Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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*.		setting/environment. Subject to ongoing discussions regarding 'Grandfathering' of existing plant.
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*	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).	Wording (a) change 'up-to-date" to 'current' Generally agreed – Good process with comments as described below

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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		

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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 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		

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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): (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.		Deeming of Performance Standards is a transitional arrangement and should be dealt with as such. Unrealistic – this clause deems the automatic access standard. If the Plant was capable of this standard, deeming would not be necessary.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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 *performance 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 *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*	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.	A Generator should not be required to exceed any existing performance standard. This is another requirement to present the complete connection agreement which is not acceptable.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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	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 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.	Agree

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	does not adversely affect *power system security*.	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 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	Amendments are required to ensure appropriate referencing.	Auswind support the NGF comments. Change to ensure correct referencing - agreed This should be assessed at time of connection and not be a continuous requirement, potentially requiring upgrades to plant in the future This has implication of imposing new requirement to put in place a monitoring program onto the entire generation system which will have significant impacts on costs (and risk allocation) rather than using the program by exception (ie if something goes wrong, the issue is dealt with and investigated and a monitoring program is put in place).

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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*.		Duplication with 5.7.3(b)

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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 *performance 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* 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		

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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.		
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		There is concern with the open end nature of clause (d). 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. This is an open-ended requirement, potentially requiring

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	future, another *Network User* is adversely affected by negative sequence voltage or current imbalance because of this *generating plant*.		unknown upgrades to plant in the future. It defeats the purpose for having a negotiated or minimum standard.
S5.2.1(a)	(a) This schedule sets out details of additional requirements and conditions ~~which~~ that ~~(subject to clause 5.2)~~ *Generators* must satisfy as a condition of *connection* of a *generating unit* to the *power system*. It does not apply to any *generating unit(s)* ~~in so far as the person who owns, controls or operates them is exempt from registration as a *Generator* in respect of those *generating units* in accordance with clause 2.2.1(c) of the *Rules* and which are *connected* or intended for use in a manner which the *Network Service Provider* considers is unlikely to cause a material degradation in the quality of supply to other *Network Users*~~ that is: (1) subject to an exemption from registration under clause 2.2.1(c); or (2) eligible for exemption under any guidelines issued under clause 2.2.1(c), and which is *connected* or intended for use in a manner the *Network Service Provider* considers is unlikely to cause a material degradation in the quality of *supply* to other *Network Users*.	This clause has been amended to clarify that small generating systems that are eligible for exemption do not need to comply with the requirements of schedule 5.2 whether or not they are registered. The existing wording could be taken to mean that plant that is eligible for an exemption under the guidelines must still satisfy the technical requirements unless the owner or operator has formally sought and been granted exemption under clause 2.2.1.	Agree
S5.2.1(d)	**Delete**	Clause S5.2.1(d) adds nothing and is not needed. It is misleading to state that negotiated access standards are derived from minimum access standards. The obligation to record standards in a connection agreement is a requirement of clause 5.3, not this schedule. The registration of performance standards is a requirement of clause 4.14, not this schedule.	Agree with deletion

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
S5.2.3	**Technical matters to be co-ordinated** (a) A *Generator* and the relevant *Network Service Provider* must use all reasonable endeavours to agree upon relevant technical matters in respect of each new or altered *connection* of a *generating unit* or *generating system* to a *network* including: (1a) design at the *connection point*; (2b) physical layout adjacent to the *connection point*; (3c) primary protection and backup protection (clause S5.2.5); (4d) control characteristics (clause S5.2.5); (5e) communications facilities ~~and alarms~~ (clause S5.2.6); (6f) insulation co-ordination and lightning protection (clause S5.2.3(b)); (7g) fault levels and fault clearance~~times~~ (clause S5.2.9); (8h) switching and isolation facilities (clause S5.2.9); (9i) interlocking and synchronising arrangements; and (10j) *metering installations* ~~as described in Chapter 7 of the *Rules*~~. (b) A *Generator* must ensure that in designing a *generating system's* electrical *plant* operating at the same *nominal voltage* as at the *connection point*, including any *substation* for the *connection* of the *generating system* to the *network*: (1) the *plant* complies with the relevant *Australian Standards* unless a provision of these *Rules* allows or requires otherwise;	These changes are necessary to ensure that the network constructed by a Generator complies with appropriate design criteria consistent with Australian Standards and good Electricity Industry practice. These are similar to the requirements already imposed on Customers (clauses S5.3.2 and S5.3.9) and Market Network Service Providers (clause S5.3a.5 and S5.3a.12) and it is considered a serious omission that similar requirements have not applied to power stations high voltage plant. For example, insulation co-ordination is essential to ensure that plant is not damaged by lightning strikes.	Agreed with comments Rules cannot require plant to not comply with the Australian standards? Also:

