NATIONAL GENERATORS FORUM

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Dr. John Tamblyn
Chairman
Australian Energy Market Commission
Level 16, 1 Margaret Street
SYDNEY NSW 2000

Dear Dr. Tamblyn,

Re: Proposed Rule Change on Technical Standards for Wind Generation

The National Generators Forum (NGF) welcomes the opportunity to comment upon the Proposed Rule Change on Technical Standards for Wind Generation.

The NGF supports the modification of the existing Technical Standards in order to remove or modify items that have a technology bias. However, the proposed Rule Change goes significantly further than this, imposing unnecessarily onerous obligations on participants.

The NGF believes that Technical Standards as a whole require review as the original NECA consultation combined with current work by NEMMCO has not gone far enough in creating a clear, equitable or consistent framework for technical standards. It appears that significant work has gone into the detail of setting standards in the absence of a clear framework linking the need for such detail to higher level objectives. The NGF proposes a contextual framework, set out in Attachment A, which addresses this shortcoming.

The NGF has responded to the specific changes in this proposed Rule Change in Attachment B.

In summary, those items which remove technology bias and some wording and structure corrections are supported. Those that we believe to be part of the broader issue and do not have a bearing on wind generation specifically should be deferred until a more comprehensive review of technical standards has been undertaken.

Consistent with this view, the NGF considers that matters NEMMCO's Rule changes address which are not required to remove barriers to entry should be examined through the review processes the Commission recommends in its draft report on its Review of Enforcement and Compliance with Technical Standards. The NGF supports the proposed reviews which form parts of recommendations 2, 3 and 12 of the draft report, with the proviso that the NGF will make a comprehensive submission to the Commission on the draft report, including on the details of those recommendations.

The NGF nonetheless offers comments on NEMMCO's draft Rules in Attachment B. The NGF notes that a number of items as agreed are better than currently exists, however further improvement is necessary and it is important that all of the technical standards are reviewed by the reliability panel as part of the above review recommended by the Commission.

The NGF recommends that the proposed changes that go beyond those required for implementation of non-scheduled generation be not included in the current package.

The NGF is happy to discuss the issues identified in this submission, and please contact me on 02 0243 5120 should this be the case.

Yours faithfully,

John Boshier
Executive Director

1. NGF proposal regarding generator Technical Standards

Role of technical standards in the NEM

Generator technical standards define the required level of capability of plant connecting to the NEM to ensure a secure and reliable power system. Technical standards must reflect the following key system objectives:

- they must ensure that plant is capable of operating within the system standards of the NEM;
- that plant does not adversely impact the ability of TNSPs and NEMMCO to maintain system standards to the connecting party or any other connected party; and
- that plant does not unduly increase the impact of a credible contingency or prevent recovery from a credible contingency

A key role of technical standards is to provide NEMMCO with confidence in the operational capability of connected plant and their likely responses to credible contingencies. Market participants more generally also have an interest in a reliable and secure system and thus must also be assured that plant can meet rigorous performance standards.

Nevertheless, there are costs to ensuring reliability and meeting technical standards which must be weighed against the benefits. It is no good legislating for a level of reliability that would make it too costly for participants to enter the market or invest. It is also important that the regime for technical standards is clear and predictable and does not favour some participants over others.

In *this context*, the NGF proposes the following framework for meeting these considerations

1. **Ensure that an appropriate set of standards are in place for the longer term**

This would allow NEMMCO to manage the NEM and, with the AER, to assure participants and the MCE that the NEM is not subject to unreasonable technical risk. This requires:

- Appropriate standards being in place;
- A relevant testing and assurance regime; and
- Appropriate measurement of compliance occurs.

This objective can further be met by building on the work of NEMMCO in refining the standards, enhancing the performance standards compliance work undertaken by NEMMCO and the TNSPs and modifying the rules to change the compliance role of the AER to one of assurance (or risk management). The NGF has developed some principles to assist in verifying that appropriate standards are in place.

This objective would cover the current rules proposed by NEMMCO to accommodate wind farms and which addresses other issues at the same time. It will also address the current review into technical standards enforcement by defining the appropriate standards and compliance regime, including appropriate penalties

2. Ensure augmentations are able to proceed at appropriate cost with no undue risk.

This will include a process to ensure that:

- NEMMCO, TNSPs and connecting parties can negotiate the necessary standards for their location/connection point;
- a connected party can be assured that the standards agreed at the time of designing their plant will not be unreasonably varied; and
- Currently connected plants are protected from requirements to make unnecessary changes in their plant to meet changes to the standards.

These objective can be met by building on the process changes put forward by NEMMCO, particularly by refining the role of the Performance Standards in the NEM and a dispute resolution process. The Performance Standard needs to become a central document, which is agreed at the time a connection agreement is signed and also referenced during the registration process.

3. Development of an appropriate set of performance standards

The NGF considers that the current technical standards are not yet optimal. While the NECA process commenced improving the standards and the current NEMMCO process has furthered this process, albeit with a focus on wind farms, there is still much to do.

The NGF believes that the principles for the standards and the enforcement regime need to be agreed before the current changes are finalised. A draft of these principles is attached as Appendices A and B. The NGF proposes that a working party, comprising NEMMCO, Generators, TNSPs and the AER be tasked to urgently finalise these principles.

4. Development of an appropriate compliance regime

Compliance plans should be based on the pro-forma developed by NEMMCO and the TNSPs adjusted to:

- Conform to the principles in appendix B, as modified;
- More clearly define the appropriate testing regime to be applied in relation to the plant types and size;
- Incorporate testing currently being used in Victoria (GTR testing), NSW and Queensland; and
- Allow for appropriate testing based on plant outages.

In parallel, a set of Rule changes need to be developed to define an appropriate compliance regime based on the principles and ensuring that:

- Compliance is based on good electricity industry practice;
- Assessment is based on adherence to agreed compliance plans.

Routine monitoring by the AER and assessment after system incidents will focus on whether a participant adhered to their plans and how efficient the plans were. Penalties would be imposed based on whether participants had conformed to good electricity industry practice.

5. Augmentation at appropriate cost and risk

The technical standards regime in the Rules must be:

- **Clear**. There needs to be a single document that defines the technical standards to be applied to a connecting party. This document should be agreed at the time the design of the connecting plant is agreed, normally at the time the connection agreement is signed, and referenced at the time of registration.
- **Stable**, so that connected parties and connecting parties are able to confidently invest in the market. This means that a party, once connected, should not unreasonably be required to upgrade;
- **Focused** on the objectives of the market and with a clear role. The standards must have a clear system security purpose that is defined and agreed (see the generator proposal in Appendix A). While the actual standard may vary in wording and measurement for different technologies, the intent of the standard should be to achieve the same market or system purpose;
- **Linked to the compliance regime**. The compliance testing regime needs to be linked to each standard. While the tests may differ for different plants, there should be an agreed suite of tests that can be used to show compliance. (See the generator proposal in Appendix B) ; and
- **Separate from market considerations**. The technical standards should be focused on the requirements of the system and be separate from other commercial considerations in the market. Power transfer capability and ancillary services should be dealt with under normal market processes.

PROPOSED PRINCIPLES FOR THE DEVELOPMENT OF TECHNICAL STANDARDS

These notes set out some broad principles for the development of Rules intended to achieve acceptable generator plant technical parameters for connection to the shared transmission system.

1. The Technical Standard must clearly express the intended outcome to be achieved by application of the Standard. The Standard should not express the means employed (technology) to achieve the outcome except as a guide to application or to current good practice.

Most Technical Standards fall into one or other of several broad objectives, which can be further expressed as detailed performance requirements. The broad objectives could be expressed as follows:

- achieving secure operation of the power system
- achieving at least a minimum level of quality of supply
- ensuring generating plant is compatible with market processes
- requiring generating plant to contribute various system services which are required for overall operation of the power system.
- ensuring that generating plant is compatible with existing power systems assets and does not materially adversely impact the performance of the shared network.

Each broad objective may be restated as follows:

Secure operation of the Power System

Specification of those plant characteristics or performance requirements necessary to give assurance that the plant will continue to operate normally, both during normal power system operation, and also immediately following a contingency event which may reasonably be expected to occur in the course of operation of the power system.

Quality of Supply

Specification of those plant characteristics or performance requirements necessary to give assurance that the plant will not unreasonably contribute to unsatisfactory supply quality at the plant point of connection. 'Quality of supply' is taken to mean issues such as waveform distortion, voltage balance, dips and surges, flicker, and similar qualities.

Compatibility with market processes

Specification of plant parameters and interface requirements necessary to give assurance that the plant may be operated in accordance with the broad requirements of market operation and to ensure compatibility with market systems.

Supply of system services

Definition of those plant outputs or characteristics necessary to provide system services, that is, those services required for normal operation of the power system.

Compatibility with the existing power system

Definition of those plant characteristics or parameters necessary to allow the generating plant to co-exist with other plant and the shared transmission network, without material adverse effect on the capability of the shared network.

2. Each Technical Standard should (where applicable) be expressed in terms of an automatic access standard and a minimum access standard.

(Same principle as in present Technical Standards)

3. Technical Standards must not create obligations that incumbent plant (including approved plant, not yet constructed) will update or change its capabilities or performance in response to evolution of the power system or of the rules themselves, except as the outcome of a commercial agreement.

This issue essentially relates to sovereign risk, where a generator could otherwise be expected to modify its plant in response to unknown and unforeseeable changes in the power system or regulatory environment, without reasonable compensation for doing so.

4. Technical Standards must be structured to provide a level playing field between generators and other Participants, to ensure that services are provided in the most economically efficient manner and with due regard for payment for services or capabilities provided.

This issue arises from the combined and mutually incompatible roles of the TNSP as asset owner and operator, and as quasi-regulator responsible for approval (in conjunction with NEMMCO) of various aspects of generator capability and performance. Combined with a lack of market process for provision of various network services, and there is real risk that the TNSP will use its position as quasi-regulator to move costs and performance obligations away from itself and towards the generator by imposing mandatory provision of service (for example, provision of reactive power).

5. Technical standards must be negotiated in good faith by all parties, and where agreement cannot be reached, there must be an avenue for resolution of the matter if so desired by the parties (for example by arbitration).

There is presently no Rules obligation on the TNSP or NEMMCO to negotiate in good faith, and, further, there is no avenue for resolution of issues where any party is intransigent or agreement cannot otherwise be reached.

6. The Technical Standards regime must not create perverse incentives which inhibit a generator from upgrading the performance of its plant.

The present regime requires that all technical standards may be reopened for negotiation, when a generator submits an application for modified connection in respect of any of its existing standards. A generator may well consider that the benefits of the plant upgrade under contemplation do not warrant the uncertainty of outcome created by such a process, resulting in a decision not to proceed with the improvement – where the improvement may well otherwise have resulted in net market benefit.

7. Technical Standards must lead directly to a compliance regime appropriate to the required Standard. (See also the note on compliance principles.)

Broadly, the technical standard should recognise the nature of the standard (i.e. whether fundamental to plant design, whether it relates to risk management activities, whether it may change or drift with time, etc) and also the materiality of the standard to the overall objective to be achieved. In turn these factors should enable the formulation of both an appropriate compliance measurement and monitoring regime, and guidance for the liability under the clause – whether absolute (e.g. for plant design capability) or for implementation of a suitable risk management strategy (e.g. for plant protection and control systems).

Application

Summary of the various clauses in the Technical Standards, and how they relate to the categories suggested above.

SECURE OPERATION OF THE POWER SYSTEM

Clause	Requirement
S5.2.5.3A	Generating Unit Response to Frequency Disturbances
S5.2.5.3B	Generating Unit Response to Voltage Disturbances
S5.2.5.3C	Generating Unit Response to Disturbances Following Contingency Events
S5.2.5.8	Protection of Generating Units from Power System Disturbances
S5.2.5.9	Protection Systems that impact on Power System Security
S5.2.5.10	Protection to trip Plant for Unstable Operation

QUALITY OF SUPPLY

Clause	Requirement
S5.2.5.2	Quality of Electricity Generated
S5.2.5.8	Power Station Auxiliary Supplies

COMPATIBILITY WITH MARKET PROCESSES

Clause	Requirement
S5.2.6.1	Remote Monitoring
S5.2.6.3	Communications Equipment

SUPPLY OF SYSTEM SERVICES

Clause	Requirement
S2.5.2.1	Reactive Power Capability
S5.2.5.11	Frequency Control
S5.2.5.14	Active Power Control

COMPATIBILITY WITH THE EXISTING POWER SYSTEM

Clause	Requirement
S5.2.5.12	Impact on Network Capability
S5.2.5.13	Control Systems and Stability
S5.2.9	Fault Current

Note: 'active power control' is included as a system service, as my understanding is that NEMMCO wish to have this facility available in the future so they can implement network loading control schemes.

PROPOSED PRINCIPLES FOR THE DEVELOPMENT OF TECHNICAL STANDARDS COMPLIANCE PROGRAMS

These notes set out some general principles proposed as a basis for the development of a compliance program for the performance standards applicable to a particular generating unit.

