AEMC

Australian Energy Market Commission

Draft Rule Determination

National Electricity Amendment (Technical Standards for Wind and other Generator Connections) Rule 2006

Rule Proponents
NEMMCO

10 October 2006

Signed: .....

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For and on behalf of
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About the AEMC

The Council of Australian Governments, through its Ministerial Council on Energy, established the Australian Energy Market Commission (AEMC) in July 2005 to be the Rule maker for national energy markets. The AEMC is currently responsible for Rules and policy advice covering the National Electricity Market. It is a statutory authority. Our key responsibilities are to consider Rule change proposals, conduct energy market reviews and provide policy advice to the Ministerial Council as requested, or on AEMC initiative.

Contents

Summary

The Australian Energy Market Commission (Commission) makes this draft Rule determination and accompanying draft Rule under section 99 of the National Electricity Law (NEL).

On 10 February 2006 the Commission received from the National Electricity Market Management Company (NEMMCO) a "technical standards for wind generation and review of existing provisions" proposal to amend the National Electricity Rules (Rules). Broadly, the technical standards are provisions that specify the nature and quality of electricity supplied by the National Electricity Market (NEM) power system. There are three main aspects to NEMMCO's proposal:

- providing technical standards for non-scheduled (principally wind) generating plant — as the proportion of wind generation in the NEM continues to grow, it is becoming increasingly important to be able to manage the impact of that generation on the power system. The proposal also addresses deficiencies in the current technical standards that apply to generators overall (Schedule 5.2 of the Rules);

- increasing the requirements on generators to provide detailed modelling information to NEMMCO and network service providers (NSPs) so that they may more accurately manage the power system and providing a process for disclosing modelling information to relevant third parties; and

- amending the framework for negotiating generator access to networks including introducing reliability of supply as a basis for negotiating access standards, providing a clearer process for establishing performance standards and relaxing some restrictions on how performance standards can be modified.

On 13 March 2006 NEMMCO submitted an amendment to its proposed draft Rule that corrected certain cross-referencing errors. On 4 May 2006 the Commission published its Section 95 consultation notice and the Rule change proposal on its website[1] for consultation. Sixteen submissions on the proposal were received by the 23 June 2006 closing date. The Commission also published two notices under section 107 of the NEL that extended the period of time for the making of the draft determination arising from the complexity of the proposal and the issues raised in submissions.

The Commission has recently completed its review into the enforcement of, and compliance with, the Rules technical standards[2]. Aspects of that review are relevant to the subject matter of NEMMCO's Rule change proposal. The Commission notes that, consistent with the recommendations contained in its final review report to the Ministerial Council on Energy (MCE) :

- a joint NEMMCO/industry process is now underway to settle the content of performance standards for existing generators and a Rule change proposal

[1] The Commission's website is located at www.aemc.gov.au.

[2] *Review of enforcement and compliance with technical standards: Final Report*, September 2006 available at the Commission's website.

intended to make the performance standards that result from that process enforceable was recently lodged with the Commission; and

- the Commission plans to review how the technical and performance standards should evolve and interact over time as part of a broader review of the technical standards to be completed by 30 June 2008.

A number of the parties who made submissions in response to NEMMCO's proposal were concerned that it included changes other than those to the technical standards required to provide for wind generation. The Commission notes that stakeholders may have formed this view based on the fact that the Rule change proposal followed a number of processes specifically designed to address how to incorporate wind generation into the NEM[3]. Under the NEL, Rule change proponents are entitled to combine different issues concerning the existing Rules within a single proposal. A proposal must, for *each* such issue, contain appropriate information as to the issue, an explanation as to how the proposed Rule addresses that issue and how that proposed Rule would or would be likely to contribute to the NEM objective[4]. Subject to the following, the Commission is satisfied that NEMMCO's proposal meets those requirements.

In this draft Rule determination, the Commission has accepted the majority of the changes proposed by NEMMCO, including almost all of the technical standards changes. However, after considering submissions and undertaking its own analysis, the Commission has:

- clarified NEMMCO's role within the access negotiation process set out in Chapter 5 of the Rules to ensure that the negotiation process itself delivers suitable performance standards rather than allow the content of the standards to be finalised in a subsequent process between NEMMCO and the connection applicant;

- provided that generators, in providing modelling information to NEMMCO and the NSPs as part of the connection process, must also provide non-confidential versions of that information suitable for release by NEMMCO and the NSPs to relevant third parties;

- decided against accepting the proposal that market participants who are subject to performance standards must submit revised performance standards as the result of changes being made to the technical standards in the Rules — as noted above, the Commission plans to examine this issue as part of the broader technical standards review to be completed by 30 June 2008;

- decided against accepting NEMMCO's proposal to allow either it or the relevant NSP to direct a generator connecting to the network to spend additional funds in order to address network supply capability concerns arising from that connection;

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3 These include the Ministerial Council on Energy (MCE) Wind Energy Policy Working Group (WEPWG), Wind Advisory Technical Advisory Group (WETAG) and NEMMCO Technical Standards Reference Group processes described in Chapter 2 below.

4 National Electricity Regulations, section 8(1).

- provided transitional arrangements that make it clear that the performance standards for new connections currently being negotiated may be based on the current technical standards; and

- made a number of minor corrections and enhancements in the draft Rule.

A draft Rule, made in accordance with this assessment, is attached. The Commission is satisfied that the draft Rule is likely to contribute to the NEM objective and that it therefore satisfies the Rule making test. This draft Rule determination sets out the reasons of the Commission in accordance with the requirements of the NEL. A concordance has been also been attached to assist readers to relate the clause references in the draft Rule with those contained in NEMMCO's proposal.

The Commission invites submissions from interested parties on this draft Rule determination and the attached draft Rule by **24 November 2006**. In particular, the Commission invites comments on the proposed way forward in relation to the provision of information requirements and the decision to not adopt the proposal that NEMMCO and/or the relevant NSP should have the ability to require a generator to spend additional funds to address network capability concerns. Any requests for a hearing in relation to this draft Rule determination and the draft Rule under section 101 of the NEL must be received by **19 October 2006**. Submissions and requests for a hearing should be forwarded to submissions@aemc.gov.au or PO Box H166, Australia Square, NSW 1215.