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(2) the earthing of the *plant* complies with the Electricity Supply Association of Australia Safe Earthing Guide to reduce step and touch potentials to safe levels; (3) the *plant* is capable of withstanding, without damage the voltage impulse levels specified in the *connection agreement*; (4) the insulation levels of the *plant* are co-ordinated with the insulation levels of the *network* to which the *generating system* is *connected* as specified in the *connection agreement*; and (5) safety provisions in respect of the *plant* comply with requirements applicable to the *participating jurisdiction* in which the *generating system* is located, as notified by the *Network Service Provider*.		Given that most equipment is sourced from overseas and Australia is only a very small market for the suppliers, recognised International Standards should be allowed as well.
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* 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*	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 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.	Wording issues: The modelling requirement appears to impose obligation to provide a system model instead of block diagram (see comments on the same issue above).

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 (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*	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.	Must be an alteration that will affect performance standards At the end of (b) (3) or equivalent, words that require the alteration to be such "that would change the performance characteristics of the generating unit or generating system". The intent of the Rules requirements is to provide a simulation of performance of generation system at the point of connection only and not in relation the internal operations of the generating unit. The manufacturers are likely to have significant issue with this, especially where the source of information is a third party, this

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Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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*;	Clause S5.2.4(c) covers the information that the NSP is required to give to the Connection Applicant if requested. It has been extended to cover power system modelling information necessary to perform assessments required under clause S5.2.5.	will impose an onerous burden of procuring third party IP licenses at significant costs, time delays and the like. From contractual point of view, this will hinder the development process and raise the issue of recovery of the abovementioned costs.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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 *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	Clause S5.2.4(d) reiterates the requirement from clause 5.3.8 that recipients must treat information provided	Wording in clause (c) (1), (3) and (4) - the word "synchronised" should read "connected" as wind farms are generally asynchronous.

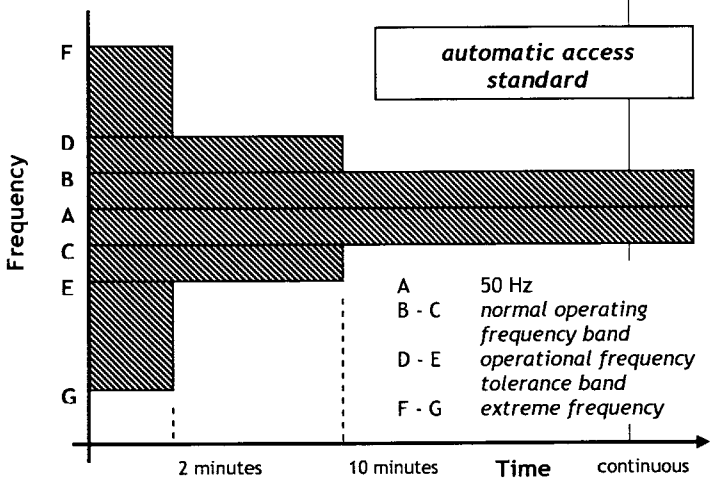
Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	treated as *confidential information*.	as confidential.	
S5.2.5.1	**Reactive power capability** ~~For the purpose of this clause S5.2.5.1:~~ ~~*'rated active power output'* means the 'Rated MW (Generated)' (as defined in schedule 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*. (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	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.	Comments to be taken into account. Agreed but not at any voltage level as identified in S5.2.5.1(a). Requirements at the connection point are all that should be required for generating systems. Generators should also be able to negotiate the point at which the requirement is met (connection point or machine terminals)

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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	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	Auswind Comments
	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*.		
S5.2.5.2	**Quality of electricity generated** (a) *Automatic access standard*: ~~(1) The *plant standard* in accordance with clause S5.2.5.2(c); or~~ ~~(2)~~ Each *generating system*~~*unit*~~, when generating ~~must *generate* a constant *voltage* level,~~ and when not generating, must not produce at any of its *connection points* for *generation*~~draw electricity, with~~: (i) voltage fluctuation ~~equal to or less~~greater than the limits ~~determined~~allocated by the *Network Service Provider* ~~in accordance with~~under clause S5.1.5(a); ~~and~~ (ii) harmonic voltage distortion ~~equal to or less~~greater than the emission limits ~~determined~~specified by a *plant standard* under clause S5.2.5.2(d) or allocated by the *Network Service Provider* ~~in~~	To allow for the possibility that the generating system has multiple connection points. The words 'for generation' are necessary to distinguish between auxiliary supply connection points and generation connection points.	Agree