The compliance program –

- Gives assurance to the generator that it is reasonably protected against commercial loss due to events on the network to which it connects
- Provides a generator with confidence that it has taken all reasonable steps to ensure compliance with the performance standards under the National Electricity Rules,
- Provides a mechanism by which the AER is able to audit the effectiveness of a generators compliance with the NER.

The compliance program may also form the basis on which generator liability is measured; this is a related although separate issue.

A compliance program, apart from being a requirement under the Rules, is appropriate because the performance of a generating unit may change for a number of reasons including

- A natural degradation over time as components age or wear,
- The unintended consequence of changes made for other reasons,
- Restrictions placed on the performance of a unit for the convenience of plant operators

The performance standards encompass characteristics with a very wide range of risk in relation to these issues. Some requirements are achieved by the inherent design of the generator and do not have a material risk of accidental or deliberate change. Other characteristics are more subject to change and thus need more active compliance control.

Principle 1
The compliance program for specific technical standards should be based on a robust assessment of the inherent risks of not meeting the absolute standard.

The assessment of risk will lead to views on how quickly performance may degrade, and thus how frequently it should be tested. This assessment needs to include consideration of the risks inherent in testing, and balance these risks against the risk which is to be controlled. There will always be some risk that the testing process itself will damage previously sound plant.
For many generating units, designed for base-load operation, there is also risk in a shut-down start-up sequence, which may be required for testing.
The issue of balancing the risks associated with plant degradation over time, with the costs of an outage to correct it, is not unique to performance standards. Generation companies need to balance these competing requirements in defining an overhaul program to maintain the reliability of each generating unit.

Principle 2

Major planned overhauls should determine the frequency of any routine testing required unless there is a clear case for more frequent testing.

A planned overhaul provides the opportunity for testing without incurring an additional shut-down start-up cycle.
Further, components relevant to performance standards may the changed or adjusted during an overhaul period. Hence the overhaul period is a natural time to test performance.
All these reasons suggest that the planned overhaul cycle should determine the timing of routine testing unless there is a clear case for some other period.

Principle 3

Any routine testing regime that is required should have sufficient timing flexibility to avoid an additional shut-down start-up sequence.

If, as proposed here, the compliance program is based on an assessment of risk, there should be an opportunity to revise it as operational experience leads to a different assessment of risk.
If it appears that for particular generating units, the risk of degradation of a particular standard is not material, then testing of that standard may be reduced or eliminated.
If, on the other hand it appears that more frequent testing would have given a material benefit in achieving compliance, then a more stringent regime may be desirable.

Principle 4

Each compliance program should be open to adjustment as more evidence on actual risks is accumulated.

ATTACHMENT B - PROPOSED RULE CHANGES IN MARK-UP WITH EXPLANATION

Affected clause	Clause with proposed amendments	Reason	NGF Comments
2.2.1(e)	(e) To be eligible for registration as a *Generator*, a person must: (1) having obtained *NEMMCO's* approval to do so, classify each of the *generating units* ~~which~~ that form part of the *generating system* it owns, operates or controls, or from which it otherwise sources electricity, as either a *scheduled generating unit* or a *non-scheduled generating unit*; ~~and~~ (2) satisfy *NEMMCO* that ~~those *generating units* and the *connection points* for those *generating units* comply with the relevant technical requirements set out in Chapter 5~~ clauses 5.3 or clauses 5.10 and 5.11(if applicable) have been complied with; and (3) satisfy *NEMMCO* that each *generating system* will be capable of meeting or exceeding its *performance standards*.	The proposed new clause 5.3.7B provides for acceptance of performance standards by NEMMCO. It is intended that Generators should not be registered until performance standards are accepted by NEMMCO for that Generator's plant, and that NEMMCO is satisfied that the Generator will be able to comply with the performance standards.	Agreed
2.9.2(a)	(a) Subject to clause 2.9.2(d), *NEMMCO* must, within 15 *business days* after receiving the application, or after receiving the further information or clarification under clause 2.9.1(b), or within 15 *business days* after receiving the information requested under clauses 5.3.7A(b), S5.2.4(b) and 5.11.2, whichever is the later, give notice to the applicant that the applicant is to be admitted in the category of *Registered Participant* applied for if *NEMMCO* is reasonably satisfied that: (1) an applicant meets ~~any~~ the eligibility requirements specified for the category of *Registered Participant* to which the application relates; (2) if the application relates to registration in one of the categories of *Market Participant*, the	Clauses 5.3.7A(b), S5.2.4(b) and 5.11.2 gives NEMMCO the power to access information necessary to enable it to properly assess proposed performance standards. The performance standards for new connection applications are to be assessed prior to the connection agreement being entered into. Although this may be well before registration, it could technically be done just prior to the registration application. It is therefore appropriate that the time periods in clause 2.9.2(a) only run once requested information is provided. It is also appropriate that a person seeking	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	applicant is and will be able to fulfil its financial obligations under Chapter 3 ~~including the *prudential requirements* set out in clause 3.3~~; and (3) the applicant <u>has complied with and</u> will <u>continue to be able</u> to comply with the *Rules*. (b) If *NEMMCO* is not reasonably satisfied that an applicant satisfies the requirements set out in clause 2.9.2(a), *NEMMCO* must, within 15 *business days* after receiving the ~~application or after receiving the further information or clarification required under clause 2.9.1(b),~~: <u>(1) application;</u> <u>(2) further information or clarification required under clause 2.9.1(b); or</u> <u>(3) information requested under clauses 5.3.7A(b), S5.2.4(b) or 5.11.2,</u> whichever is the later, notify the applicant that it is not qualified to be registered as a *Registered Participant* in the relevant category and provide reasons for that determination.	registration establish that that person has complied with the Rules. The reference to the prudential requirements is not necessary. Clauses 5.3.7A(b), S5.2.4(b) and 5.11.2 gives NEMMCO the power to access information necessary to enable it to properly assess proposed performance standards. As outlined above, it is therefore appropriate that the time periods in clause 2.9.2(b) only run once requested information is provided.	
<u>2.9.2(d)</u>	<u>(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.</u>	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	Delete - This clause gives NEMMCO excessive power to impose any standards on connection. The automatic access standards are to highest level of standard which NEMMCO may impose.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
		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.	
3.11.7(a)	(a) In addition to the requirements under clause ~~4.15~~5.12, a *Market Participant* which has classified a *generating unit* as an *ancillary service generating unit* or a *market load* as an *ancillary service load* must install and maintain in accordance with the standards referred to in clause 3.11.7(b) monitoring equipment to monitor and record the response of the *ancillary service generating unit* or *ancillary service load* to changes in the *frequency* of the *power system*.	This change is necessary to ensure that the appropriate cross-reference is made on implementation of these proposed Rule changes.	Agree
3.13.3(k)	(k) Subject to the restrictions and obligations in clause 5.3.8(a) *NEMMCO* must make ~~the following *registered bid and offer data* and *Network Service Provider* data and updates~~ available to a *Registered Participants*~~*~~, on request without unreasonable delay, the following information and data if in its possession and control: (1) ~~details of the shared *transmission* and *distribution network* impedance data and other technical data as listed in:~~ ~~(i) schedule 5.5.1;~~ ~~(ii) schedule 5.5.2;~~ ~~(iii) schedule 5.5.3; and~~ ~~(iv) schedule 5.5.4,~~ ~~sufficient to carry out *power system* studies as reasonably required by *Registered Participants* for planning and/or operational purposes;~~	This clause forms the basis of NEMMCO's data policy – which allows for snapshots of the power system to be distributed to Registered Participants (including if required generating plant dynamic models). The original clause was poorly worded, and has been revised to aid clarity. The different types of data described in the clause have been separated into different sections. The reference to "Network Service Provider Data" for the modelling data has been removed, as it is not clear that all the data provided under this clause belongs to the NSP. Some of it clearly is NSP data, and this has been maintained through	Agree

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~and~~*registered bid and offer data*; (2) the following information, provided that it is reasonably required by the *Registered Participant* to carry out *power system* studies (including, without limitation, load flow and dynamic simulations) for planning and operational purposes: (i) historical information relating to the operating conditions of the *power system*; (ii) information and data provided to *NEMMCO* under clauses 3.13.3(f), 3.13.3(g) and S5.2.4(b)(4); (iii) information and data described in the *Generating System Model Guidelines*, *Generating System Design Data Sheet*, and *Generating System Setting Data Sheet*; (iv) information and data described in schedules 5.5.3 and 5.5.4; and (3) operating procedures and practices for *transmission network* or *distribution network* operation and maintenance that have been developed for the application of schedule 5.1 sufficient to enable *power system* modelling under normal, *outage* and emergency conditions.	references to 3.13.3(f) and 3.13.3(g). S5.2.4(b) has been included because this is currently the clause used to obtain wind farm models. The reference to "historical information relating to the operating conditions of the power system" has been added to make it clear that information is to be given sufficient to generate a load flow file.	
3.13.3(k1)	(k1) *NEMMCO* may, in its absolute discretion, provide information of the type described in clause 3.13.3(k) to persons who request it for the purpose of undertaking research or providing advice to *Registered Participants or* potential investors in the *power system*.	This clause has been added to enable NEMMCO to pass on standard system snapshots to power system consultants who have a need for the data.	Agreed - Some information may be subject to commercial intellectual property and the authors of particular document(s) may need to be consulted on a case by case basis for permission. This proposed clause seems inconsistent with 5.3.8 and 5.2.3(c).
3.13.3(k2)	(k2) Information provided under clause 3.13.3(k)(2) is *confidential information*.	Current NEMMCO policy is to give out snapshots to Participants under cover of a letter saying that this is confidential information. This clause formalises that this information is to be treated as	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
		confidential. Registered Participants are bound by the Rules to treat confidential information as described in 8.6.1. Non participants (under 3.13.3(k1)) would need to sign a confidentiality agreement.	
3.13.3(k3)	(k3) *NEMMCO* may recover from *Registered Participants* and other persons to whom information and data is provided or to be provided under clauses 3.13.3(k) and 3.13.3(k1), respectively, *NEMMCO's* estimate of the reasonable costs incurred by *NEMMCO*, or to be incurred by *NEMMCO*, in complying with a request under either of those clauses. *NEMMCO* may withhold the information and data until its estimate of reasonable costs is paid.	This is required to ensure that the user of the service, as opposed to the market as a whole, pays the cost of providing this service.	Agreed
4.2.5(d)	(d) *NEMMCO* must, when determining the secure operating limits of the *power system*, assume that the applicable *performance standards* are being met, subject to: (1) a *Registered Participant* notifying *NEMMCO*, in accordance with clause ~~4.15(f)~~5.12 (f), that a *performance standard* is not being met; or (2) *NEMMCO* otherwise becoming aware that a *performance standard* is not being met.	This change is necessary to ensure that the appropriate cross-reference is made on implementation of these proposed Rule changes.	Agreed
4.9.2(b) & (b1)	(b) Subject to ~~paragraph~~ clause 4.9.2(b1), *NEMMCO* may at any time give an instruction to a ~~*Scheduled*~~ *Generator* in relation to any of its ~~*scheduled*~~ *generating units* with a *nameplate rating* of 30MW or more, or its *generating systems* of combined *nameplate rating* of 30 MW or more, nominating that: (1) the *generating unit* or *generating system* transformer is to be set to a nominated tap position (if it has on-load tap changing capability); (2) the *generating unit's* or *generating system's voltage* ~~*excitation*~~ *control system* set-point is to be set to give a nominated *voltage* ~~at its terminals~~; or (3) the *generating unit* or *generating system* is to be	NEMMCO currently requires Non-Scheduled Generators to be subject to dispatch for reactive power as a condition of registration under clause 2.2.3(c) for generating systems of 30 MW or more, but NEMMCO considers that the power to dispatch reactive power from non-scheduled generating systems of 30 MW or more should be a normal part of power system security dispatch without resort to registration powers. The changes to include "generating system" and to allow that the plant might not have a conventional excitation	Agreed – subject to connection agreement requirements