Abbreviations

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
Auswind	Australian Wind Energy Association
AVR	Automatic voltage regulator
EHV	Extremely high voltage
ERAA	Energy Retailers Association of Australia
ESCOSA	Essential Services Commission of South Australia
ESIPC	Electricity Supply Industry Planning Council
ETNOF	Electricity Transmission Network Owners' Forum
MCE	Ministerial Council on Energy
MNSP	Market Network Service Provider
MW	MegaWatt
NECA	National Electricity Code Administrator
NEL	National Electricity Law
NEMMCO	National Electricity Market Management Company
NGF	National Generators Forum
NSP	Network Service Provider
PASA	Projected Assessment of System Adequacy
REGA	Renewable Energy Generators Australia
Roaring 40s	Roaring 40s Renewable Energy
TSRG	Technical Standards Reference Group
WETAG	Wind Energy Technical Advisory Group
WEPWG	Wind Energy Policy Working Group

1 NEMMCO's Rule proposal

On 10 February 2006 the Commission received from the National Electricity Market Management Company (NEMMCO) a "technical standards for wind generation and review of existing provisions" proposal to amend the National Electricity Rules (Rules). NEMMCO submitted an amended draft Rule on 13 March 2006 to address a number of cross-referencing errors. There are three main aspects to NEMMCO's proposal.

Technical standards

The first aspect concerns the technical standards applicable to generation. These are mainly set out in Schedule 5.2 of the Rules. The proposal is to amend the standards to more effectively provide for non-scheduled[5] (principally wind) generating plant. NEMMCO submitted that, as the proportion of wind generators in the NEM continues to grow, it is becoming increasingly important to be able to manage the impact of that generation on the power system.

Currently, wind generators are exempted from aspects of the standards because those standards are specific to scheduled, synchronous or transmission connected generating units whereas wind generators are classified as non-scheduled, generally use asynchronous technology and are sometimes connected to distribution networks. Other aspects of the current standards can impede wind developments. For example, a number of the requirements apply to each individual generating unit. This would impose a heavy cost burden on wind farms which typically comprise a large number of small turbines. To address this, NEMMCO proposes to move certain performance requirements to the point of connection with the network.

NEMMCO also submitted that, because wind generating units are currently treated as non-scheduled and are therefore not optimally dispatched, they may cause inefficient dispatch outcomes and potential network overloads. Under the Rule change proposal wind generators would be required to have active power control, in particular the ability to reduce their output in response to a dispatch instruction from NEMMCO.

NEMMCO also proposes changes designed to address deficiencies in the standards that apply to generators overall. These include providing greater flexibility in the technical standards to allow a wider range of parties to connect to the power system, enhancing the clarity of certain technical requirements and allowing generators to use their auxiliary equipment to meet the standards, if appropriate.

Provision of information

The second set of changes are intended to increase the requirements on generators to provide detailed modelling information to NEMMCO and network service providers (NSPs) so that they may more accurately manage the power system. They also

[5] Non-scheduled generation is generation that has not been required to participate in the NEM dispatch processes. Historically, it has referred to smaller generation (typically, generating systems less than 30MW in size). By contrast, scheduled generation is required to participate in dispatch and has typically been of larger size. The NEM now contains wind farms larger than 30 MW in size.

provide a process for disclosing that information to other prospective connection applicants so that they may assess the performance impact of their own plant on the power system and also to other parties to increase the base of expert opinion available.

Access negotiation and compliance

Finally, NEMMCO proposes to amend the framework for generators negotiating access to networks including introducing reliability of supply as a basis for negotiating access standards, providing a clearer process for establishing individual performance standards and relaxing some restrictions on how performance standards can be modified.

2 Background to the proposal

2.1 The technical standards framework

Appropriate standards for plant connecting to the network are vital to protecting the integrity of the power system. The technical standards framework set out in the Rules was established as the result of a review conducted by the National Electricity Code Administrator (NECA) in 2001[6]. The framework was designed to ensure that the target performance levels of the power system could be achieved but also that this could be done as efficiently as possible. Accordingly, the framework provides flexibility with respect to:

- the technologies that can be used — to the extent that emerging technologies may be able to contribute towards meeting end-user customer demands, they should not be restricted from doing so by unnecessarily rigid standards or standards limited by existing technology or practice; and

- the point of connection within the power system — different performance standards may be appropriate in different locations within the power system, for example, to provide for remote and embedded generation.

This flexibility is subject to the requirement that the target power system performance levels can be achieved. It is important to emphasise in this regard that the framework was *not* designed to automatically permit the use of every potential technology or for the standards applying at specific locations to be lower than the minimum standard accepted across the NEM as the result of local conditions. Rather, the framework is designed to minimise barriers to entry consistent with achieving the system performance targets.

The framework comprises the following hierarchy:

- *system standards* set out in Schedule 5.1a of the Rules that establish the security, reliability and quality parameters of the power system;

- *access standards* set out in Schedules 5.1 to 5.3a that define the levels to which plant (whether network, generator, customer or Market Network Service Provider, MNSP) must be able to perform in order to connect to the power system; and

- *plant standards* being technology-specific standards which, if met, would assure compliance with the access standards. Plant owners may request that the Commission's Reliability Panel approve particular standards for this purpose[7].

Certain access standards are mandatory. However, in order to provide the flexibility referred to above, most allow a range within which plant operators may negotiate

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6 NECA, *Review of Technical Standards: Report*, December 2001. See also the Australian Competition and Consumer Commission (ACCC), *Applications for Authorisation: Amendments to the National Electricity Code*, *Technical Standards*, February 2003.

7 Rules, clause 5.3.3(b2).

with NSPs for access to the network. Both NEMMCO and the NSP must be satisfied that the outcome of those negotiations is consistent with achieving the system standards. The negotiating range comprises:

- an *automatic access standard* where, if connected plant achieves that standard, then the system standards are expected to be met; and

- a *minimum access standard* which denotes the level below which there would be an unreasonable risk of the system standards not being met or harm occurring to other connected parties.

Negotiations below the minimum standard are not permitted due to the risks to power system security and quality of supply and, as proposed by NEMMCO as part of the Rule change proposal, supply reliability. A one-off exception was provided for in the National Electricity Code (Code), the predecessor to the Rules, to reflect the fact that plant connected to the network at the launch of the market had a variety of capabilities based on requirements that existed at the time of their connection[8]. The resulting performance standards, whether below the minimum or not, were preserved or "grandfathered".

2.2 Access negotiation, compliance and enforcement

Under the access negotiation process set out in Chapter 5 of the Rules:

- negotiation takes place between the plant owner or operator and the NSP, being the parties with the most direct commercial interests in the outcomes;

- the NSP is responsible for ensuring that the connecting plant meets the access standards concerned with local quality of supply matters; and

- NEMMCO is required to advise the NSP, and the NSP must accept that advice, regarding the access standards to do with power system security and supply reliability.