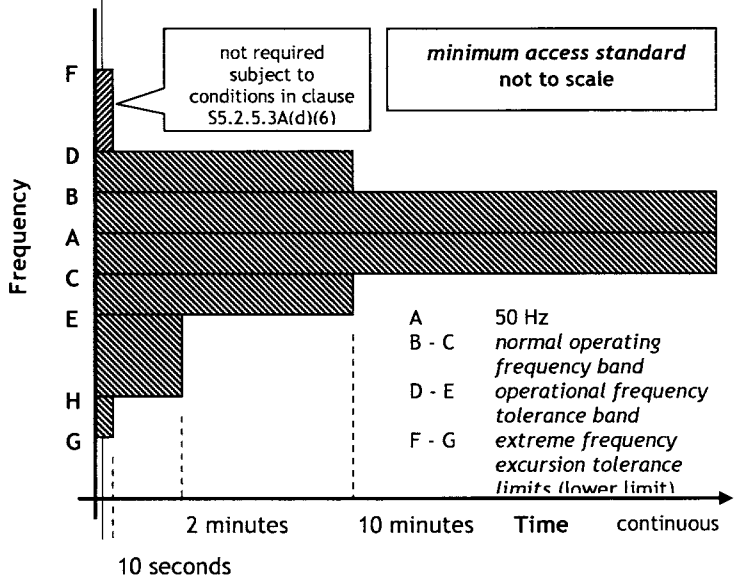
Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	~~accordance with~~under clause S5.1.6(a); and (iii) voltage unbalance ~~equal to or less~~greater than the limits allocated by the *Network Service Provider* in accordance with clause S5.1.7(c)(1). (b) *Minimum access standard*: Each *generating* ~~*unit*~~*system*, when generating and when not generating, must not produce at any of its *connection points* for *generation*: (1) ~~must *generate* a constant~~ voltage fluctuations greater than limits determined under clause S5.1.5(b); ~~level with balanced phase *voltages* and~~ (2) harmonic voltage distortion ~~equal to or less~~more than the lesser of the emission limits determined by the relevant *Network Service Provider* ~~in accordance with~~under clauses ~~S5.1.5(b) and~~ S5.1.6(b) and ~~clause S5.1a.7 of the *system standards*~~ specified by a *plant standard* under clause S5.2.5.2(d); and (3) voltage unbalance more than limits determined under clause S5.1.7(c)(2). (c) The *access standard* negotiated under clause S5.2.5.2 must not prevent the *Network Service Provider* meeting the *system standards* or contractual obligations to existing *Network Users*. (d) *Plant standard*: In respect of a ~~When operating *unsynchronised*, each~~ *synchronous generating unit*, AS 1359.101 and IEC 60034-1 are *plant standards* for ~~must *generate* a constant *voltage* level with balanced phase *voltages* and~~ harmonic voltage distortion~~equal to or less than permitted in accordance with *Australian Standard AS* 1359 "General Requirements for Rotating Electrical Machines"~~.	The AS 1359.101 refers to a superseded version of IEC 60034-1. Amendment is to include current version of IEC 60034-1	
S5.2.5.3	**Deleted**	The purpose of S5.2.5.3, and the clauses that replace it, is to set standards to	Agreed