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	operated to supply or absorb a nominated level of *reactive power* at its terminals or at its *connection point*. (b1) Unless otherwise provided under an *ancillary services agreement* or a *connection agreement*, *NEMMCO* must not give an instruction under ~~paragraph~~ clause 4.9.2(b) that requires a *generating unit* or *generating system* to supply or absorb *reactive power* ~~at its terminals~~ at a level ~~which is~~ outside the ~~mandatory capability for that *generating unit* determined in accordance with clause S5.2.5.1 of schedule 5.2~~ *plant's* relevant *performance standard*.	control system and the measurement point for reactive power might be the connection point, are necessary to be consistent with the proposed amendments to clauses S5.2.5.1 and S5.2.5.13. The change to the reference to "mandatory capability" is to remove an inconsistency that arose with the introduction of the performance standards regime, which replaced the concept of a "mandatory capability" with agreed performance standards. NEMMCO should be able to dispatch reactive power within the capabilities defined by the relevant performance standard.	
4.13(a) &(b)	**Delete**	These are being moved to clause 5.10.1(a) and (b), respectively after some amendments	Agreed
4.14	**Delete**	Clauses 4.14(a) to (i) and 4.14(l) to (o) are being moved to clause 5.11.1 after some amendments. Clauses 4.14(j) and (k) are being moved to clause 5.11.2(a) and (b), respectively, after some amendments.	Agreed
4.15	**Delete**	Clause 4.15 is being moved to clause 5.12 after some amendments.	Agreed
5.1.2(a)	**5.1.2 Purpose** (a) This Chapter*:* (1) provides the framework for *connection* to a *transmission network* or a *distribution network* and access to ~~the *networks* forming part of~~ the	This change is required to clarify that Chapter 5 also deals with alterations to generating plant. The term *connection* can be ambiguous in that changes to *connections* can be interpreted as only those that change the physical link to the	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	national grid; and (2) has the following ~~purposes~~aims: (i) to detail the principles and guidelines governing *connection* and access to a *network*; (ii) to establish the process to be followed by a *Registered Participant* or a person intending to become a *Registered Participant* to establish or modify a *connection* to a *network* or to alter *generating plant connected* to a *network*; (iii) to address a *Connection Applicant's* reasonable expectations of the level and standard of *power transfer capability* that the relevant *network* should provide; and (iv) to establish processes to ensure ongoing compliance with the technical requirements of this Chapter to facilitate management of the *national grid*.	transmission or distribution network, whereas 5.2.5 clearly includes alterations to generating plant.	
5.1.3(b2)	(b2) A *Registered Participant or* person intending to become a *Registered Participant* may request *connection* of a *facility*, modification of a *connection*, or alteration of *connected plant* at a standard below an *automatic access standard* if the *connection*, modification to the *connection*, or alteration of *connected plant* does not adversely affect ~~other *Registered Participants*~~: (1) *power system security*; (2) as regards *connection* of a *generating system*, *reliability* of *supply*; or (3) the quality of *supply* to other *Network Users*.	These changes are required to clarify that the provisions apply to modification of connections and alterations of connected plant. Further, previously the clause referred to any adverse effect on other Registered Participants. This is too broad a test and it is appropriate to restrict the clause to the specific instances in (1), (2) and (3).	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
5.2.2(b)	(b) The *Rules* apply to all: (1) ~~all~~ *connection agreements* made after 13 December 1998; (2) ~~all~~ deemed *connection agreements* ~~created pursuant to~~ under clause 5.2.2(a); and (3) ~~all~~ requests to establish *connection* ~~or modify an existing connection~~ after 13 December 1998.	There is no need to refer to modifications of connection in (3) as there will already be in place a connection agreement that is referred to in (1) or (2).	Agreed
5.2.2(c) & (d)	**Delete**	There is no need for clause 5.2.2(c). Its effect is unclear and it is confusing. Chapter 5 no longer contains mandatory technical requirements that could conflict with the connection agreement. There is no need for clause 5.2.2(d). Its operation is unclear given the obligations set out in clauses 5.2.3 (Obligations of Network Service Providers), 5.2.4 (Obligations of Customers) and 5.2.5 (Obligations of Generators).	Agreed
5.2.5(a)	(a) ~~Each~~ A *Generator* must plan and design its *facilities* and ensure that ~~its *facilities*~~ they are operated to comply with: (1) ~~its *connection agreement* with a *Network Service Provider*~~ the *performance standards* applicable to those *facilities*; (2) subject to clause 5.2.5(a)(1), ~~all applicable *performance standards*~~ its *connection agreement* with a *Network Service Provider;* and (3) subject to clause 5.2.5(a)(2), the *system standards*.	It is important that the performance standards take precedence over the connection agreement because: • performance standards are assessed by NEMMCO in the context of system security, reliability of supply and quality of supply; • application of the existing procedures has resulted in differences between connection agreements and performance standards, which must not be allowed to undermine that process; • performance standards are only amended with the agreement of the	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
		parties, and any subsequent agreement should take precedence over an earlier agreement; and • the connection agreement is a private arrangement between third parties and the Rules should override those agreements where the Rules cover the field, ie system security, reliability of supply and quality of supply in the NEM. When the technical requirements in schedule S5.2 were mandatory, it was necessary for any variations agreed in a connection agreement to take precedence over schedule S5.2, but now that the mandatory requirements have been converted into automatic and minimum access standards that is no longer required and undermines the concept of performance standards. For new connections, there should be no inconsistencies as the performance standards will be recorded in the connection agreement. NEMMCO will have imput into the drafting of the the performance standards and they will be accepted by NEMMCO subject to the connection agreement being executed.	
5.2.5(b)(1) & (2)	(b) A *Generator* must: (1) submit an *application to connect* in respect of new ~~or altered equipment~~ *generating plant* owned, operated or controlled by the *Generator*, or to be owned, operated or controlled by the *Generator*, and enter into a *connection agreement* with a *Network Service Provider* in accordance with clause 5.3 prior to that ~~equipment~~ *generating plant* being *connected* to the *network* of that	The previous reference to altered equipment is now dealt with in clause 5.3.9.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	Network Service Provider ~~or altered (as the case may be)~~; (2) comply with the reasonable requirements of the relevant *Network Service Provider* in respect of design requirements of ~~equipment~~ *generating plant* proposed to be *connected* to the *network* of that *Network Service Provider* in accordance with clause 5.4 and schedule 5.2;		
5.3.1	(a) ~~The process and procedures in this c~~Clause 5.3 must be followed by a *Registered Participant* or person intending to become a *Registered Participant* wishing to establish ~~or modify~~ a *connection* to a *network.* (b) For the purposes of clause 5.3, the expression "establish a *connection"* ~~Establishing a connection in this clause~~ includes modifying an existing *connection* ~~to the *national grid*~~ or altering *plant* but does not include alterations to *generating plant* in the circumstances set out in clause 5.3.9. (c) A *Generator* wishing to alter *connected generating plant* must comply with clause 5.3.9.	Modifications to plant can occur without modifications to the connection. There is generally no need to go through a full connection enquiry process for a Generator who is modifying plant, and a simplified process is more efficient.	Agreed
5.3.2(a)	(a) ~~An existing or intending *Registered Participant*, or a person who is eligible to become a *Registered Participant*, who wishes~~ A person wishing to lodge or ~~consider~~ is considering lodging an *application to connect* to a *network* must first make a *connection* enquiry by advising the *Local Network Service Provider* of the type, magnitude and timing of the proposed *connection* to the *network* of that *Local Network Service Provider.*	There is no need to refer to existing or intending Registered Participants. Anyone can make a connection inquiry.	Agreed
5.3.2(e)	(e) For the purposes of clause 5.3.2(d), where the performance or operation of *plant* that is the subject of an *application to connect* could be materially affected by another project, the *Network Service Provider* must provide to the *Connection Applicant* the following information about the other project sufficient to identify	Clause 5.3.2(e) has been added to allow for the situation where one project has an adverse impact on another project. Until now, clause 5.3.8 has prevented the NSP disclosing such information to the connection applicant, even though the information may be of critical importance	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	the extent of the impact: (1) if an *application to connect* has been received in respect of the other project, information of the types specified in clause S5.4 but not clauses S5.4(d) or S5.4(i), consistent with the *application to connect* of the other project; and (2) if an *offer to connect* has been made in respect of the other project, information of the types specified in clauses S5.2.4(b), and S5.5, consistent with the *offer to connect* of the other project.	to the viability of the second project and the NSP is required to negotiate in good faith. This modification attempts to address this problem by allowing the release of basic information of competing projects for which an application to connect has been received and more detailed information of competing projects for which an offer to connect has been made.	
5.3.3(b)(1)(i)	(i) will need to be involved in planning to make the *connection* or will be involved under clause 5.3.5(f); and	This change is needed to ensure that the inquirer is told that the TNSP will be involved in the planning carried out in respect of a generating system connected to a distribution network where that generating system is more than 10 MW.	Agreed
5.3.4A(a)	(a) A *negotiated access standard* must: (1) be no less onerous than the corresponding *minimum access standard* specified by the *Network Service Provider* in accordance with clause 5.3.3(b1)(2); (2) be set at a level that will not adversely affect *power system security*; ~~and~~ (3) be set at a level that will not adversely affect the quality of *supply* for other *Network Users*; (4) in respect of *generating plant*, be set at a level that will not adversely affect *reliability* of *supply*; and (5) in respect of *generating plant*, meet the requirements applicable to a *negotiated access standard* in clauses S5.2.5, S5.2.6, S5.2.8 and S5.2.9.	Clause 5.3.4A must reference reliability of supply as this concept is also central to the proper operation of the market. Some of the technical requirements impact reliability of supply as well as power system security (notably S5.2.5.9 and S5.2.5.12): a change to the technical envelope is treated as an impact on security in the planning framework, but in operational timeframes may be managed by actions that impact reliability to maintain security. Bases for negotiation have been added to the technical requirements in S5.2.5. These do not form part of the automatic or minimum standards but explain how they are to be applied. The additional wording in 5.3.4A(a)(5) is required to ensure that these bases for negotiation are	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
		applied.	
5.3.4A(b)	(b) A *Network Service Provider* must, following the receipt of a proposed *negotiated access standard* ~~in accordance with~~ under clause 5.3.4A(e) or 5.3.4A(f)~~,~~: (1) consult *NEMMCO* on all matters ~~allocated to *NEMMCO* under clause 5.3.3(b1)(4) and must~~ related to the proposed *negotiated access standard* for which *NEMMCO* must be involved in the negotiation; and (2) accept *NEMMCO's* advice in respect of those matters in determining its response to each proposed *negotiated access standard* and any applicable terms or conditions of acceptance to be applied to each proposed *negotiated access standard*.	The change is required to clarify the obligation to consult and where that obligation is referenced.	Agreed
5.3.4A(d)	(d) A *Network Service Provider* must, within 30 *business days* following the receipt of a proposed *negotiated access standard* in accordance with clause 5.3.4(e) or 5.3.4A(f)(3) accept or reject the proposed *negotiated access standard*. The *Network Service Provider* must reject the proposed *negotiated access standard* if *connection*, or alteration of the *generating plant* (as the case may be), at the *negotiated access standard* proposed by the *Connection Applicant* would: (1) ~~accept the proposed *negotiated access standard*~~ in *NEMMCO*'s reasonable opinion, adversely affect *power system security;* or (2) ~~reject the proposed *negotiated access standard* if *connection* at the *negotiated access standard* proposed by the *Connection Applicant* would:~~in respect of the *connection* of *generating plant*, in *NEMMCO's* reasonable opinion adversely affect *reliability* of *supply*; or ~~(i) in *NEMMCO's* reasonable opinion, adversely affect *power system security*;~~	This clause has been re-written to clarify the basis for rejection of proposed access standards. In paragraph (2), a reference to reliability of supply (limited to generating plant) has been added. Previously, NEMMCO could reject an application on the basis of security and the Network Service Provider on the basis of quality of supply but neither had a specific power to reject it on the basis of impact on reliability. There is a grey area between security and reliability impacts. In the operational sense of security something that affects the operating envelope can often be managed by reductions in transfers on interconnectors or other major transmission network elements, which means that a security impact is translated to a reliability impact. See also comments under clause 5.3.4A(a).	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~or~~ ~~(ii) in the *Network Service Provider's* reasonable opinion, adversely affect quality of *supply* for other *Network Users*; or~~ ~~(iii) in the opinion of *NEMMCO* (in respect of a matter allocated to *NEMMCO* under clause 5.3.3(b1)(4)) or in the opinion of the *Network Service Provider* (in respect of a matter not allocated to *NEMMCO* under clause 5.3.3(b1)(4)), not meet the requirements of clause 5.3.4A(a).~~ (3) in the *Network Service Provider's* reasonable opinion, adversely affect quality of *supply* for other *Network Users*; or (4) in the opinion of *NEMMCO* or the *Network Service Provider*, in respect of a matter allocated to *NEMMCO* or the *Network Service Provider*, respectively, be lower than the corresponding *minimum access standard*; or (5) in respect of the *connection* of *generating plant*, in *NEMMCO*'s reasonable opinion, not satisfy clause 5.3.4A(a)(5).		
5.3.4A(g)	**Delete**	Submission and acceptance of performance standards and the relationship between performance standards and access standards is now dealt with in clauses 5.3.7A and 5.3.7B (transitional arrangements are in clauses 5.10 and 5.11).	Agreed
5.3.5(a)	(a) The *Network Service Provider* to whom the *application to connect* is submitted: (1) at the *automatic access standard* ~~in accordance with~~ under clause 5.3.4; or	The reference to clause 5.3.4A(d)(1) is now clause 5.3.4A(d) because of the change described above. "a *Network Service Provider*" has been changed to "the *Network Service Provider*	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(2) at a *negotiated access standard* that has been accepted by the *Network Service Provider* ~~in accordance with~~ under clause 5.3.4A(d); ~~(3) at any applicable *plant standard*;~~ must proceed to prepare an offer to *connect* in response.	…" because it is specific to that connection. Clause 5.3.3(b3) deems applicable plant standards to be an automatic access standard or negotiated access standard and in other cases a plant standard may be accepted as a automatic access standard or negotiated access standard. Therefore the reference to applicable plant standard is not necessary.	
5.3.5(d)(1)	(1) the ~~performance~~ technical requirements for the equipment to be *connected*;	The change is for consistent usage of the terms "performance standards" and "technical requirements".	Agreed
5.3.5(g)	**Delete**	This is no longer required due to the proposed changes in this package.	Agreed
5.3.6(e)	**Delete**	This clause is a legacy of the Code prior to the introduction of negotiated access standards. The concept of variations is now specifically dealt with under the negotiation of access standards between minimum and automatic levels.	Agreed
5.3.7(a)	~~(a)~~ If the *Connection Applicant* wishes to accept an offer to *connect*, the *Connection Applicant* must~~:~~ ~~(1) [Deleted]~~ ~~(2) enter into a~~ negotiate a proposed *connection agreement* with each relevant *Network Service Provider* identified in accordance with clause 5.3.3(b)(2) and, in doing so, must use its reasonable endeavours to negotiate in good faith with all parties with which the *Connection Applicant* must ~~enter into~~ negotiate such a *connection agreement*.		Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
5.3.7	(a1) The proposed *connection agreement* must include proposed *performance standards* with respect to each of the technical requirements identified in schedules 5.2, 5.3 and 5.3a where applicable and each proposed *performance standard* must have been established in accordance with the relevant technical requirement. (a2) The proposed *performance standards* must be based on the *automatic access standard* or, if the procedures in clause 5.3.4A have been followed, the *negotiated access standard*. (a3) The Network Service Provider and the Connection Applicant must not enter into the proposed connection agreement until NEMMCO has accepted the proposed performance standard.		Agreed
5.3.7(e)	**Delete**	This is being moved to clause 5.3.7A.	Agreed
5.3.7(f)	**Delete**	This is being moved to clause 5.3.7A(f).	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF 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*,	Throughout Chapter 5 the term 'access standard' has been adopted to refer to the automatic or negotiated standards that are recorded in the connection agreement. The standards in the connection agreement are proposed performance standards until they are accepted by NEMMCO and recorded on the register.	NEMMCO should only be concerned with the Performance Standards. The connection agreement should have no bearing on technical obligations for new connections and the commercial terms are no concern of NEMMCO's.