The outcome of the negotiation process is a connection agreement which contains or refers to the set of performance standards that apply to that plant. The performance standards comprise the mandatory and automatic access standards or, where standards between the automatic and minimum have been agreed, those negotiated access standards.

Once the connection agreement has been finalised, the plant operator and the NSP must provide NEMMCO with details of all of the performance standards[9]. The plant operator is then required to comply with its performance standards obligations and

[8] Rules, clauses 4.13 and 14. Note that the obligation to submit performance standards for plant located in regions of the NEM other than Tasmania set out in clause 4.13 of the Code was limited to plant in operation on 16 November 2003 . As that requirement had expired by 1 July 2005, the date the Rules commenced, it was not carried across into the Rules. The obligation with respect to Tasmanian plant appears in the Rules due to the State's more recent (29 May 2005) entry into the NEM.

[9] Rules, clause 5.3.7(e).

to institute and maintain a compliance program[10]. The Australian Energy Regulator (AER) is responsible for the monitoring and enforcement of any breaches of the performance standards.

The Rule change proposal incorporates changes to address a number of issues identified by NEMMCO associated with the current access negotiation framework.

2.3 MCE and NEMMCO processes

Since the technical standards framework was introduced, the number of connection applications for wind farm developments has grown significantly. In 2004 the Ministerial Council on Energy (MCE) established the Wind Energy Policy Working Group (WEPWG) to consider a range of issues related to the impact of the increasing number of wind generators in the NEM. The WEPWG formed the Wind Energy Technical Advisory Group (WETAG) to report on the relevant issues for the connection of non-scheduled generators. The WETAG discussion paper[11] identified the need for an urgent review of the technical requirements for wind generator connection. NEMMCO convened an industry based Technical Standards Reference Group (TSRG) to assist with a review of the technical standards and the development of a Rule change proposal. That Rule change proposal is the subject of the current draft determination.

The WETAG paper also recommended that the Rules be amended to allow NEMMCO to publish additional information in relation to non-scheduled (principally wind) generation in order to assist market participants assess the impact of that generation on NEM spot market outcomes. The Commission made a final determination in respect of NEMMCO's Rule change proposal on that issue in December 2005[12].

2.4 Review of enforcement and compliance with technical standards

The Commission recently completed its review concerning the enforcement of, and compliance with, the technical standards[13]. That report was in response to a terms of reference from the MCE that concerned the investigative, rectification and penalty provisions of the Rules as they relate to the technical standards framework. The Commission was also required to consider three recent power system events as part of its review.

As part of the report, the Commission recommended that:

- there were material deficiencies in the process established under the Code to grandfather the performance standards for existing plant — a joint NEMMCO/ industry process is now underway to settle the content of the standards applicable to generators and a Rule change proposal intended to make the

10 Rules, clause 4.15.

11 WETAG, *Integrating wind farms into the NEM, discussion paper*, March 2005.

12 *Publication of information for non-scheduled generation, Final Determination, December 2005*. A copy of the report can be found on the Commission's website.

13 Final report published 1 September 2006 and available on the Commission's website.

performance standards that result from that process enforceable was recently lodged with the Commission; and

- it would be appropriate to conduct a thorough program of work to review the future development, scope and content of the technical standards — that review will be conducted after the completion of the current Rule change assessment process. The Commission would address the issue as to whether NSPs should be subject to specific performance standards and the question of how agreed performance standards should relate to the technical standards over time. The Reliability Panel would be responsible for reviewing the scope and content of the technical standards themselves.

3. Draft Rule determination

The Commission has determined in accordance with section 99 of the National Electricity Law (NEL) to make the attached draft Rule as set out in this draft Rule determination. The draft Rule reflects the majority of the elements of the proposed Rule put forward by the proponent. Certain aspects of the proposed Rule have been deleted, modified or enhanced by the Commission. Explanations for those changes are located in the relevant sections of Chapter 4 and summarised in Section 4.4.

On 2 May 2006, under section 94 of the NEL, the Commission determined to commence initial consultation on this proposal by publishing a notice under section 95 of the NEL. This Rule change proposal was open for public consultation for seven weeks. Submissions closed on 23 June 2006.

The Commission also issued two notices under section 107 of the NEL which extended the time period for the making of the draft Rule determination by a total of eight weeks. The basis for these extensions was that the Commission considered that the issues raised by NEMMCO's proposal were of sufficient complexity that it was in the public interest to extend the time period in order to appropriately address those issues in this determination.

This draft Rule determination sets out the Commission's reasons for making the draft Rule. The Commission has taken into account:

- the Commission's powers under the NEL to make the Rule;
- the proponent's Rule change proposal including the proposed Rule;
- submissions received;
- relevant MCE statements of policy principles; and
- the Commission's analysis as to the ways in which the draft Rule will or is likely to contribute to the achievement of the NEM objective so that it satisfies the statutory Rule making test.

3.1 The Commission's power to make the Rule

The NEMMCO Rule change proposal raises matters about which the Commission may make a Rule (NEL s.94 (1)(b)). In particular, the proposed Rule falls under the matters set out in NEL s.34(1), as it relates to:

- the operation of the national electricity market;
- the operation of the national electricity system for the purposes of security and reliability of that system; and
- the activities of persons participating in the national electricity market or involved in the operation of the national electricity system.

In addition, the proposed Rule changes fall under the following items in Schedule 1 of the NEL:

- clause 1 relates to the registration of participants;
- clause 11 concerns the operation of generating systems;
- clause 13 relates to network access; and
- clause 35 concerns confidential information.

3.2 Submissions received

The Commission received 16 submissions on NEMMCO's proposal including in relation to the proposed Rule from the following parties:

- the Australian Energy Regulator (AER);
- the Australian Wind Energy Association (Auswind);
- Citipower and Powercor Australia (joint submission);
- the Energy Retailers Association of Australia (ERAA);
- the Electricity Supply Industry Planning Council (ESIPC);
- the Electricity Transmission Network Owners' Forum (ETNOF);
- Hydro Tasmania;
- NEMMCO;
- the National Generators Forum (NGF);
- Pacific Hydro;
- Renewable Energy Generators Australia (REGA);
- Roaring 40s Renewable Energy (Roaring 40s);
- TransGrid;
- TrustPower;
- VENCorp; and
- Vestas.