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
		prevent cascading events occurring on the power system. The mandatory standards (for frequency and voltage) have been translated to automatic access standards, and new minimum standards and basis for negotiation have been defined for each clause. This clause has been deleted and separated into three clauses S5.2.5.3A, S5.2.5.3B and S5.2.5.3C for frequency, voltage and system disturbances respectively. The separation was necessary because when the frequency and voltage requirements are expressed as minimum and automatic standards it is necessary to clearly distinguish between the three sets of automatic standards and three sets on minimum access standards.	
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) *Automatic access standard*: Each *generating unit* must be capable of *continuous uninterrupted operation* for frequencies in the following ranges provided that the rate 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;	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 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	NEMMCO have related the generator performance directly to the Frequency standards of the Reliability Panel. What is the cost benefit of requiring all generators wishing to connect to Tasmania to meet the automatic standard? This is implied in the NEMMCO notes. – For further discussion on the setting of standards please see detailed notes on this clause. Additional requirements have been imposed in addition to those required for intermittent generation. These include the acceptable rates of change of frequency in both automatic and minimum access standards. Depending on time of event and system demand the rate of change of frequency on the system will vary.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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.  	minimum standards. This is more technology neutral than the partial load rejection concept, and is more appropriate for wind generation.	Many combustion turbine Generators are not able to satisfy the extreme under-frequency requirements, particularly at elevated ambient temperatures (eg>35C). (1) as a minimum standard this is unacceptable as it eliminates a number of different technologies from

Affected clause	Clause with proposed amendments	Reason	Auswind 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* 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.	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.	being connected. Some wind turbines have a diminishing time period below 47.5 Hz, 9 sec but not 10 sec. Gas turbines would not meet this standard, **particularly in Tasmania**. NEMMCO's note infers that only the automatic standard should allowed in Tasmania. This sets an extreme limit on the type of technology that could be considered. Most wind turbines will perform to 47.5 Hz continuously. Some will perform continuously to 47 Hz. References to absolute frequency limits should be removed. This may lead to a situation in which the minimum access standard may exceed the automatic should the reliability panel change the frequency criteria. (1) may still not be possible for many combustion turbine Generators, particularly at elevated ambient temperatures (eg>35C) and/or when combined with extreme voltage levels outside IEC60034. More latitude is required to allow different technologies to define an acceptable negotiated standard. Reference should be made to the standard rather than extracting figures from it.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(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.		



Affected clause	Clause with proposed amendments	Reason	Auswind 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.	In a small enough island, this would be inevitable for any generator.
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 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	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 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	Needs further work and discussion. Again this clause is referred to the unit level and contradicts NEMMCO's principle of allowing flexibility. The performance of the generating system to voltage disturbances is likely to include the response of auxiliary equipment to support the generating system – wind farm. Lower voltages are already significantly lower than IEC60034. 70-90% of normal voltage is not realistic except for transient conditions. This is +/-10% on the normal voltage where the automatic standard is only requiring up to 100% of normal. In addition it conflicts with S5.1a.4 which only

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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*	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.	requires 110% of normal voltage for 10 minutes. This is a higher obligation than that of the automatic access standard (S5.1a.4) Clause S5.2.5.3B(c)(2) says that if the amount of generation plant at risk of tripping (due to this negotiated standard) (as a result of excursions the size of the automatic standard) is less than 100MW, and (1) and (3) are met then a negotiated standard is okay. --- This clause needs an introduction such a (c) The proposed *negotiated standard* may be accept if : Each generating unit … etc. Logically then, if more than 100 MW is at risk of tripping then NEMMCO will require the automatic access standard, are the new (large) generating units capable of this voltage standard? 'Abnormal' is not defined – could be anything In distribution systems the NSP will require the generator to trip for voltage well within the ranges defined in this clause. A generating system must respond to hold the connection point voltage within +/- 6% otherwise the NSP considers the generator to be

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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.		affecting customer voltages. The standards as approached in this clause require performance well beyond that necessary in a distribution system. To remain connected and operational in a distribution system at +10% will high pot customers and reduce reliability and quality of supply.
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 (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	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. 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	Requires further work for distribution connections, although parts of this clause work well for wind farms. Resolve the reclose questions and (a) is acceptable There is no standard reclosure delay time in the NEM. They vary from region to region from +4secs to 0.5 sec. When will these be standardised? 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. The number of successive recloses is also not defined. Delay between reclosure is not defined. 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.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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	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 breaker fail protection.	Transfer limits and system capability is defined using the fastest protection clearing time. Why is NEMMCO using a fault duration that is not consistent with the system limits and the calculations for the critical clearing times on the system? Transfer limits are not set on breaker fail time. (iii) It should be noted that no bank would finance a generation project without breaker fail protection. Reference to the lack of such protection is almost redundant. The definition of "transmission system" includes any 66kV to 220kV network that operates in parallel to and provides support to the higher voltage network. The fault clearance times for 100kV and above are defined in the NER (table S5.1a.2). There is no definition for fault clearance times at lower voltages. (b) (iv) makes connection to a distribution system more difficult than for transmission. Auswind propose that (iv) be deleted and faults in the distribution systems be considered the same as for transmission on the basis that as for transmission, three phase faults on distribution lines (eg 132 and 66kV) to which wind farms are connected have a very low probability of occurrence. Such amount not to exceed requirements under clause S5.2.5.1