Affected clause	Clause with proposed amendments	Reason	NGF 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.		
5.3.7B	**5.3.7B Acceptance of Performance Standards** (a) *NEMMCO* must, if it assesses that the proposed *performance standard* submitted under clause 5.3.7A(a): (1) satisfies the requirements set out in clause 5.3.7A(c), accept the proposed *performance standard* on the condition that the *connection agreement* is entered into; or (2) does not satisfy the requirements set out in clause 5.3.7A(c), reject the proposed *performance standard*.	This clause clarifies the process and criteria for acceptance of performance standards. Note that the reference to Registered Participants in clause 5.3.7B(d) includes Connection Applicants by virtue of the definition of Registered Participant.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(b) <u>*NEMMCO* must advise the *Connection Applicant* and the *Network Service Provider* of its decision to accept or reject the proposed *performance standard* within 30 *business days* of the receipt by *NEMMCO* of the information referred to in clauses 5.3.7A(b) and S5.2.4 (if applicable).</u> (c) <u>If *NEMMCO* rejects a proposed *performance standard* under clause 5.3.7B(a)(2), *NEMMCO* must, when advising the person under clause 5.3.7B(b) also provide the person with detailed reasons for its decision to reject the proposed *performance standard*.</u> (d) <u>A *Registered Participant* whose proposed *performance standard* is rejected under clause 5.3.7B(a)(2) may dispute *NEMMCO's* decision to reject the proposed *performance standard*.</u> (e) <u>If a dispute arising under clause 5.3.7B(d) 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.</u>		
5.3.8	**5.3.8 Provision and use of information** (a) The data and information to be provided ~~by a *Connection Applicant*~~ under clause 5.3 must ~~be~~: (1) <u>be</u> prepared, given and used in good faith; (2) <u>be</u> treated as *confidential information*; and (3) ~~protected from being~~ <u>not be</u> disclosed or made available by the recipient to a third party~~,~~ except ~~for the purpose of enabling *Network Service Providers* and *NEMMCO* to assess the effect of the proposed *facility* on the performance of the *power system* and determine the extent of any required *augmentation* or *extension* or for the purpose of enabling *Network Service Providers* to advise *NEMMCO* of *ancillary services* to be~~	The protection from disclosure that was in clause 5.3.8(a)(3) has been limited to the point where the project becomes a "*considered project*". The information remains confidential. (a1) is reformatted from previous rule (a)(3).	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~provided under a *connection agreement*~~ in the circumstances set out in clauses 5.3.2(b), 5.3.8(a1), 5.3.8(a2) and 5.3.8(a3). (a1) The data and information to be provided under clause 5.3 may be disclosed by a *Network Service Provider* to *NEMMCO* and by *NEMMCO* to a *Network Service Provider* for the purpose of enabling *Network Service Providers* or *NEMMCO* (as the case may be) to: (1) assess the effect of the proposed *facility* or proposed alteration to *generating plant* (as the case may be) on the performance of the *power system* or another proposed *facility* or another proposed alteration; (2) determine the extent of any required *augmentation* or *extension*; or (3) advise *NEMMCO* of services described in clause 3.11.4(j). (a2) Where a technical requirement in clause S5.2.5, S5.2.6, S5.2.8 or S5.2.9 requires a *Network Service Provider* or a *Generator* to take into account a *considered project* when negotiating an *access standard*, the data and information to be provided under clause 5.3 on the *considered project* may be disclosed by the *Network Service Provider* to the *Connection Applicant* to the extent reasonably necessary for the *Connection Applicant* to determine a proposed *access standard* for that technical requirement. (a3) The data and information to be provided under clause 5.3 may only be disclosed by the recipient to a third party as allowed under clauses 3.13.3(k) and 3.13.3(k1) once: (1) a person is registered with *NEMMCO* as a *Registered Participant* in respect of the relevant *plant*; and (2) unless the disclosure is to a *Transmission Network Service Provider*, only if it does not contain data and information from which the load characteristics described in clause S5.5.5		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	could be derived as an identifiable component. (b) A person intending to disclose information under clause 5.3.8~~(a)(3)~~(a1) must first advise the relevant *Connection Applicant* of the extent of the disclosure.		
5.3.9	**5.3.9 Procedure to be followed by a Generator proposing to alter a Generating System** (a) If a *Generator*: (1) proposes to alter a *connected generating system*; or (2) proposes to alter a *generating system* for which *performance standards* have been previously accepted by *NEMMCO*, in a manner that will affect the performance of the *generating system* relative to any of the technical requirements set out in clauses S5.2.5, S5.2.6, S5.2.8 and S5.2.9, this clause 5.3.9 must first be followed by the *Generator*. (b) The *Generator* must submit to the *Network Service Provider*, with a copy to *NEMMCO*: (1) a description of the nature of the alteration and the timetable for implementation; (2) in respect of the *generating system* as altered, details of the *generating unit* design data and *generating unit* setting data in accordance with schedule S5.5 or the *Generating System Model Guidelines*, *Generating System Design Data Sheet*, or *Generating System Setting Data Sheet*; (3) in respect of the *generating system* as altered, the information described in clause S5.2.4(b); and (4) proposed amendments to the relevant *performance standard* being, for each relevant technical requirement for which the proposed	The existing provisions of clause 5.3 apply to modifying a connection. It is possible to alter generating plant where the alteration has an impact without actually modifying the connection. It is therefore important that the Rules be amended to specifically deal with alterations to generating plant. Clause 5.3.9 is a truncated version of the process set out to establish a connection. An important aspect of this clause is that it clarifies that a modification to plant does not require that all performance standards need to be reconsidered, just those that may be affected by the proposed change. This is necessary because some aspects of plant design are not easily modified, and requiring all performance standards to be reassessed to current standards may discourage Generators from upgrading plant.	It is not appropriate to deem all prospective changes to generating plant as leading to a change in performance relevant to the technical requirements for generators. An example of a preferable approach would be to require Participants considering changes to plant to consider whether the change would affect compliance with a technical requirement. If a Participant considers that it would affect compliance then the Participant should be required to engage with NEMMCO. The risk – and therefore behavioural incentive - would be on the Participant while minimising the regulatory burden. That is, if the Participant entertained doubts about the effect of the proposed plant alteration the process would strongly encourage it to discuss the matter with NEMMCO. This point is consistent with technical facts which are discussed opposite the table located after draft cl5.3.9(c) below. Draft clauses operating in relation to draft cl.5.3.9 should be read in light of these issues.

<table>
<tr><th>Affected clause</th><th>Clause with proposed amendments</th><th>Reason</th><th>NGF Comments</th></tr>
<tr>
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<td>
alteration to the equipment will affect the performance of the generating system, the applicable automatic access standard or a proposed negotiated access standard determined by application of clause 5.3.4A as if that clause applied to the submission.

(c) Without otherwise limiting clause 5.3.9(b)(4), for the purposes of that clause, a proposed alteration to the equipment specified in column 1 of the table set out below is taken to affect the performance of the generating system relative to technical requirements specified in column 2 thereby necessitating a submission under clause 5.3.9(b)(4):
<table>
<tr><th>Column 1
(altered equipment)</th><th>Column 2
(clause)</th></tr>
<tr><td>machine windings</td><td>S5.2.5.1, S5.2.5.2, S5.2.9</td></tr>
<tr><td>power converter</td><td>S5.2.5.1, S5.2.5.2, S5.2.5.3C, S5.2.5.12, S5.2.5.13, S5.2.9</td></tr>
<tr><td>reactive compensation plant</td><td>S5.2.5.1, S5.2.5.2, S5.2.5.3C, S5.2.5.12, S5.2.5.13</td></tr>
<tr><td>excitation control system</td><td>S5.2.5.3C, S5.2.5.12, S5.2.5.13</td></tr>
<tr><td>voltage control system</td><td>S5.2.5.3C, S5.2.5.12, S5.2.5.13</td></tr>
<tr><td>governor control system</td><td>S5.2.5.11, S5.2.5.14</td></tr>
<tr><td>power control system</td><td>S5.2.5.11, S5.2.5.14</td></tr>
</table>
</td>
<td></td>
<td>The table opposite is not necessarily accurate. Modifications may be made to this equipment (eg rewinding a machine or changing an AVR) without changing its performance. In this case, a statement from the designer and/or test data should be sufficient to not require a submission under clause 5.3.9(b)(4).</td>
</tr>
</table>

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	protection system | S5.2.5.3A, S5.2.5.3B, S5.2.5.3C, S5.2.5.8, S5.2.5.9 auxiliary supplies | S5.2.5.1, S5.2.5.2, S5.2.8 remote control and monitoring system | S5.2.5.14, S5.2.6.1, S5.2.6.3 (e) The *Network Service Provider* may, as a condition of considering the submission made under clause 5.3.9(b), require payment of a fee to meet the reasonable costs anticipated to be incurred by it and any other *Network Service Providers* and *NEMMCO* in the assessment of the submission. The *Network Service Provider* must require payment of such a fee if so requested by *NEMMCO*. On payment of the required fee, the *Network Service Provider* must pay such amounts as are on account of the costs anticipated to be incurred by the other *Network Service Providers* and *NEMMCO* as appropriate. (f) The *Network Service Provider* and the other party must immediately jointly advise *NEMMCO* when a variation to an existing *connection agreement* has been entered into between them in relation to an alteration to a *generating system*.		
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	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.	A modified plant should not be required to exceed its existing performance standard. If this is less than the minimum then the

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	the *automatic access standard*, it would not be rejected if clauses 5.3.4A(a) and 5.3.4A(d) were 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*.		existing standard should form the floor.
5.4.1	**5.4.1 Applicability** ~~This c~~Clause 5.4 applies only to new installations and modifications to existing installations (including, without limitation, alterations to existing *generating plant*) after 13 December 1998 (in the case of installations located in *participating jurisdictions* other than Tasmania) and after ~~the date that Tasmania becomes a *participating jurisdiction*~~ 29 May 2005 in the case of installations located in Tasmania.	This change is necessary to make it clear that clause 5.4 (Design of Connected Equipment) applies to the alteration of generating plant. Also amended to clarify date when Tasmanian installations are covered.	Agreed
5.4.2	(a) At any stage prior to commissioning the *facility* in respect of a *connection*, the *Registered Participant* or the person intending to be registered as a *Generator* must advise the relevant *Network Service Provider* and *NEMMCO* in writing of any inconsistency between the proposed equipment and the ~~provisions of the~~ relevant ~~*connection agreement*~~ *performance standards* and, if necessary, the *Network Service Provider* and the *Registered Participant* or the person intending to be registered as a *Generator* must negotiate in good faith any necessary changes to the ~~*connection agreement*~~ relevant *performance standards* under clause 5.3.9. (b) If there is an inconsistency in a ~~*connection agreement*~~ *performance standard* identified in clause 5.4.2(a), the *Registered Participant* or the person intending to be registered as a *Generator* and *Network Service Provider*	These changes are necessary to ensure that any inconsistency between the plant and the performance standards are resolved before commissioning. As the performance standards are accepted subject to the execution of the Connection Agreement the reference to connection agreement can be removed.	NEMMCO should also be required to negotiate in good faith as they are a party to almost all negotiations

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	must not commission the *facility* in respect of a *connection* unless the *facility* or the ~~*connection agreement*~~ *performance standard* has been varied to remove the inconsistency. (c) Nothing in this clause 5.4.2 affects the operation of clause 5.3.6(c1).		
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* or *generating systems* 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.	Agreed as marked up
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* or *generating system* is not complying with one or more technical requirements of clause S5.2.5 of schedule 5.2 and the relevant *connection agreement* or one or more of the *performance standards* for that *generating unit* or *generating system* then the *Generator* must:	This change is required to ensure that correct referencing is applied.	Agreed as marked up
5.7.3(e)	(e) If *NEMMCO*: (1) is satisfied that: (i) a *generating unit* or *generating system* does not comply with its *performance standards* in respect of one or more technical requirements of clauses S5.2.5, S5.2.6, S5.2.8 or S5.2.9 ~~of schedule 5.2~~ and the relevant *connection agreement*; or (ii) ~~does not have evidence demonstrating that a *generating unit* complies with the~~	These amendments are to change the reference to technical requirements to references to performance standards, and to include inadequate models used to assess power system security as grounds for directing the Generator to operate the plant.	