In regard to the proposed changes to the technical standards, the submissions were broadly favourable in terms of extending the application of the standards to wind generation and to separating a number of the standards into automatic and minimum standards. There were mixed views as to the range of new technical

requirements proposed to be introduced. The comments and suggestions arising from these submissions have been addressed in section 4.1.

With respect to the proposed requirements to provide modelling and other technical information, submissions largely objected to the changes on the basis that inadequate protection was provided for commercial in confidence material and that the information required was unduly specific, onerous and poorly drafted. This matter is addressed in section 4.2.

In regard to the proposed changes to the access negotiation process, the submissions disagreed with the changes concerning the negotiation of performance standards for new plant. They also submitted that performance standards for existing plant should remain at their grandfathered levels and, more generally, that revisions of the technical standards should not force plant upgrades. Submissions favoured the proposed changes in relation to amending performance standards where plant is modified. The comments and suggestions arising from these submissions have been addressed in section 4.3.

3.3 Relevant MCE statements of policy principles

The NEL requires the Commission to have regard to any MCE statements of policy principles in applying the Rule Making test. The Commission notes that currently, there are no specific MCE statements of policy principles that directly relate to the technical standards, provision of information clauses or access negotiation process contained in the Rules.

4 Commission's consideration of matters raised in analysis and consultation

This Chapter sets out the Commission's consideration of matters raised in its analysis of, and as the result of consultation on, NEMMCO's Rule change proposal. The structure of the Chapter is as follows:

- technical standards — section 4.1;
- provision of information — section 4.2;
- access negotiation and compliance — section 4.3;
- summary of the differences between NEMMCO's proposed Rule and the Commission's draft Rule — section 4.4; and
- savings and transitional provisions — section 4.5.

4.1 Technical standards

NEMMCO proposed a number of changes that relate to the technical standards contained in Chapter 5 of the Rules and the Schedules to that Chapter. The Commission proposes to largely accept the changes with the main exception being the proposed new requirement in relation to managing the impact of connecting generators on network capability. The Commission's reasons for doing so are outlined below. The specific changes addressed in this section of the report are as follows:

- quality of supply — section 4.1.1;
- frequency — section 4.1.2;
- reactive power — section 4.1.3;
- voltage — section 4.1.4;
- disturbances — section 4.1.5;
- partial load rejection — section 4.1.6;
- protection of generation — section 4.1.7;
- impact on network capability — section 4.1.8;
- control systems and stability — section 4.1.9;
- fault control — section 4.1.10;
- technical matters to be co-ordinated — section 4.1.11;
- active power — section 4.1.12;

- remote monitoring — section 4.1.13;
- generating units and systems — section 4.1.14; and
- glossary definitions — section 4.1.15.

4.1.1 Quality of supply

NEMMCO's proposal

Quality of supply covers a number of technical issues that impact on customers such as voltage flicker and fluctuation, voltage unbalance and harmonics. Quality of supply is a local issue and thus, under the Rules, is treated as an NSP responsibility while power system security is the responsibility of NEMMCO.

The quality of supply changes proposed by NEMMCO are as follows:

- modifying clause S5.1.7 (voltage unbalance) to provide minimum and automatic access standards with respect to NSPs requiring certain levels of negative phase sequence voltage for generating units;
- modifying clause S5.2.5.2 (quality of electricity generated) to provide for the standard to apply at the generating system level rather than at the unit level and to allow for situations where there are multiple connection points; and
- deleting clause S5.2.5.3 (generating unit response to disturbances on the power system) and replacing it with clauses S5.2.5.3A, B and C which address the relevant disturbances (frequency, voltage and post-contingency event) individually.

NEMMCO argued that the changes were appropriate because the current Rules did not provide for automatic and minimum access standards, did not allow for generating systems with multiple connection points and did not distinguish between auxiliary supply connection points and generating connection points.

Views in submissions

Voltage unbalance

Under clause S5.1a.7, each NSP is responsible for meeting quality of supply limits set out in Table S5.1a.1 of the Rules. Under clause S5.1.7, the NSP must allocate quality of supply allowances to entities connected to its network so that the overall Table S5.1a.1 limits can be met. The proposed changes to:

- clause S5.1.7 introduce automatic and minimum standards on NSPs with respect to the allocations that can be made specifically to generators; and
- clause S5.2.5.2 introduce automatic and minimum standards on generators which set limits on the amount of voltage unbalance they may cause.

VENCorp submitted that the way that the automatic standards contained in the two clauses would operate together would permit generators to meet their individual allocations but in a way that may prevent NSPs from meeting their clause S5.1a.7 obligations. VENCorp submitted this is an issue because, while synchronous

(thermal) generators typically cause little voltage unbalance, asynchronous (wind) generators are likely to cause more and the clause has been written to allow all plant to meet the greater requirement.

Generator auxiliary load

VENCorp also submitted that proposed clause S5.2.5.2 be modified to treat generator auxiliary load quality of supply requirements separately from generator quality of supply requirements. Generator auxiliary load is the supply that the generator requires to run all the electrical equipment that allows it to generate (for example, fans pumps and motors). Like other loads, it can have quality of supply implications. The supply for the auxiliary load can be at the same, or a different, connection point as that of the generator. VENCorp proposed that the clause should recognise that generator auxiliary load is like any other form of customer load and that allocations should be made for auxiliary load on a similar basis to customer, rather than generator load.

Network automatic standard

Proposed clause S5.1.7(d) provides that an NSP and generator may include in their connection agreement a requirement to upgrade performance to an agreed level not higher than the generator automatic standard if, at any time in the future, another user of that network is adversely affected by negative sequence voltage or current imbalance because of the generator. Auswind, NGF, REGA and Vestas submitted that this would impose an open-ended requirement, potentially requiring unknown upgrades to plant in the future. They argued that this would defeat the purpose of having a negotiated or minimum generator standard.

Quality of supply and continuous uninterrupted operation

VENCorp recommended that a new clause S5.2.5.3D be added requiring that "generating plant must be capable of continuous uninterrupted operation at distortion levels up to the maximum voltage fluctuation, harmonic voltage distortion and voltage unbalance conditions outlined in S5.1a5, S5.1a6, and S5.1a.7 of the System Standards". The purpose of the change was said to be to ensure that generator operation would not be constrained at times of the highest distortion levels allowable under schedule 5.1.

Other issues

A number of other issues concerning proposed paragraphs S5.1.7 (c) and (d) are described and addressed in Table 4.1.1.