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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	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 based on actual operating times of all relevant primary protection systems, rather than a number out of a table in the system standards.	(ii)This requirement appears to be directed to large power stations connected to transmission networks. Wind farms are commonly connected to distribution networks remote from main system supply points by long, high impedance lines. Achievement of this performance could require high cost for additional equipment. This performance requirement should be considered in the context of small generating systems embedded in weak distribution networks as well as large generating stations connected to strong transmission networks. Such amount not to exceed requirements under clause S5.2.5.1 Timeframe must be defined Agree

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 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*		It is not the role of a distribution connected wind farm to control the system voltage.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	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 equipment*. (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.		Unsynchronised automatic reclose must be avoided due to the high risk of damage to generators. Abnormal conditions are undefined. Abnormal conditions are mentioned in several causes and the intention should be clearly defined.
S5.2.5.4	**Deleted**.	This clause has been the cause of considerable confusion. A more practical concept is to require that plant operate continuously provided the rate of change of frequency is within a specified limit. This has been incorporated in S5.2.5.3A.	Agree to deletion if S5.2.5.3A can be resolved.
S5.2.5.8	**Protection of generating units from power system disturbances** (a) The *minimum access standard* is: (1) Subject to clauses S5.2.5.8(ba)(2) and S5.2.5.8(b)(3), if a ~~*Connection Applicant*~~ *Generator* or *Network Service Provider* requires ~~that its~~a *generating unit* to be automatically disconnected from the *power system* in response to abnormal conditions arising from the *power system*, the relevant *protection system* or *control system* must not disconnect the *generating unit* for conditions,	The scope of the clause has been amended to be based on size rather than whether scheduled or not because this power system security issue has no relationship to being scheduled. The methods of meeting the power system security requirement have been clarified and extended to include fast operating governors, which already exist	Agree But where is S5.2.5.8(b)(2) and (b) (3)? There is a clause S5.2.5.8 (a)(2) and (a)(3) is this the intention?

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	~~under~~for which it must remain in *continuously ~~ly~~ uninterrupted operation~~e~~* or conditions it must withstand under ~~a provision of~~ the *Rules*. (2) Each ~~*scheduled*~~ *generating unit* with a *nameplate* rating of 30MW or more, or *generating system* comprised of *generating units* with combined *nameplate rating* of 30 MW or more, *connected* to a *transmission system* must have *facilities* to automatically and rapidly reduce its *generation:* (i) by at least half if the *frequency* at the *connection point* exceeds a level nominated by *NEMMCO* ~~that is~~ (not less that the upper limit of the *operational frequency tolerance band*) and the duration above this *frequency* exceeds a value nominated by *NEMMCO*. The reduction may be achieved: (A) by reducing the output of the *generating unit* within six seconds, and holding the output at the reduced level until the *frequency* returns to within the *normal operating frequency band*; or (B) by disconnecting the *generating unit* from the *power system*; or (ii) in proportion to the difference between the *frequency* at the *connection point* and a level nominated by *NEMMCO* (not less than the upper limit of the *operational frequency tolerance band*), such that the *generation* is reduced by at least half, if the *frequency* reaches the upper limit of the *extreme frequency excursion tolerance limits*. (3) *NEMMCO* or the *Network Service Provider* may require that an *access standard* include a	on some types of generating plant. Paragraph (3) has been included to permit situations where local issues, such as	This is highly subjective. There must be an objectivity criteria in this provision.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	requirement for the *generating unit* or *generating system* to automatically *disconnect* whenever the part of the *network* to which it is *connected* has been disconnected from the *national grid*, forming an island that *supplies* a *Customer*. The *access standard* must include specification of conditions for which the *generating unit* or *generating system* must trip and must not trip.	impact on supply to nearby customers, can require disconnection without adverse impact on overall power system security. Such situations already exist and need to be acknowledged under the Rules.	
	(4) Notwithstanding clauses S5.2.5.3A, S5.2.5.3B and S5.2.5.3C a *generating unit* or *generating system* may be automatically disconnected from the *power system* under any of the following conditions: (i) in accordance with an *ancillary services agreement* between the *Generator* and *NEMMCO*; (ii) where a load that is not part of the *generating system* has the same *connection point* as the *generating system* and *NEMMCO* and the *Network Service Provider* agree that the disconnection would in effect be under-frequency load shedding; (iii) where the *generating unit* is automatically disconnected under clauses S5.2.5.8(b)(3) or S5.2.5.9; (iv) where the *generating unit* is automatically disconnected under clause S5.2.5.10 due to a failure of the *generating plant*; or (v) in accordance with an agreement between the *Generator* and a *Network Service Provider* (including an agreement in relation to an emergency control scheme under clause S5.1.8) to provide a service that *NEMMCO* agrees is necessary to maintain or restore *power system* security in the event of a specified *contingency event*.	Paragraph (4) has been included to resolve inconsistencies with clauses S5.2.5.3A, S5.2.5.3B and S5.2.5.3C by comprehensively including all situations where automatic disconnection is or should be permitted, taking precedence over clauses S5.2.5.3A, S5.2.5.3B and S5.2.5.3C. For example, a Generator with a system restart ancillary services agreement with NEMMCO could be in breach of existing clause S5.2.5.3. Also, a Generator tripping its generating units for an emergency control scheme such as the System protection Scheme in Tasmania could be in breach of existing clause S5.2.5.3.	Good provision –trip due to failure of plant is acceptable
	(b) There is no *automatic access standard* ~~for this technical requirement~~ for protection of *generation units* from *power*		