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~technical requirements set out in clause S5.2.5 of schedule 5.2~~ a *generating unit's* or *generating system's* performance is not adequately represented by the applicable analytical model provided under clause 5.7.6(g) or clause S5.2.4; and (2) holds the reasonable opinion that there is, or could be, a threat to *power system security* because of the performance of the *generating unit* or *generating system*, or because the inadequacy of its analytical model is adversely affecting *NEMMCO's* ability to assess *power system security*, including *power transfer capabilities*~~; and~~ ~~(3) holds the reasonable opinion that there is or could be a threat to the *power system security* because of the performance of the *generating unit*~~, *NEMMCO* may direct the relevant *Generator* to operate the relevant *generating unit* or *generating system* at a particular *generated* output or in a particular mode until the relevant *Generator* submits evidence reasonably satisfactory to *NEMMCO* that the *generating unit* or *generating system* is complying with the relevant ~~technical requirement(s)~~ *performance standard* and performing substantially in accordance with its analytical model.		
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	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	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	with the *Generating System Model Guidelines*, or otherwise agreed with *NEMMCO* under clause S5.2.4(b1)(2), *NEMMCO* may direct a *Network Service Provider* to require a *Generator* to conduct a test under clause 5.7.6(a). *NEMMCO* may witness such tests.	limits.	
5.7.6(g)	(g) ~~The *Network Service Provider* must provide to a *Generator* such details of the analytic parameters of the model derived from the tests referred to in clause 5.7.6 for any of that *Generator's generating units* as may reasonably be requested by the *Generator*~~The *Generator* must provide the test records obtained from a test under clause 5.7.6(a) to the *Network Service Provider*, who must derive the analytical parameters for the applicable model developed in accordance with the *Generating System Model Guidelines*, or otherwise agreed with *NEMMCO* under clause S5.2.4(b1)(2) and provide them to *NEMMCO* and the relevant *Generator*.	This amendment gives NEMMCO access to analytical parameters derived from tests under clause 5.7.6.	Agreed
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).	Excluding further testing carried out under 5.7.6(a1) at NEMMCO's request and 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	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	A derogation is a more appropriate manner to deal with transitional changes with a sunset date. Must refer to the standards outlined in 5.10.3

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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	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.	

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 (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	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	Not acceptable - Open ended requirement. This provides no regulatory certainty. Participants may be required to upgrade their plants after building and agreeing performance standards. Subject to ongoing discussions regarding 'Grandfathering' of

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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*.	agreed or if there is no agreement, then what is technically achievable by the plant.	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 ~~s~~ 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	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).	Generally agreed - Good process with comments as described below

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 (ii) the design performance of the *plant* at the *performance standards*		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 proposed *performance standard* to *NEMMCO* must, within 20 *business days* of the date on which *NEMMCO*		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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. (k) If a dispute arising under clause 5.11.1(j) is not resolved		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	NGF Comments
	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 p*erformance 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 clause~~s~~ 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*.	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. Replace 'up-to-date' with 'current' This is another requirement to present the complete connection agreement, including commercial terms, which is not acceptable.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 does not adversely affect *power system security*.	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. Clause 5.11.3(d) is inserted to introduce flexibility into the performance standard regime to change performance standards	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
		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 accordance with the compliance program; (2) ensure that the *plant* complies with the relevant	Amendments are required to ensure appropriate referencing.	Changes 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 Notwithstanding these comments, the NGF considers that the matters dealt with in this clause ought to be examined through reviews proposed in the AEMC's draft report on its review of enforcement and compliance with technical standards. Duplication with 5.7.3(b)

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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*. (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*		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 future, another *Network User* is adversely affected by negative sequence voltage or current imbalance because of this *generating plant*.		This is a requirement of the system standards, not generators. Any requirements on generator should be in S5.2 (as they are). When not generating, no current is drawn in each phase. Maybe the words "voltage generated" and "current drawn" are in the wrong places. Swapping them might make more sense. This clause should deal with the allowable amount of negative sequence voltage on the network. This is an open-ended requirement, potentially requiring unknown upgrades to plant in the future. It defeats the purpose for having a negotiated or minimum standard.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
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.	Agreed
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.	Agreed
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	These changes are necessary to ensure that the network constructed by a	Agreed with comments

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	technical matters in respect of each new or altered *connection* of a *generating unit* or *generating system* to a *network* including: (1~~a~~) design at the *connection point*; (2~~b~~) physical layout adjacent to the *connection point*; (3~~c~~) primary protection and backup protection (clause S5.2.5); (4~~d~~) control characteristics (clause S5.2.5); (5e) communications facilities ~~and alarms~~ (clause S5.2.6); (6~~f~~) insulation co-ordination and lightning protection (clause S5.2.3(b)); (7~~g~~) fault levels and fault clearance~~*times*~~ (clause S5.2.9); (8~~h~~) switching and isolation facilities (clause S5.2.9); (9~~i~~) interlocking and synchronising arrangements; and (10~~j~~) *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; (2) the earthing of the *plant* complies with the Electricity Supply Association of Australia Safe Earthing Guide to reduce step and touch	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.	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.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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*.		
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 standards* are submitted to *NEMMCO* under clause 5.3.7A(a), 5.3.9(b). 5.10.1(a), 5.10.1(c) or	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. The requirement for information in S5.2.4(b) has been extended to cover control systems that are applied to the	Agreed with comments Why is this now an "**either – or**" proposal. If generators don't have to supply any S5.5 data then remove S5.5 from the Rules altogether. It is noted that clauses S5.5.1 and S5.5.2 are proposed to be removed. The reasons given could apply to S5.5.3, S5.5.4 and S5.5.5 also (but have not been). Proposal for (b) is poorly worded. Points 1,2 and 3 refer to dates of delivery and points 4 and 5 concern what has to be delivered. Suggest splitting the proposal into two clauses and renumbering the entire proposal.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 Provider*s (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 Provider*s to perform load flow and dynamic simulation studies.	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.	(2) and (3) - Must be an alteration that will affect performance standards It is unreasonable to ask a generator to provide data in a yet unspecified software format as listed in the proposed S5.2.4(b)(5). NEMMCO's expectations in this regard are unrealistic and under specified. For example, the machine output will affect some of the response parameters. Governor models are only as accurate as the

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~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*; (2) the clearing times of the existing *protection*	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.	tests that derived them and subject to change with general wear and tear, loading level. Start up systems are not normally modelled and would be different for many plants. Speed control systems are complex and interconnect. It is a noble cause but not one that should be listed as a Rules obligation exposing generator to legal implications for failure to comply. Clauses (c) (1), (3) and (4) - the word "synchronised" should read "connected" - synchronised has a technology bias.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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.	

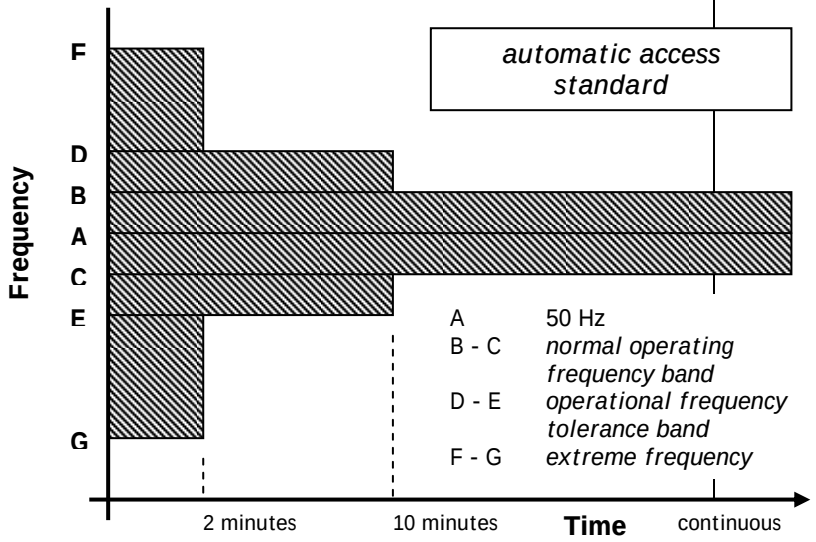
Affected clause	Clause with proposed amendments	Reason	NGF Comments
S5.2.5.1	**Reactive power capability** ~~For the purpose of this clause S5.2.5.1:~~ ~~*'rated active power output'* means the 'Rated MW (Generated)' (as defined in schedule 5.5.1) for the relevant *synchronous generating unit*; and~~ ~~*'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 after ~~under system normal and~~*credible contingency events* ~~operating conditions~~ under	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.	Agreed but not at any voltage level as identified in S5.2.5.1(a). Voltage capability should be defined separately, as it is in Clause S5.2.5.3 Reactive Power is affected by voltage and capability is utilised for voltage control This clause is difficult to apply for generators which have an operating curve exclusive of the generator transformer. The application of an equation that uses the active power output of the generator and applies the result to the connection point seems a little inconsistent.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 to and document as part of the *access standard*,	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.	Should also be able to negotiate the point at which the requirement is met (connection point or machine terminals)

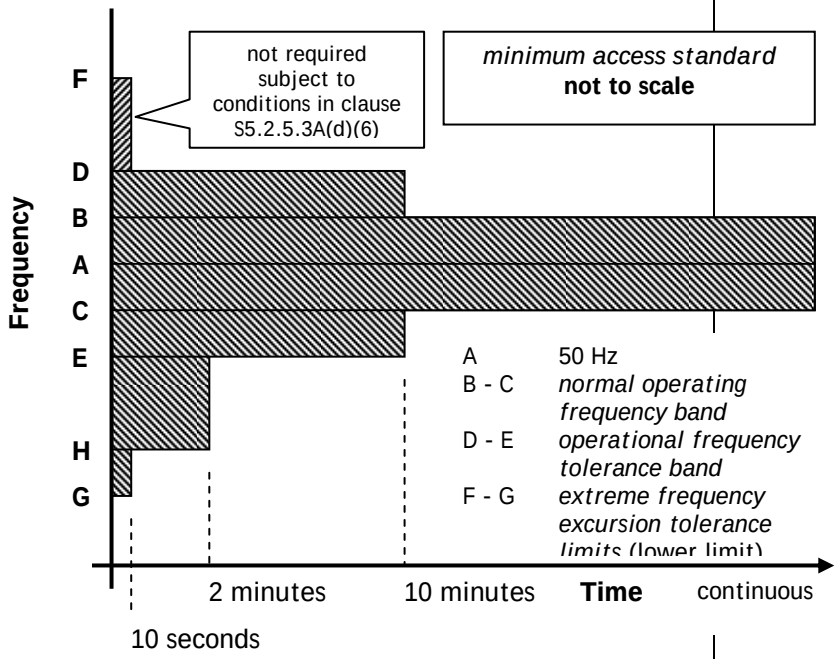
Affected clause	Clause with proposed amendments	Reason	NGF Comments
	operational arrangements by which the *plant* can achieve an agreed level of performance for those operating conditions. (e) The *access standard* must record, the agreed value for *rated active power* and where relevant the method 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 accordance with~~under clause S5.1.6(a);	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.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 prevent cascading events occurring on the	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
		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) A*utomatic 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; (2) the lower bound of the *operational frequency*	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 minimum standards. This is more	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. The NGF supports such a definition that is based on a realistic assessment of the performance of plant. Many combustion turbine Generators are not able to satisfy the extreme under-frequency requirements, particularly at elevated ambient temperatures (eg>35C).