Commission considerations

Voltage unbalance

With respect to clauses S5.1.7 and S5.2.5.2, the Commission considers that it is in the interests of the operation of the power system that the generator should not contribute to a breach of the quality of supply allocations made by the NSP. The Commission agrees with VENCorp that the amount of voltage unbalance permitted to generators under the automatic access standard appears too large for some technologies if NSPs are to meet their obligations under clause S5.1a.7.

The Commission notes that NEMMCO's proposed paragraph S5.2.5.2(c) attempts to address the problem by requiring that the amount allocated to a generator must not prevent the NSP from meeting its clause S.1a.7 obligations. However, the Commission considers that the most transparent solution would in fact be to not accept the proposed clause S5.1.7 automatic access standard and adopt the wording of the proposed minimum standard instead. This would make it clear within the NSP standard itself that the NSP must allocate a generator limit that will allow the NSP to meet its clause S5.1a.7 obligations. The generator would be required to comply with those requirements under the proposed standards in clause S5.2.5.2.

Generator auxiliary load

With respect to the suggestion made by VENCorp to treat generator auxiliary load quality of supply separately, the Commission considers that NEMMCO's proposal addresses this appropriately. This is because the quality of supply allocations made by the NSP would be undertaken in accordance with the plant standards referred to in clauses S5.1.5, S5.1.6 and S5.1.7. Those plant standards are customer based standards. Paragraph S5.2.5.2(c) referred to above can therefore be used to place specific requirements on the generator with respect to generator auxiliary load quality of supply issues at the same time that generator quality of supply issues are addressed under clause S5.2.5.2. Where the auxiliary load uses a separate connection point, then the relevant customer load standards contained in Schedule 5.3 would apply.

Network automatic standard

The Commission notes that proposed clause S5.1.7(d) uses the phrase "may include". This makes the question of future generator performance requirements a matter for negotiation as part of the access negotiation process between the NSP and generators. It therefore does not impose a mandatory requirement on generators. However, the Commission also notes that proposed paragraph S5.2.5.2(c) could be interpreted as requiring that the generator standard negotiated under a connection agreement be overridden if the NSP, as the result of subsequent connections or a change to the levels of Table S5.1a.1, determined that a reallocation of that generator's quality of supply level was appropriate. This raises an intergenerational equity issue discussed in Section 4.3, below. Consistent with the Commission's views in this regard, the clauses have been amended to make it clear that generators are required not to exceed the initial level of allocation made by the NSP during the access negotiation process.

Quality of supply and continuous uninterrupted operation

The Commission agrees with the addition of an extra clause S5.2.5.3D as proposed by VENCorp. This is consistent with the removal of clause S5.2.5.3 and its replacement with clauses S5.2.5.3A, S5.2.5.3B and S5.2.5.3C which identify the requirements on generators to ride through power system disturbances more clearly. The Commission understand that there may be some slight increase in costs to generators (more robust auxiliary systems) to meet the S5.2.5.3D requirements. However, it considers that those costs are likely to be more than offset by the reduction in the risk that generators would be unable to provide continuous uninterrupted operation arising from quality of supply situations. Failure to provide continuous uninterrupted operation may lead to a cascade failure on the power system that involves a material risk of customer loss of supply. The Commission has also

amended the Draft Rule to ensure all references to NEMMCO's proposed S5.2.5.3A, S5.2.5.3B, and S5.2.5.3C also refer to VENCorp's proposed clause, S5.2.5.3D.

Other issues

Table 4.1.1.

Stakeholder	Clause	Issue	AEMC considerations
Auswind, Renewable Energy Generators Australia (REGA), and Vestas	Clauses S5.1.7(c) & (d)	Should deal with the allowable amount of negative sequence voltage on the network	The allowed amount is allocated to different parties in the network. This clause deals with the allocation to generators. No change.
The National Generators Forum (NGF)	S5.1.7(c)	This clause is confusing. When not generating, no current is drawn in each phase. Arguably the words "voltage generated" and "current drawn" are in the wrong places. Swapping them might make more sense.	The clause deals with both the main generator and its auxiliary load. No change required.

4.1.2 Frequency

NEMMCO's proposal

This section deals with issues related to clauses S5.2.5.3A (generating unit response to frequency disturbances) and S5.2.5.11 (frequency control). The proposed new rules set an automatic and minimum access standard and add requirements in relation to non-scheduled generation. NEMMCO argued that the proposed changes were necessary because they needed to cover non-scheduled generation, remove technology specific terminology or add clauses specific to particular technologies, introduce an automatic and minimum access standard to expand the range for connection negotiation and make the clauses more explicit in terms of how the various frequencies are to be applied.

As noted above, clause S5.2.5.3 has been deleted and replaced by three clauses S5.2.5.3A, S5.2.5.3B and S5.2.5.3C which address frequency, voltage and system disturbances separately. NEMMCO stated that the purpose of S5.2.5.3, and the clauses that replace it, is to set standards to prevent cascading events occurring on the power system.

Views in submissions

Automatic standard

Auswind, NGF, REGA, Roaring 40s and Vestas argued that the automatic access standard in clause S5.2.5.3A cannot be met by wind and combustion turbines. The submissions were not specific as to why this may be the case. However, it is understood that the comments concerned the time generators were required to

continue operating in the extreme frequency ranges, the level of the extreme frequency ranges and the rate of change of frequency requirements.

Auswind, Hydro Tasmania, NGF, REGA, Roaring 40s and Vestas submitted that the proposed changes to the automatic access standard in clause S5.2.5.11 add a new obligation that generators must have a frequency control ancillary services capability. These ancillary services consist of generators who are willing to bid services to control their power output to help restore the frequency back to its normal value (50Hz) when required. Previously, generators have been free to make a commercial decision as to whether to supply such services into the ancillary services market.

Minimum standards

AER, Auswind, the Energy Supply Industry Planning Council of South Australia (ESIPC), NGF, REGA and Vestas argued that the proposed minimum access standard potentially eliminates a number of different technologies (wind and gas turbines) because the depth of the extreme frequency band is greater than international standards require and because the time required to remain connected to the power system when the frequency is below 47.5Hz is excessive. Vestas submitted that 9 seconds, rather than the 10 seconds proposed, should suffice for certain technologies.

Frequency rates of change

Those stakeholders also noted that the automatic and minimum standards only require generators to be capable of continuous uninterrupted operation for rates of change of frequency up to 4 Hz and 1 Hz per second respectively. They commented that the implication was that performance outside those ranges is not defined. The AER noted that compliance monitoring and enforcement for breaches of the standards may be more difficult with the proposed standards.