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	system disturbances. (c) ~~For the purposes of this clause, abnormal conditions include:~~ ~~(1) *frequency* outside the *extreme frequency excursion tolerance limits*;~~ ~~(2) sustained and uncontrollable stator current beyond the *generating unit's* "Rated Stator Current" (as described in schedule 5.5.1);~~ ~~(3) stator *voltage* above the *generating unit's* stator *voltage* maximum rating or sustained below the lower limit for stable operation;~~ ~~(4) *voltage* to *frequency* ratio beyond the *generating unit's* magnetic flux based *voltage* to *frequency* rating;~~ ~~(5) sustained *voltage* fluctuations at the *connection point* beyond the level determined under clause S5.1.5(a);~~ ~~(6) sustained harmonic *voltage* distortion at the *connection point* beyond the level determined under clause S5.1.6(a);~~ ~~(7) sustained negative phase sequence *voltage* at the *connection point* beyond the level determined under clause S5.1.7(a); and~~ ~~(8) any similar condition agreed between the *Generator* and the relevant *Network Service Provider* after consultation with *NEMMCO*.~~ *NEMMCO* must be involved in ~~T~~the negotiation of *access standards* ~~in relation to this~~ under clause S5.2.5.8~~must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*~~. (d) The *Network Service Provider* is not liable for any loss or damage incurred by the *Generator* or any other person as a consequence of a fault on either the *power system*, or within the *Generator's facility*.	The abnormal conditions listed as examples in existing paragraph (c) have been removed because: • Some had a strong technology bias; • Some were not practical; and • Some were inconsistent with S5.2.5.3. The voltage to frequency ratio allowance has been moved to S5.2.5.2B.	There is no clause S5.2.5.8 (b)(3) 'abnormal conditions' is now an undefined term.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
			This clause is excessively wide, what is it doing in a generator standard?
S5.2.5.9	**Protection systems that impact on power system security** ~~The requirements of this clause apply only to protection measures which may be necessary to maintain *power system security*. Protection solely for *Generator* risks is at the *Generator's* discretion.~~ (a) The *automatic access standard* is: (1) Primary *protection systems* must be provided to disconnect from the *power system* any faulted element in the *generating system* and in ~~within the~~ protection zones that include the *connection point*, ~~the *generating unit* stator winding or any *plant connected* between them,~~ within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l). (2) Each primary *protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is disconnected from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.	The introductory paragraph of this clause has been removed because it is misleading and does not assist the understanding of the technical requirements. It predates the access standards regime, when the protection requirements were expressed more generally than now. Wording of the automatic and minimum access standards has been amended to remove technology-specific working.	Agreed subject to comments

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary *protection system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1). (b) The *minimum access standard* is: (1) *Protection systems* must be provided to disconnect from the *power system* any faulted element within the *generating system* and in protection zones that include the *connection point*, ~~the *generating unit* stator winding and any *plant* between them,~~ within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l). (2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the primary *protection system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(3). (c) The *Network Service Provider* and the *Generator* must cooperate in the design and implementation of *protection systems* to comply with clause S5.2.5.9, including cooperation ~~with regard to~~on: (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other; (2) tripping of one party's circuit breakers by a *protection system* of the other party; and (3) co-ordination of *protection system* settings to ensure inter-operation. (d) The *protection system* design must: (1) be coordinated with other *protection systems*	A basis for negotiation has been added to clarify when redundancy of protection systems is required and how the decision is to be made.	