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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. 	technology neutral than the partial load rejection concept, and is more appropriate for wind generation.	

Affected clause	Clause with proposed amendments	Reason	NGF 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.	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	NGF 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	NGF 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	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	Lower voltages are already significantly lower than IEC60034. Suggest a curve be supplied for this clause. 70-90% of normal voltage is not realistic except for transient conditions

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 Service Provider* must take into account, without limitation (1) the expected performance of existing *networks* and *network* developments that are *considered projects*;	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.	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 plant is larger than 100MW, the minimum access standard is the automatic – this is not acceptable. Should be assessed on a case by case basis. 'Abnormal' is not defined – could be anything

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(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 (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,	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	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 and the delay between recloses are also 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. The conditions for a generator to assess here are excessive and in many cases beyond their control and sphere of knowledge. This requirement should form part of a real and specific NSP responsibility in the switchyards of power stations. Generators

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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	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 breaker fail protection.	should be obligated to have certain protection systems as previously defined in S5.2.5.8 and be permitted to trip in accordance with them. Generators should be reasonably secure for conditions outside the zones and settings of their required protection. Fault currents and action of protection systems for incorrectly controlled events are unpredictable and should not be the responsibility of generators 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. No consideration has been given as to significant torque fluctuations on machines during these situations which may cause major damage. In some cases with transformer ended lines, this may be of the order of seconds. No generator should be expected to stay online during faults of this magnitude and duration.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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	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.	Such amount not to exceed requirements under clause S5.2.5.1 Such amount not to exceed requirements under clause S5.2.5.1 Timeframe must be defined Same comments apply as for automatic access standard

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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*		Allowance should be made for small generators connected to transmission systems as well. These are likely to have less impact than those connected to distribution systems.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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.		Unsynchronised automatic reclose must be avoided due to the high risk of damage to generators. Abnormal conditions are undefined
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.	Agreed
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	The scope of the clause has been amended to be based on size rather than whether scheduled or not because this	Clause imposes additional requirements on generators that are not required for intermittent generation

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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, ~~under~~for which it must remain in *continuously~~y~~ 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	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 on some types of generating plant.	The new clause is less effective than the current clause. The clause should list the basic requirements for generator electrical and mechanical protection from system disturbances including minimum expected relays and systems proposed generators should have. This may vary according to technology but should never-the-less be defined. The wording of the original clause was poor in that it suggests a minimum standard of no protection except for an automatic 50% load shed. Allowing generators on the system that have no other protection systems puts all participants at risk.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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.	Paragraph (3) has been included to permit situations where local issues, such as 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.	Paragraph (ii) overrides the requirement of (i). (ii) seems more of a function of regulation than contingency as it is a continuous process.
	(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	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.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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*. (b) There is no *automatic access standard* ~~for this technical requirement~~ for protection of *generation units* from *power 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*	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.	No referred clause - S5.2.5.8(b)(3) Good provision –trip due to failure of plant is acceptable ‘abnormal conditions’ is now an undefined term.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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*.		This is a definition of a NSPs overall liability – it has no place in generator standards
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	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	NGF Comments
	communications facility upon which that *protection system* depends) out of service. (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.	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	NGF Comments
	(d) The *protection system* design must: (1) be coordinated with other *protection systems* already existing in the *power system* or to be provided as part of a *considered project;* (2) avoid consequential disconnection of other *Network Users' facilities*; and (3) take into account existing obligations of the *Network Service Provider* under *connection agreements* with other *Network Users.* (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.
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	The clause has been amended to allow it to be applied to asynchronous as well as synchronous plant.	Generally Agreed subject to comments

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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*	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 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.	Note that most pole-slip protection only detects pole slips and disconnects the units. It will not prevent a pole-slip from happening.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	standards under clauses S5.2.5.10(c) and S5.2.5.10(d).		
S5.2.5.11	**Frequency control** ~~General:~~ (a) For the purpose of ~~this~~ clause S5.2.5.11: "*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	Minor reformatting of the clause has been undertaken. 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.	Agreed subject to comments

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(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 *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.~~ (2e) ~~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*;	Reference to damping of oscillations has been moved to new clause S5.2.5.14.	Clause conflicts with S5.2.5.8 And subject to a limit of its *minimum operating level* These requirements are a statement of desired response but should reflect the natural governor or control response of the machine and this may vary from unit to unit but would correlate to the standard design of 4% droop on speed regulations systems

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(ii~~2~~) 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 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.		Definition of "frequency recovering gradually" would be helpful. It is assumed to mean a frequency recovery that takes longer than 50% time permitted by the Reliability Standard to be outside the normal band.
	(iii) sufficiently rapidly for the *Generator* to be in a position to offer measurable amounts of lower services to the *spot market* for *market ancillary services*.		This is an ancillary service by definition, not a technical obligation
	(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		And subject to a limit of its *maximum operating level*

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	the lower limit of the *normal operating frequency band* and *system frequency*; (B~~ii~~) ~~five percent~~ 5% of its *maximum operating level*; and (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		This is an ancillary service by definition, not a technical obligation (c) and (d) seem to be missing – numbering issue

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(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 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.	This may be exceptionally difficult to comply with for some generators, in particular, Gas Turbines operating at full load with no overfiring capability. This implies a link between the obligations of the ancilliary services market and technical standards. Not all participants are involved in the AS market.
S5.2.5.12	~~**Stability**~~**Impact on network capability** (a) *Automatic access standard*: Each ~~A~~ *generating unit* must have plant capabilities and *control systems*, ~~including, but not limited to inertia, short circuit ratio and power system~~	The requirement in the automatic access standard not to 'cause instability that would adversely impact other Registered	Agreed subject to comments This is not well defined. It does not assist Generators in defining physical obligations that are measurable and able to be tested for

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~stabilisers,~~ sufficient not to~~:~~ ~~(1) not cause any *inter-regional* or *intra-regional power transfer capability* based on:~~ ~~(i) transient stability;~~ ~~(ii) oscillatory stability; or~~ ~~(iii) *voltage* stability,~~ ~~to be reduced below the level that would apply if the *generating unit* were *disconnected*;~~ reduce any *inter-regional* or *intra-regional power transfer capability* below the level that would apply if the *generating unit* were disconnected. ~~(2) not cause instability that would adversely impact on other *Registered Participants*.~~ (b) *Minimum access standard*: The *generating* ~~*unit*~~ *system* must have plant capabilities and *control systems*~~,~~ ~~including, but not limited to inertia, short circuit ratio and power system stabilisers,~~ sufficient to not reduce any ~~*inter-regional* or *intra-regional power transfer capability* to import into the *generating unit's region* by more than its *loading level* whenever it is *synchronised*~~ and operational arrangements sufficient to not reduce: (1) the ability to *supply Customer* load as a result of a reduction in *power transfer capability*; (2) *power transfer* capabilities into a *region* by more than the combined *sent out generation* of its *generating units* ; and (3) *power transfer capabilities* into another *region* by more than the lesser of 15 per cent of the combined *nameplate rating* of its *generating units* and 30 MW, unless *NEMMCO* considers that the *connection* of that *generating system* is likely to result in a net improvement in *supply reliability* across all *regions*, (c) ~~The relevant requirements for short circuit ratio in~~	Participants' has been moved to clause S5.2.5.13 to combine this requirement with the other power system stability requirement. The clause has been extended to include all types of network impact (including impact on thermal transfer limits). This arose out of situations arising with some new wind farm installations, in which generation from the wind farm reduced import capability (associated with a thermal limit) by a ratio greater than 1:1.) Clause (b)(2) relates to the impact on intra-regional flow paths. The clause has been extended in the minimum standard to cover a reduction in import capability into another region (where generation may reduce the reliability of another region.)	compliance. Need to ensure that consistant application of methodology is applied across all NSPs in assessing this requirement. There may be some contingencies, however unlikely that may prevent a generator from achieving the automatic access standard.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~IEC 60034-3 are a *plant standard* in relation to clause S5.2.5.12(a)(1)(i).~~In carrying out assessments of proposed *access standards* under clause S5.2.5.12, the *Network Service Provider* and *NEMMCO* must at least 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 *automatic reclose equipment*.	The focus of this clause has been changed to be on equipment, facilities and control mechanisms that will achieve minimum impact on network transfer capability.	
	(d) The *access standard* must include operational arrangements, including curtailment of *generation* if necessary, to the satisfaction of *NEMMCO*, to ensure that the *generating plant* is operated in a way that meets at least the *minimum access standard* under abnormal *network* and *generating system* conditions, so that *power system security* can be maintained. (e) The *Generator* must take measures, to the satisfaction of *NEMMCO* and the *Network Service Provider*, to minimise any reduction in *power transfer capabilities*. The following matters must be considered in the design of the *generation system*, and implemented, where they would have a material impact on *power transfer capability* to the extent that the total cost of mitigation measures does not exceed 5% of the capital cost of the *generation* project, where the capital cost is based on a project design that would at least meet the *minimum access standard*: (1) *control system* functions and settings; (2) dynamic *reactive power capability* of the *generating unit* or additional *plant* such as SVC or	A problem with the original wording of the clause was that it applied an on-going risk to the Generator – on-going compliance with the clause depended on factors outside the Generator's control, including design and configuration of the network, new generation plant and load growth. To avoid this consequence the current wording makes it clear that the assessment is to be based on the current system, considered projects and expected network developments only. The access standard (and therefore the performance standard) documents the facilities equipment and control systems agreed to be provided. The clause also allows for the Network Service Provider and the Generator to negotiate for additional control system facilities on a commercial basis.	Mitigation would have to be justified on the basis of a shortfall in generating system capabilities, not system capability.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	STATCOM; (3) choice of technology and *plant* parameters; (4) *transmission network augmentation* or *distribution network augmentation;* and (5) location and manner of *connection* to the *network*. (f) The *access standard* under clause S5.2.5.12 must detail the *plant* capabilities, *control systems* and operational arrangements that will be maintained by the *Generator*, notwithstanding that changes to the *power system*, but not changes to the *generating system*, may reduce the efficacy of the *plant* capabilities, *control systems* and operational arrangements over time. (g) If a *Network Service Provider* considers that *power transfer capabilities* of its *network* would be increased through provision of additional *control system* facilities to a *generating system* (such as a *power system* stabiliser), the *Network Service Provider* and the *Generator* may negotiate for the provision of such additional *control system* facilities as a commercial arrangement. (~~d~~h) The negotiation of access standards ~~in relation to~~ under ~~this~~ clause S5.2.5.12 must involve *NEMMCO* in accordance with ~~under~~ clause 5.3.4A(b)~~of the *Rules*~~.		
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: (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	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 responses that are largely oscillatory. The automatic and minimum standards have been written in terms of scheduled	Agreed for big systems. Overly onerous for small plant where noted.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 (ii) facilities for testing the *control system* sufficient to establish its dynamic operational characteristics.	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. The previous automatic access standard requirement from S5.2.5.12 not to cause instability that would adversely affect	Referred to generating unit capability – should include generating systems All inputs and outputs are not key variables. Overly onerous for small plant.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(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 location agreed under clause S5.2.5.13(b)(3)(i) of: (A) generated voltage less than 2.5	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	NGF Comments
	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 settable for boost or droop. (4) Each *generating unit*, other than a *synchronous generating unit*, must have a voltage *control*		Overly onerous for small systems – suggest existing limits on system size may be appropriate.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 operating point where the voltage disturbance would not cause any limiting device to		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 nepers per second and does not degrade any other mode of oscillation to within 0.29 nepers per second of being	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.	Overly onerous for small systems – suggest existing limits on system size may be appropriate.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 MW or more, must have an *excitation control system* that: (i) regulates voltage at the *connection*		If transmission connected is intended then this should be stated rather than a voltage level. There are 132kV distribution lines in the network.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 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		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	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 range of –10% to +10% of stator voltage; (v) monitoring and recording facilities for key variables including inputs, output and the inputs		

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

Affected clause	Clause with proposed amendments	Reason	NGF Comments
S5.2.5.14	**Active power control** (a) *Automatic access standard:* A *generating system* comprised of *generating units* with a combined *nameplate rating* of 30 MW or more must have an active power *control system* capable of: (1) for each *scheduled generating unit* or, if subject to aggregation approved by *NEMMCO* under clause 3.8.3, *scheduled generating system*: (i) maintaining and changing its active power output in accordance with its *dispatch instructions*; and (ii) ramping its active power output linearly from one dispatch level to another, and (2) for each *non-scheduled generating unit* or *non-scheduled generating system*, subject to the energy source availability: (i) subject to clause S5.2.5.14(a)(2)(iii), automatically reducing or increasing its active power output within five minutes, at a constant rate, to below the level specified in an instruction electronically issued by a *control centre*; (ii) automatically limiting its active power output, to below the level specified in clause S5.2.5.14(a)(2)(i); and (iii) not changing its active power output within five minutes by more than the raise and lower amounts specified in an instruction electronically issued by a *control centre*. (b) *Minimum access standard:* A *generating system* comprised of *generating units* with combined *nameplate*	The requirement for active power control is currently implied in the dispatch requirements for scheduled generating units, but has not previously been expressed as a technical requirement. A number of concerns have been raised about the lack of active power control from wind farms – particularly with respect to control of line loading and reduction in reliability as a result of ramp rate limitations in scheduled plant that is regulating output to compensate for load and wind farm variability. Therefore it is necessary to formalise in technical requirements a requirement for active power control. The requirements for scheduled generating units are consistent with existing dispatch arrangements.	Agreed Some discussion of acceptable error in dispatch output could enhance this clause. Many participants can only follow dispatch output targets with about 1% accuracy.