Roaring 40s submitted that the Rules should not specify the frequency ranges or the rates of change. Rather, it should simply reference the frequency operating standards determined by the Reliability Panel. NEMMCO submitted revised drafting designed to address this comment and to specify how frequency rates of change performance will be measured.

Other issues

A number of specifically technical issues were raised by stakeholders. These are addressed in Table 4.1.2.

Commission considerations

Automatic standard

Consistent with the technical standards framework, the Commission considers that the automatic access standard is an expression of the desired performance from a generator connecting to the power system that will allow NEMMCO to manage power system security. It is realistic to note that not all technologies can be assumed to be able to meet the automatic standards. This is why room to negotiate was introduced. A lower level of performance is available through the negotiated access

arrangements, provided the performance does not create problems with power system security or reliability.

The Commission understands that NEMMCO's concern with respect to proposed clause S5.2.5.11(b)(2)(iii) is to ensure that there is an ability to procure sufficient ancillary services to maintain the security of the power system when needed. Again, however, this requirement only applies to the automatic access standard which is an expression of the desirable performance of a generator. If a generator does not wish to provide this capability it is open to them to negotiate a performance standard rather than agree to the automatic access standard.

Minimum standards

The argument raised by stakeholders is that the minimum access standards should be lowered to allow more room for negotiation. As discussed in Chapter 2 above, the minimum standards are intended to be set at the point below which there is an unacceptable risk to power system security from connection. In the present case, if a significant number of generators trip during a major disturbance on the power system (because they cannot continue to operate during the frequency range or rate of change resulting from the disturbance), then the effect of the original disturbance on the power system can be substantially worsened, potentially leading to cascade failure and major load shedding.

Stakeholders submitted that, in the alternative, individual connecting plant should be allowed to negotiate below the minimum access standard on a case by case basis. This would lower the barrier to entry and allow more efficient customer outcomes if the risk to system security could be managed acceptably. Connections could be established one by one until system analysis indicated that the security risks associated with the connection of the next generator exceeded the relevant thresholds. The issue was raised in recognition of the fact that, while the minimum standard is set for the NEM as a whole, local performance requirements may vary. As discussed in Chapter 2, this variability is taken into account by defining an appropriate minimum access standard that provides a range for negotiation. Negotiation below the minimum standard is not permitted and this is reinforced by proposed clause 5.3.4A(a)(1). The issue therefore remains whether the minimum access standard is appropriate.

Subject to the matter below, from a system security point of view, the minimum access standards proposed by NEMMCO appear reasonable.

NEMMCO propose to set the transient frequency time to 10 seconds. As noted above, this could present difficulties to some technologies for the relevant frequency range. The range itself is a matter determined by the Reliability Panel. Some of these technologies could meet a slightly reduced time (as suggested by Vestas). After discussions with NEMMCO, the Commission is satisfied that 9 seconds would be acceptable and the Commission has amended the draft Rule accordingly.

Frequency rates of change

The current standards do not indicate levels for the rate of change of frequency. By implication generators must therefore provide continuous uninterrupted operation for all rates of change of frequency. It is known that some technologies cannot do so. Rate of change standards are important because having a power system successfully

recover after a severe disturbance (with high rate of change of frequency) requires the generators to remain connected to the system. Therefore setting a range of rate of change of frequencies that can reasonably be met by most or all generation technologies is a step in the right direction. The proposed automatic access standard sets a rate of change of frequency standard that would ensure generators remain connected to the power system in all regions for most disturbances. The minimum access standard value will ensure that generators remain connected to the power system for most events on the mainland of Australia when the system was not islanded.

A number of stakeholders submitted that some wind generators (and potentially other technologies) cannot remain in continuous uninterrupted operation for the high rates of change of frequency proposed in the automatic access standard. Where generators that cannot meet high rate of change of frequency are only a small part of the generating system, their loss should not be a threat to power system security. However, in large disturbances the loss of a significant additional amount of generation could be very serious. As the penetration of wind generation is increasing this requirement is quite important to future power system performance. This is particularly likely to be the case in Tasmania and South Australia if either were to island from the rest of the system. The Commission notes however that the concerns are raised in the context of the automatic standard and that the minimum provides an appropriate range for negotiation.

The submissions also noted that both the automatic and minimum access standards are drafted in the form that "each generating unit must be capable of continuous uninterrupted operation for [the frequency ranges determined by the Panel] provided that the system rate of change of frequency [is less than X Hz per second]. The implication is that, outside those rates of change of frequency, a generator is *not* required to be capable of continuous uninterrupted operation. This leaves the standard for generator performance undefined outside the rate of change of frequency range but within the frequency bands within which the Panel requires them to be capable of operating. In such circumstances, generators may decide to trip off the system to protect themselves.

The Commission notes that this represents a reduction in the scope of the fault ride through standards required of generators. It understands from discussions with NEMMCO that this amendment was proposed on the basis that the current fault ride through standard of continuous uninterrupted operation for all frequency ranges may have been very difficult to meet in practice. Subject to the below, the Commission's view is that the rate of change ranges proposed are appropriate to cater for the relevant range of potential events.

The Commission notes that the AER submitted that the use of rates of change of frequency that leave performance unspecified outside a range may make compliance monitoring and enforcement for breach of the standards more difficult. The Commission considers that it is important to recognise the limitations of different technologies in providing for the effective management of power system security and that this should take precedence over compliance and enforcement issues. However, the Commission is concerned to ensure that the compliance and enforcement regime is as effective as possible and invites specific feedback from

stakeholders on the impact that the change proposed by NEMMCO would be likely to have in this regard.

The Commission notes both the AER and NEMMCO's submissions that enforcing the instantaneous rates of change proposed may potentially cause difficulties in monitoring compliance and taking actions to enforce a breach of the technical standards. The Commission agrees with the proposal contained in NEMMCO's submission that a change of greater than 4 Hz per second is measured as an average over 0.25 seconds for the automatic standard and a change of greater than 1 Hz per second is measured as an average over 1 second for the minimum standard. The Commission has included these changes in the draft Rule.

Finally, the Commission notes that the specification of the 4 Hz per second in clause S5.2.5.3A(b) and the 1 Hz per second in clause S5.2.5.3A(d) are meant to refer to a band of acceptable rate of change of frequencies between increasing and decreasing rates up to the values specified above. The Commission accepts the requirement for rate of change of frequency as written but has amended the draft Rule to make it clear that the rates of change of frequency are bands between +4 Hz per second down to -4 Hz per second and +1 Hz per second to -1 Hz per second in clauses S5.2.5.3A(b) and S5.2.5.3A(d), respectively.

