voltage control.	that the stability criterion for these controllers is only important if the controllers exist. We further suggest that there is a hierarchy of control within a generating system. That is there maybe a controller at an individual generating unit that, in conjunction with, all other similar controllers within the generating system, provides an adequately controlled voltage at the connection point. This should be the aim of this clause and so it should be reworded to define the voltage control requirements at the connection points and the standard methods that are used to provide that control across a broad range of generator technologies.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	nepers per second and does not degrade 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 (iii) in either case, sufficient to achieve the performance agreed in respect of clauses S5.2.5.1, S5.2.5.2, S5.2.5.3A, S5.2.5.3B, S5.2.5.3C and S5.2.5.12. (4) Each *synchronous generating unit*, that is part of a *generating system* comprised of *generating units* with a combined *nameplate rating* of 30		The ability to test and verify the performance of control systems is inescapable but the requirements are very vague and need clarification. Will certification from Manufacturer suffice to comply with requirement? Usually tests have to wait for system events to be captured by event recorders to verify the performance. Allowance for this fact needs to be made.

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	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 clause S5.2.5.13(g), 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. (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*		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	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) subject to coordination under clause S5.2.5.13(g), has 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. (d) A *power system* stabiliser provided under clause S5.2.5.13(b) must have the following characteristics: (i) 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; (ii) two washout filters for each input, with ability to bypass one of them if necessary; (iii) 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*; (iv) an output limiter, which for a *synchronous generating unit* is continually adjustable over the		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	range of –10% to +10% of stator voltage; (v) monitoring and recording facilities for key variables including inputs, output and the inputs to the lead-lag transfer function blocks; and (vi) 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. (e) A limiting device provided under clauses S5.2.5.13(b) or S5.2.5.13 (c) must: (1) not detract from the performance of any *power system* stabiliser; and (2) be coordinated with all *protection systems*. (f) If a *generating unit* cannot meet the *automatic access standard*, the *Generator* must demonstrate why that standard could not be reasonably achieved. The *negotiated access standard* proposed by the *Generator* must then 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) 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*. The *access standards* must record such requirements. (h) 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).		

Affected clause	Clause with proposed amendments	Reason	Roaring 40's Comments
	(i) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.13.		