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	rating of 30 MW or more must have an active power *control system* capable of: (1) for each *scheduled generating unit* or, if subject to aggregation approved by *NEMMCO* under clause 3.8.3, *scheduled generating system*, maintaining and changing its active power output in accordance with its *dispatch instructions*. (2) for each *non-scheduled generating system*: (i) reducing its active power output, within five minutes, to or below the level required to manage *network* flows that is specified in a verbal instruction issued by the *control centre*; (ii) limiting its active power output to or below the level specified in clause S5.2.5.14(b)(2)(i); (iii) ensuring that the change of active power output in a five minute period does not exceed a value specified in a verbal instruction issued by the *control centre*; and (iv) being upgraded to receive electronic instructions from the *control centre* and respond within five minutes. (c) Each *control system* used to satisfy the requirements of clauses S5.2.5.14(a) and S5.2.5.14(b) must be *adequately damped*. (d) The *access standard* must document to *NEMMCO's* satisfaction any operational arrangements necessary to manage *network* flows, that may include a requirement for the *generating system* to be operated in a manner that prevents its output changing within five minutes by more than an amount specified by a *control centre*. (e) A *negotiated access standard* may provide that if the		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	number or frequency of verbal instructions becomes difficult for a *control centre* to manage, *NEMMCO* may require the *Generator* to upgrade its *facilities* to receive electronic instructions and act automatically on those instructions. (f) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.5.14.		
S5.2.6.1	**Replace clause S5.2.6.1 with the following:** **Remote Monitoring** (a) The *automatic access standard* is: (1) Each *scheduled generating unit* or *non-scheduled generating unit* with a *nameplate rating* of 30MW or more or non-scheduled generating system with a combined nameplate rating of 30MW or more, must have *remote monitoring equipment* to transmit to *NEMMCO*'s *control centres* in real time in accordance with clause 4.11, the quantities that *NEMMCO* reasonable requires to discharge its *market* and *power system security* functions set out in Chapters 3 and 4. (2) The quantities that *NEMMCO* may request include: (i) in respect of each *scheduled generating unit* or *non-scheduled generating unit* with a *nameplate rating* of 30MW or more, current, voltage, active power and reactive power in respect of *generating unit* stators or power conversion systems (as applicable), that status of all switching devices that carry the *generation*, *tap-changing transformer* tap position, and aggregate power if subject to aggregation approved by *NEMMCO* under clause 3.8.3; (ii) in respect of each *non-scheduled generating system* that includes a *generating unit* with a *nameplate rating* of less than 30MW, its connected status, *tap-changing transformer* tap		Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	position and voltages, active power and reactive power aggregated for groups of identical *generating units*, and either the numbers of identical *generating units* operating or the operating status of each non-identical *generating units;* (iii) in respect of each auxiliary system with capacity of 30MW or more associated with a *generating unit* or *generating system*, active power and reactive power; (iv) in respect of reactive power equipment that is part of a *generating system* but not part of a particular *generating unit*, its reactive power, (v) in respect of each wind farm, wind speed, wind direction and ambient temperature; and (vi) any other quantity that *NEMMCO* reasonable requires to discharge its *market* and *power system security functions* as set out in Chapters 3 and 4. (b) *Minimum Access Standard*: Each *scheduled generating unit* or, if subject to aggregation approved by *NEMMCO* under clause 3.8.3, *scheduled generating system*, or *non-scheduled generating system* with a combined *nameplate rating* of 30MW or more must have *remote monitoring equipment* to transmit to *NEMMCO*'s *control centres* in real time in accordance with clause 4.11: (1) the active power output of the *generating unit*, *scheduled generating system*, or *non-scheduled generating system* (as applicable); (2) if connected to a *transmission system*, the reactive power output of the *generating unit*, *scheduled generating system*, or *non-scheduled generating system* (as applicable); (3) if a wind farm, number of units operating, wind speed and wind direction. (c) *NEMMCO* must be involved in the negotiation of *access*		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	standards under clause S5.2.6.1		
S5.2.6.3	**Replace clause S5.2.6.3 with the following:** **Communications Equipment** (a) The *automatic access standard* is: (1) A generator must provide and maintain two separate telephone facilities using independent telecommunications service providers, for the purposes of *operational communications* between the *Generator*'s responsible operator under clause 4.11.3(a) and *NEMMCO*'s *control centre*. (2) A *Generator* must provide electricity supplies for *remote monitoring equipment* and *remote control equipment* installed in relation to its *generating units* or *generating system* capable of keeping such equipment available for at least three hours following total loss of *supply* at the *connection point* for the relevant *generating unit* (b) The *minimum access standard* is: (1) A generator must provide and maintain a telephone facility for the purposes of *operational communications* between the *Generator*'s responsible operator under clause 4.11.3(a) and *NEMMCO*'s *control centre*. (2) A *Generator* must provide electricity supplies for *remote monitoring equipment* and *remote control equipment* installed in relation to its *generating units* or *generating system* capable of keeping such equipment available for at least one hour following total loss of *supply* at the *connection point* for the relevant *generating unit* (c) Where the *Network Service Provider* or *NEMMCO* reasonably requires that a back-up telephone facility be independent of commercial telephone service providers, the *Network Service Provider* must provide and maintain the separate facility on a cost-recovery basis only through the		Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	charge for *connection*. (d) A *Generator* must provide communications paths (with appropriate redundancy) from the *remote monitoring equipment* or *remote control equipment* installed for each of its *generating units*, or *generating system* as appropriate, to a communications interface in a location reasonably acceptable to the *Network Service Provider* at the relevant *generation facility*. Communications systems between this communications interface and the *control centre* must be the responsibility of the *Network Service Provider* unless otherwise agreed by the *Generator* and the *Network Service Provider*. The *Generator* must supply accommodation and secure power supplies for communications facilities provided by the Network Service Provider under clause S5.2.6.3 (e) *NEMMCO* must be involved in the negotiation of *access standards* under clause S5.2.6.3		
S5.2.8	**Replace clause S5.2.8 with the following:** **Power station auxiliary supplies** In cases where a *generating system* takes its auxiliary supplies via a *connection point* through which its *generation* is not transferred to the *network*, the *access standards* must be established under clause S5.3.5 as if the *Generator* were a *Market Customer*.		Agreed
S5.2.9	**Replace clause S5.2.9 with the following:** **Fault Current** (a) The *automatic access standard* is: (1) The contribution for the *generating system* to the fault current on the *connecting network* through its *connection point* must not exceed the lesser of: (i) three times the combined maximum continuous current of the operating *generating units* of the *generating system*; and		Substantial changes to structure – to be deferred

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	(ii) the level that can be safely interrupted by the circuit breakers of the *connecting network* and safely carried by the *connecting network* for the duration of the applicable *breaker fail protection system fault clearance times*, as specified for the relevant *connection point* by the *Network Service Provider*. (2) A *generating syste*m's connected plant must be capable of withstanding fault current through the *connection point* up to the higher of: (i) the level specified in clause S5.2.4(c)(1); and (ii) the highest level of current at the *connection point* that can be safely interrupted by the circuit breakers of the *connecting network* and safely carried by the *connecting network* for the duration of the applicable *breaker fail protection system fault clearance times*, as specified by the *Network Service Provider*. (3) A circuit breaker provided to isolate a *generating unit* or *generating system* from the *network* must be capable of breaking, without damage or restrike, the maximum fault currents that could be reasonably expected to flow through the circuit breaker for a fault in the *network* or in the *generating unit*, or *generating system*, as specified in the *connection agreement*. (b) The *minimum access standard* is: (1) The *generating system* does not need to limit fault current contribution. (2) A *generating system's connected plant* must be capable of withstanding fault current through the *connection point* up to the level specified in clause S5.2.4(c)(1) (3) A circuit breaker provided to isolate a *generating unit* or *generating system* from the *network* must be capable of breaking, without damage or restrike, the maximum fault currents that could be reasonably expected to flow through the circuit breaker for a fault in the *network* or		

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	in the *generating unit*, or *generating system*, as specified in the *connection agreement*. (c) The *Network Service Provider* must consider alternate *network* configurations in the determination of the applicable fault current level and must prefer those options that maintain an equivalent level of service to other *Network Users*, and which in the opinion of the *Generator*, impose the least obligation on the *Generator*. (d) In carrying out assessments of proposed *access standards* under clause S5.2.9, the *Network Service Provider* must take into account, without limitation: (1) The expected performance of the existing *networks* and *network* developments that are *considered projects*; (2) The expected performance of existing *generating plant* and *generation* projects that are *considered projects*; and (3) The expected range of *power system* operating conditions. (e) The *Network Service Provider* is not liable for any loss or damage incurred by the *Generator* or any other person as a consequence of a fault on either the *power system*, or within the *Generator's facility*.		It is inappropriate that a clause referring to a NSP's liability to everyone exists in a Generator standard.
S5.5.2	**Under the heading "Preliminary system planning data":** This data is required for submission with the *application to connect*, to allow the *Network Service Provider* to prepare an offer of terms for a *connection agreement* and to assess the requirement for, and effect of, *network augmentation* or *extension* options. Such data is normally limited to the items denoted as Standard Planning Data (S) in the ~~technical data schedules 5.5.1 to 5.5.5~~ *Generating System Model Guidelines Generating System Design Data Sheet, Generating System Setting Data Sheet* and in schedules 5.5.3 to 5.5.5. The *Network Service Provider* may, in cases where there is reasonable doubt as to the viability of a proposal, require the submission of other data before making an offer to *connect* or to	The references to schedules 5.5.1 and 5.5.2 (implied) have been amended to refer to the documents to be prepared under clause S5.5.7.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	amend a *connection agreement*.		
S5.5.4	Schedules 5.5.3 to 5.5.5 cover the following data areas: (a) ~~schedule 5.5.1 *Generating Unit* Design Data. This comprises *generating unit* fixed design parameters.~~ ~~(b) schedule 5.5.2 *Generating Unit* Setting Data. This comprises settings which can be varied by agreement or by direction of the *Network Service Provider* or *NEMMCO*.~~ ~~(c)~~ schedule 5.5.3 - Network Plant Technical Data. This comprises fixed electrical parameters. (~~d~~b) schedule 5.5.4 - Plant and Apparatus Setting Data. This comprises settings ~~which~~ that can be varied by agreement or by direction of the *Network Service Provider* or *NEMMCO*. (e) schedule 5.5.5 - *Load* Characteristics. This comprises the estimated parameters of loads~~ groups in respect of, for example, harmonic content and response to *frequency* and *voltage* variations~~. The documents and schedules applicable to each class of *Registered Participant* are as follows: (1) *Generators:* ~~schedules 5.5.1 and 5.5.2~~ the *Generating System Model Guidelines*, *Generating System Design Data Sheet* and *Generating System Setting Data Sheet*; (2) *Customers* and *Network Service Providers:* schedules 5.5.3 and 5.5.4; and (3) *Customers:* schedule 5.5.5.	The references to schedules 5.5.1 and 5.5.2 have been removed or amended to refer to the documents to be prepared under clause S5.5.7.	Agreed
S5.5.5	**Replace clause S5.5.5 with the following:** S5.5.5 A *Generator* that *connects* a *generating unit*, that is not a *synchronous generating unit*, must be given exemption from complying with those parts of ~~schedules 5.5.1 and 5.5.2~~ the *Generating System Model Guidelines Generating System Design Data Sheet* and	The references to schedules 5.5.1 and 5.5.2 have been amended to refer to the documents to be prepared under clause S5.5.7.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	Generating System Setting Data Sheet that are determined by the *Network Service Provider* to be not relevant to such *generating units*, but must comply with those parts of schedules 5.5.3, 5.5.4, and 5.5.5 that are relevant to such *generating units*, as determined by the *Network Service Provider*.		
S5.5.6	**Replace clause S5.5.6 with the following:** S5.5.6 A *Generator* that connects a *synchronous generating unit* equal to or smaller than 30 MW or a number of *synchronous generating units* totalling less than 30 MW to a *connection point* to a *distribution network* will usually be required to submit less registered system planning data and less registered data than is indicated ~~in schedule 5.5.1~~ the *Generating System Model Guidelines* *Generating System Design Data Sheet* and *Generating System Setting Data Sheet*. In general these data will be limited to confirmation of the preliminary system planning data, marked (S), but other data must be supplied if required by the *Network Service Provider* or *NEMMCO*. Codes: S = Standard Planning Data D = Detailed Planning Data R = Registered Data (R1 pre-*connection*, R2 post-*connection*)	The reference to schedules 5.5.1 has been amended to refer to the documents to be prepared under clause S5.5.7.	Agreed
S5.5.7	(a) *NEMMCO* must, subject to clause S5.7.7(b), *publish* in accordance with the *Rules consultation procedures:* (1) a *Generating System Design Data Sheet* describing, for relevant technologies, the *generating system* design parameters of *generating unit*s and *generating systems* including, without limitation, *plant* configurations, impedances, time constants, non-linearities, ratings and capabilities, to be	This modification removes the data schedules S5.5.1 and S5.5.2 and allows their replacements to be changed outside of the Rule change process. This is because the data requirements need to change from time to time to reflect changes in technology. Currently the data schedules are heavily biased toward thermal synchronous plant, and some of the requirements are not applicable to	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	provided under clauses S5.2.4 and S5.5, (2) a *Generating System Setting Data Sheet* describing, for relevant *generation* and *control system* technologies, the *protection system* and *control system* settings of *generating unit*s and *generating systems* including, without limitation, configurations, gains, time constants, delays, deadbands, non-linearities and limits, to be provided under clauses S5.2.4 and S5.5; and (3) *Generating System Model Guidelines*, describing, for relevant *generation* and *control system* technologies, *NEMMCO's* requirements when developing mathematical models for *generating units* and *generating systems*, including, without limitation, the impact of their *control systems* and *protection systems* on *power system* security. (b) If the first version of: (1) the *Generating System Design Data Sheet published* under paragraph (a) is identical to schedule 5.5.1; (2) the *Generating System Setting Data Sheet published* under paragraph (a) is identical to schedule 5.5.2, as each of those respective schedules existed one day before the *Rules* changes that give effect to this clause S5.5.7 take effect, *NEMMCO* is not required to comply with the *Rules consultation procedures* in *publishing* them. (c) The purpose of making the *Generating System Design Data Sheet*, *Generating System Setting Data Sheet* and *Generating System Model Guidelines*, is to: (1) allow *generating units* and *generating systems* to be mathematically modelled by *NEMMCO* and relevant *Registered Participants* in load flow	asynchronous plant. It is proposed that changes to these schedules will be made through a Rules consultation process. Because of the urgency of replacing these schedules with documents covering wind generation technologies, NEMMCO would like to be able to commence the Rules consultation process before these changes come into effect.	