"Push up" clause

The Commission notes that proposed clause S5.2.5.3A(f) provides limits on the total amount of generation that can be accepted below the automatic standard. Paragraph (f)(2) allows performance at a negotiated standard only where the system frequency would be unlikely to fall below a certain range as the result of over-frequency tripping. The Commission notes however that a generator would only trip off for over-frequency if it couldn't meet the minimum access standard. Thus, the clause appears to permit a negotiated standard at a level below the minimum standard. To remain consistent with the principles noted above and embodied in proposed clause 5.3.4A(a)(1), the Commission has amended the draft Rule to make it clear that the negotiated standard cannot be negotiated to a level below the minimum standard.

More broadly, the Commission notes that NEMMCO has included several clauses ("push up" clauses) in the Rule change proposal that provide restrictions on the ability of parties seeking access to negotiate access at performance levels below the automatic standard. In principle, this is different to the case discussed above where stakeholders argued that individual performance below the minimum standard would be appropriate. However, it could be argued that, if the push up clause conditions are so restrictive that the minimum standard is effectively raised and the negotiating range removed, it becomes the same issue in substance, namely, the level of the minimum standard.

It is an important principle of the technical standards framework that negotiating ranges are, where feasible, available to connecting parties to provide flexibility in terms of the plant technologies used and allowances for where that plant connects into the network. This lowers the barriers to entry and can result in the more efficient operation of the power system for the benefit of electricity consumers. The Commission notes however that the negotiating range available will depend on a number of factors. In some circumstances, no range is provided for and a mandatory standard applies. The "push up" clauses proposed by NEMMCO provide a way of

recognising the relevant limiting factors where including those conditions in the description of the automatic or minimum standards themselves would prove problematic. In principle, such clauses are therefore acceptable provided that the conditions allow the maximum appropriate range for negotiation without compromising the minimum standard.

Frequency ranges

The Commission notes that, under clause 8.8.1 of the Rules, the Reliability Panel is responsible for determining the power system security and reliability standards. Those standards are defined to include "standards for the frequency of the power system in operation". The Commission notes that this definition is arguably wide enough to include frequency rates of change but that, historically, in carrying out its responsibility to set the power system security and reliability standards, the Panel has not prescribed the mechanisms associated with implementing the standards as part of that task.

The Commission notes that setting the rates of change of frequency could therefore be considered to be an operational matter addressed via a Rule change as proposed by NEMMCO. The Commission proposes to proceed on this basis in this draft determination. However, it wishes to hear submissions on alternatives, for example, requiring as part of the final Rule that the proposed frequency rates of change be referred to the Panel for review within 6 months of the commencement of the Rule.

As the power to determine the frequencies themselves lies specifically with the Panel, the Commission agrees with NEMMCO's submission to revise the drafting to simply refer to those frequencies as so determined rather than "hard code" them into the Rules. The Commission has amended the draft Rules accordingly.

Other issues

Table 4.1.2.

Stakeholder	Clause	Issue	AEMC considerations
Roaring40s	S5.2.5.3A(f)(3)	"Adverse impact" needs to be clearly defined.	NSP will need to indicate the impact during negotiations. No change.
Auswind, NGF, Roaring 40s, Vestas	S5.2.5.3A(f)(2)	In a small enough island, it would be inevitable for any generator to cause the frequency to fall below the lower bound of the operational frequency tolerance band as a result of tripping on over-frequency.	The islanding issue is correctly stated. This clause is looking at protecting the power system from too much generation tripping at less than the full range in the frequency standards. However, this should only apply to islands of reasonable size. The Commission will

Stakeholder	Clause	Issue	AEMC considerations
			direct the Reliability Panel to address this matter in its upcoming frequency standards review.
Auswind, NGF, REGA and Vestas	S5.2.5.11(b)(2)	Clause conflicts with S5.2.5.8	No anomaly. S5.2.5.8 to be read subject to the requirements of S5.2.5.11(b)(2)
Auswind, NGF, REGA and Vestas	S5.2.5.11(c)	The paragraphs (c) and (d) referred to do not exist.	The submission was based on a copy of the Rules changes with an old clause numbering. This has now been corrected.
NGF	S5.2.5.11(b)(2)(ii)(C)	Definition of "frequency recovering gradually" would be helpful	The words form part of the automatic standard and are acceptable.
Auswind, NGF, REGA and Vestas	S5.2.5.11(b)(3)	Requires generators to increase output when frequency falls. What about when generating at full output?	Clause S5.2.5.11(b)(3) addresses situations where performing at or close to full output
Auswind, NGF, REGA, Vestas and TrustPower	S5.2.5.11(c)	Should be interpreted "in response to the system frequency" and not as a coincidental increase or fall in the wind.	Changed clause to add "For each generating system under relatively stable input energy, active power transfer to the power system must not…"

4.1.3 Reactive power

NEMMCO proposal

Reactive power is different to active power and is predominately consumed in the creation of magnetic fields in motors and transformers. The power system requires sources of reactive power to assist in voltage control. This section refers to schedule S5.2.5.1. NEMMCO argued the changes were necessary because they remove technology specific wording, have been extended to apply to any technology, and they specify greater details about what can be negotiated.

Views in submissions

The issues related to proposed clause S5.2.5.1 are as follows:

- a number of submissions (Auswind, NGF, REGA, Roaring 40s and Vestas) were concerned that the automatic access standard would requires reactive power capability for the full range of connection point voltages whereas the current Rules require reactive power only at the nominal voltage;

- Auswind, NGF, REGA, Vestas and ESIPC submitted that proposed clause S5.2.5.1(c) should also allow negotiation as to the point at which the requirement must be met (connection point or machine terminals); and

- the AER submitted that S5.2.5.1(d) provides that the NSP may require a generator to rectify a reactive power support deficiency and identifies a number of options for doing this. The AER suggested that the clause be redrafted to allow generators to select the lowest cost option out of those listed to address this deficiency.

Commission considerations

With respect to the automatic standard, the Commission considers that the standard is an expression of the desired performance from a generator connecting to the power system which will allow NEMMCO to manage power system security. A lower level of performance is available through the negotiated access arrangements.

With regard to S5.2.5.1(c) the Commission notes that connection applicants would in fact be able to negotiate the point at which the requirement is met. With regard to clause S5.2.5.1(d) the Commission agrees that a generator should be able to select the lowest cost option or options to address a reactive power deficiency and has amended the clause to provide the generator with choice in this regard. Subject to the above comments the changes to schedule S5.2.5.1 are accepted.