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	already existing in the *power system* or to be provided as part of a *considered project;* (2) avoid consequential disconnection of other *Network Users' facilities*; and (3) take into account existing obligations of the *Network Service Provider* under *connection agreements* with other *Network Users.* (e) The *Generator* must provide redundancy in the primary *protection systems* under clause S5.2.5.9(a)(2) and provide *breaker-fail protection systems* under clause S5.2.5.9(a)(3) if *NEMMCO* or the *Network Service Provider* consider that a lack of these *facilities* could result in a material adverse impact on *power system security* or quality of *supply* to other *Network Users*, or a reduction in *inter-regional* or *intra-regional power transfer capability*, through any mechanism including: (1) consequential tripping of, or damage to, other *network* equipment or *facilities* of other *Network Users*, that would have a *power system security* impact; or (2) instability that would not be detected by other *protection systems* in the *network.* (f) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.9.	Paragraph (f) is consistent with clause S5.1.9(b) and makes it clear that the negotiation of protection system performance must include NEMMCO whether under S5.1.9 or S5.2.5.9.	The NSP or NEMMCO should be obliged to provide assistance with this. Redundancy systems are required only at the substation system and should not be required on each individual generating unit.
S5.2.5.10	**Protection to trip plant for unstable operation~~Asynchronous operation of synchronous generating units~~** (a) The *automatic access standard* is: (1) Each *synchronous generating unit* must have a *protection system* to ~~promptly~~ *disconnect* it promptly in order to prevent pole slipping or other conditions where the *generating unit* causes *active power*, *reactive power* or voltage at the *connection point* to become unstable as assessed	The clause has been amended to allow it to be applied to asynchronous as well as synchronous plant. Requiring the Network Service Provider to approve settings has been removed as it currently means that the Network Service Provider takes the risk associated with design of the Generator's plant. That risk	Agreed. Auswind support the NGF comment with respect to pole slip protection.

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	in accordance with the *power system* stability guidelines established under clause 4.3.4(h); (2) Each *generating unit* that is not a *synchronous generating unit* must have a *protection system* to *disconnect* it promptly for conditions where the *active power*, *reactive power* or voltage at the *connection point* become unstable as assessed in accordance with the *power system* stability guidelines established under clause 4.3.4(h). (b) The *minimum access standard* is: Each *generating unit* must not cause a voltage disturbance at the *connection point* due to sustained unstable behaviour ~~pole slipping~~ of more than the maximum level specified in Table 7 of *Australian Standard* AS/NZS 61000.3.7:2001. (c) ~~The actual settings of protection installed on a *generating unit* to satisfy the requirements of clause S5.2.5.10(a) must be approved by the *Network Service Provider*.~~ If the *Network Service Provider* and the *Generator* agree, a *protection system* proposed to meet a *negotiated access standard* may also trip any other part of the *generating system* in order to cease the instability. (d) A *protection system* to trip the affected *generating unit* must be provided where: (1) the *Network Service Provider* considers it necessary to prevent consequential tripping of, or damage to, other *generating units*, *network* equipment or other *Network Users' facilities*, or (2) *NEMMCO* considers it necessary to prevent unstable operation having an adverse impact on *power system security*. (e) *NEMMCO* must be involved in the negotiation of *access standards* under clauses S5.2.5.10(c) and S5.2.5.10(d).	should lie with the Generator. These new clauses (c) and (d) provide greater detail in relation to tripping. Basis of negotiation added to remove risk of wasted costs if NEMMCO later rejects standard.	
S5.2.5.11	**Frequency control** ~~General:~~	Minor reformatting of the clause has been	Agreed subject to comments - no to (b)(2)(iii)

Affected clause	Clause with proposed amendments	Reason	Auswind Comments
	(a) For the purpose of ~~this~~ clause S5.2.5.11:	undertaken.	
	"*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~~:	The definitions have been clarified to remove reference to S5.5.1 and make the definitions stand alone.	
	(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;	"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.	
	(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		