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	and dynamic stability assessments with sufficient accuracy to permit: (i) the *power system* operating limits for ensuring *power system security* to be quantified with the lowest practical safety margins; (ii) proposed *access standards* and *performance standards* of *generating units* and *generating systems* to be assessed; and (iii) settings of *control systems* and *protection systems* of *generating units*, *generating systems* and *networks* to be assessed and quantified for maximum practical performance of the *power system*; and (2) identify for each type of data its category in terms of clause S5.5.2. (d) Any consultation commenced by *NEMMCO* in accordance with the *Rules consultation procedures* prior to this clause coming into effect is taken to have been conducted in accordance this clause S5.7.7.		
schedules 5.5.1 & 5.5.2	**Delete**		Agreed
schedule 5.6(c1)	(c1) details of each *access standard* agreed between the *Network Service Provider* and the *Registered Participant* and all related conditions of agreement resulting from the application of any ~~of the~~ access provisions ~~for access~~ contained in schedule 5.1 for *Network Service Providers*, or schedule 5.2 for *Generators*, or schedule 5.3 for *Customers*, or schedule 5.3a for *Market Network Service*	This amendment is required to correct an incorrect reference to the term performance standard. Access standards are what are agreed between Network Service Providers and Registered Participants.	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	Providers		
8.6.2(m)	(m) **(modelling):** the disclosure, use or reproduction of data held by *NEMMCO* or a *Network Service Provider* for the purpose of modelling the operation of the *power system*, to the extent reasonably necessary to enable a ~~Network User~~ *Connection Applicant* to develop an *application to connect*.	The change here corrects an error in the previous formulation of this clause by replacing the term *Network User*, which relates to people already connected to the network, with the term *Connection Applicant*, which relates to people wanting to develop an application to connect.	Agreed
8.6.2(n)	(n) the disclosure of a *performance standard* to a *Network Service Provider* for the purpose of establishing a compliance monitoring program, or if *connection* at that *performance standard*, in *NEMMCO's* opinion, affects, or is likely to affect, the performance of that *Network Service Provider's network*.	This is necessary so that NEMMCO can provide the performance standards to other NSPs	Performance Standards are between the Generator, the NSP and NEMMCO, not with all other NSPs. Specific permission should be sought for this to happen on a case by case basis as required.
Chapter 10	**access standard** Either an *automatic access standard* or a *negotiated access standard* for a particular technical requirement as recorded in a *connection agreement*. **adequately damped** In relation to a *control system*, when tested with a step change of a feedback input or corresponding reference, or otherwise observed, any oscillatory response at a frequency of: (a) 0.05 Hz or less has a damping ratio of at least 0.4; (b) between 0.05 Hz and 0.6 Hz has a halving time of 5 seconds or less (equivalent to a damping coefficient – 0.14 nepers per second or less); and (c) 0.6 Hz or more has a damping ratio of at least 0.05 in relation to a *minimum access standard* and a damping ratio of at least 0.1 otherwise.	The concept of access standard is used extensively in the technical requirements in Schedule 5.2.	Agreed Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	considered project In respect of a *generating system*, a project that meets both of the following criteria: (a) A *connection agreement* has been entered into. (b) An *offer to connect* has been made and the *Network Service Provider* considers that if the *offer to connect* were accepted that project might adversely affect the *Connection Applicant's* proposed *generating system*. In respect of a *transmission network* augmentation, a project that meets all of the following criteria: (a) The *Network Service Provider* has acquired the necessary land and easements. (b) The *Network Service Provider* has obtained all necessary planning and development approvals. (c) As applicable: (i) the augmentation project has passed the *regulatory test;* or (ii) in respect of a *new small transmission network asset*, an intention to proceed with the project has been published in the *Network Service Provider's Annual Planning Report*; or (iii) in respect of a *funded augmentation* the arrangements have been made for its funding. (d) Construction has either commenced or the *Network Service Provider* has set a firm date for it to commence. In respect of a *distribution network* augmentation, a project that meets all of the following criteria: (a) The *Network Service Provider* has acquired the necessary land and easements; (b) The *Network Service Provider* has obtained all necessary planning and development approvals; (c) Construction has either commenced or the *Network*	This definition is needed to describe what facilities need to be considered when assessing a proposed generating system connection. It is also needed to describe the stage at which a project's technical details (such as control system models and generator details) should reasonably be made available to other persons applying to connect.	For a generating system, planning and development approvals (b) and construction commitment (d) should also be included as per Transmission augmentation in order to prevent false projects from affecting other projects

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	Service Provider has set a firm date for it to commence.		
	continuous uninterrupted operation In respect of a *generating unit* operating during a *power system* disturbance, not disconnecting from the *power system* and, after clearance of any associated electrical fault, delivering *active power* and *reactive power* in accordance with its *performance standards*, with all essential auxiliary and reactive *plant* remaining in service, so as to not exacerbate or prolong the disturbance for other *connected plant*.	This new definition is required to clarify that behaviour that exacerbates or prolongs the disturbance is not acceptable.	Inconsistent with NET proclamation. Leaves uncertainty for compliance. (eg. no reference to post disturbance loading levels) Some system events will cause load rejections similar to those listed in the present S5.2.5.4 (proposed to be deleted). Such rejections usually trip 'automatic' controls to 'manual mode' requiring manual intervention by operators to recover the situation even though the Unit doesn't trip. Some time will pass before a return to normal dispatch.
	generating system A system comprising one or more *generating units* and includes auxiliary or reactive *plant* that is located on the *Generator's* side of the *connection point* and is necessary for the *generating system* to meet its *performance standards*.	This definition is modified to clarify that a generating system includes other equipment that is provided by the Generator in order to meet its performance standards.	Agreed
	Generating System Design Data Sheet The data sheet published by *NEMMCO* under clause S5.5.7(a)(1).		Agreed
	Generating System Model Guidelines The guidelines published by *NEMMCO* under clause S5.5.7(a)(3).		Agreed
	Generating System Setting Data Sheet The data sheet published by *NEMMCO* under clause S5.5.7(a)(2).		Agreed
	Generator A person who engages in the activity of owning, controlling or operating a *generating system* that is *connected* to, or who otherwise *supplies* electricity to, a *transmission* or *distribution*	The term Generator has been extended to cover its use in Schedule 5.2 where it refers to persons who are connection	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	system and who is registered by *NEMMCO* as a *Generator* under Chapter 2 and, for the purposes of Chapter 5 (other than clause 5.10), the term includes a person who is required to, or intends to register in that capacity.	applicants in respect of generating plant as "Generators".	
	nameplate rating The maximum continuous output or consumption in MW of an item of equipment as specified by the manufacturer, or as subsequently modified.		Agreed
	nominal voltage The design *voltage* level, nominated for a particular location on the *power system*, such that power lines and circuits that are electrically connected other than through transformers have the same nominal *voltage* regardless of operating *voltage* and *normal voltage.*	This term has been widely used in the Generator requirements as well as in the definition of normal voltage.	Agreed
	non-scheduled generating system A *generating system* comprising *non-scheduled generating units.*		Agreed
	normal voltage In respect of a *connection point*, its *nominal voltage* or such other voltage up to 10% higher or lower than *nominal voltage*, as approved by *NEMMCO*, for that *connection point* at the request of the *Network Service Provider* who provides *connection* to the *power system.*	This definition currently in the system standards (S5.1a.4) is now used more widely, and therefore is to be moved into the glossary.	It should be clear that the normal voltage is specified at time of connection and is not continually variable. If it were so, the actual range that at generator would have to be able to operate at would be 20% above and below nominal which is not realistic.
	performance standard ~~A standard of performance established as a result of it being:~~ ~~(1) accepted by *NEMMCO* in accordance with clause 4.14(d)(1);~~	This definition has been simplified. It identifies performance standards as those standards registered as such with	Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	~~(2) taken to be an applicable performance standard in accordance with clause 5.3.4A(g);~~ ~~(3) deemed to apply in accordance with clause 4.14(h); or~~ ~~(4) determined pursuant to clause 4.14(m).~~ In relation to a technical requirement of access for a particular *plant*, a standard of performance recorded on the register by *NEMMCO* under clause 5.11.1. **performance standards commencement date** ~~For:~~ ~~(a) *Generators*, *Customers* and *Network Service Providers* who plan, own, operate or control a *facility* located in a *participating jurisdiction* (other than Tasmania), the *performance standards commencement date* is, in relation to that *facility*, 16 November 2003; and~~ ~~(b) *Generators*, *Customers* and *Network Service Providers* who plan, own, operate or control a *facility* located in Tasmania, the *performance standards commencement date* is, in relation to that *facility*, the date that Tasmania becomes a *participating jurisdiction*.~~ For *Generators*, *Customers* and *Market Network Service Providers* who plan, own, operate or control a *facility* located in: (a) a *participating jurisdiction* other than Tasmania, the *performance standards commencement date* is, in relation to that facility, 16 November 2003; and (b) Tasmania, the *performance standards commencement date* is, in relation to that facility, 29 May 2005. **rated active power** (1) in relation to a *generating unit*, the maximum amount of *active power* that the *generating unit* can continuously deliver at the *connection point* when operating at its	NEMMCO under clause 5.12. In conjunction with 5.10.1(c), this change corrects an anomaly under the present wording where plant with connection agreements pre-dating 16 November 2003, but registered subsequent to that date, technically does not have performance standards. Now that Tasmania is also a participating jurisdiction, this definition needs to be corrected, and it can also be simplified. Amendment clarifies meaning and specifies date that Tasmania entered the NEM.	Agreed Agreed

Affected clause	Clause with proposed amendments	Reason	NGF Comments
	nameplate rating; and (2) in relation to a *generating system*, the combined maximum amount of *active power* that its in-service *generating units* can deliver at the *connection point*, when its in-service *generating units* are operating at their *nameplate ratings.* **reliability** ~~The probability of a system, device, *plant* or equipment performing its function adequately for the period of time intended, under the operating conditions encountered.~~ In respect of equipment, the probability of its performing its function adequately for the period of time intended under the operating conditions encountered. In respect of *supply*, the probability that it is sufficient to satisfy the demand for that *supply*, taking into account available *generation*, *power transfer capability* and other demand. **scheduled generating system** A *generating system* comprising *scheduled generating units.*	This definition is extended to distinguish reliability of supply from reliability of equipment.	Agreed Agreed