4.1.4 Voltage

NEMMCO proposal

This section refers to clauses 4.9.2 and S5.2.5.3B.

Clause 4.9.2 concerns dispatch-related instructions by NEMMCO to scheduled generators. Scheduled generators are normally 30MW or greater in size[14]. NEMMCO proposes to include the power to instruct non-scheduled generators of greater than 30MW in relation to reactive power, allow for generating systems and refer to agreed performance standards.

Schedule S5.2.5.3B concerns generating unit response to voltage disturbances. This clause extends the requirements under previous clause S5.2.5.3 to non-scheduled generation, refers to generating systems rather than units and introduces automatic and minimum access standards.

[14] Rules clause 2.2.2(a).

Views in submissions

REGA submitted that schedule S5.2.5.3B should be fully reviewed by the Reliability Panel. Only those changes needed for wind should be incorporated at this time. The standards as defined in this clause require performance well beyond that necessary in a distribution system. Auswind and Vestas indicated that distribution system obligations will require generators to trip for voltage well within the ranges set out in clause S5.2.5.3B(e)(3).

Submissions in relation to clause 4.9.2 and other aspects of clause S5.2.5.3B are dealt with in Table 4.1.4.

Commission considerations

The Commission notes REGA's view that only those changes to clause S5.2.5.3B that are relevant to wind generation should be included in the current Rule change proposal. The Commission has addressed this issue above and considers the changes to lie within the scope of the current proposal. The Commission is required to assess NEMMCO's proposal in accordance with the requirements of the NEL. The Commission also notes that the statutory timeframes that apply to that assessment make seeking the advice of the Reliability Panel as part of that process impracticable. This leaves open the possibility that the final Rule could require the Panel to review the effectiveness of the proposal at a later time. The Commission seeks the views of stakeholders in this regard, noting that the review would need to be justified on its merits.

The Commission notes that a number of generators submitted that the changes require performance beyond that required in a distribution system. For example, the proposed minimum access standard requires continuous uninterrupted operation through voltages in the range of 90% to 110% of normal voltage. The Commission understands that the typical range for distribution systems is narrower, in the order of 94% to 106%. The Commission also understands that the generators who made submissions in respect of this issue consider that, as voltage fluctuation are normally considered to be a local quality of supply issue, only distribution level performance should be required.

Requiring generator plant to perform to the proposed higher standard may have generator cost implications although this was not quantified in submissions. On the other hand, increased performance would reduce the risk of cascading failure due to the loss of generation following a transmission contingency event that causes voltages to reduce or increase suddenly. This is important from a power system security perspective. It is also important to note that the requirements as to the wider range are only for the period associated with riding through the disturbances. On balance, the Commission considers that power system security considerations should prevail and that the changes proposed by NEMMCO are appropriate. However, the Commission invites further submissions from stakeholders as to the likely cost impacts.

Other issues

Table 4.1.4.

Stakeholder	Clause	Issue	AEMC considerations
Auswind, REGA, Vestas	4.9.2(b) and (b1)	Distribution connected wind farms often have a requirement imposed by the NSP in the connection agreement, to remain within a designated voltage range, to avoid affecting customer voltages. Clause (b1) is only correct if NEMMCO accept the connection agreement voltage limits.	The clause recognises connection agreement requirements to restrict a NEMMCO instruction to within both the performance standard and the connection agreement.
Roaring 40s	S5.2.5.3B	"Normal voltage" should be more clearly defined and refer to one voltage set point and not a range of voltages. The requirement of S5.1a.4 far exceeds the capability of most wind plant	Normal voltage is defined by the NSP and NEMMCO as part of the access negotiations. Normal voltage is defined at a single voltage point. S5.1a.4 applies to the automatic access standard. Access can still be negotiated for performance below this requirement.
Auswind, NGF, REGA, and Vestas	S5.2.5.3B	Lower voltages are already significantly lower than IEC60034	The voltage ranges required in this clause are realistic for Australian conditions
NGF	S5.2.5.3B(a)	Suggest a curve be supplied for this clause	A curve is applied for over voltages in S5.1a.4. This clause is appropriate as written.
Auswind, NGF, REGA and Vestas	S5.2.5.3B(a)(4)	70-90% of normal voltage is not realistic except for transient conditions	This is a requirement of the automatic access standard. Access can still be negotiated for performance below this requirement.
Auswind, NGF, REGA	S5.2.5.3B(b)	The minimum standard requires +/-10% on normal voltage where the	The relevant part of the automatic standard (S5.2.5.3B(a)(1)) refers to

Stakeholder	Clause	Issue	AEMC considerations
and Vestas		automatic standard requires only 100% of normal. In addition the minimum standard conflicts with S5.1a.4 which only requires 110% of normal voltage for 10 minutes	Table S5.1a.4 which requires voltage of at least 110% continuously. The curve in the Table S5.1a.4 graph has been extended to the end of the graph to make this clear. Clause S5.2.5.3B(a)(2) has been changed to "90% to 110%" to remove any ambiguity.
Auswind, NGF, REGA and Vestas	S5.2.5.3B(b)(1)	This is a higher obligation than that of the automatic access standard (S5.1a.4)	Changing clause S5.2.5.3B(a)(2) to 110% as suggested above means the minimum access standard in S5.2.5.3B(b)(1) will be the same as the automatic access standard but for a more limited voltage to frequency range.
Auswind, REGA, Roaring 40s Vestas	S5.2.5.3B(c)(2)	The 100MW limitation appears arbitrary. The limit should be assessed on a case by case basis. The basis of negotiation should not be prescriptive but simply required to be on a good faith basis.	The issue here is that the plant trip must not cause a power system security issue or lead to severe disruption or cascading failure. Experience indicates that 100 MW is appropriate. But the Commission agrees that it should be allowed to be negotiated, if a different amount of generation loss can be accepted without causing a power system security issue.
Auswind, NGF, REGA and Vestas	S5.2.5.3B(d)	"Abnormal" is not defined and could mean anything.	This clause needs to be expressed as it is as there are likely to be different issues needing to be addressed at different locations in the system. The Commission notes that recourse may be had

Stakeholder	Clause	Issue	AEMC considerations
			to the Chapter 8 dispute resolution process in the event that differences in interpretation arise.
NEMMCO	s. 4.9.2(b)(3)	Remove the words "at its terminals or" to be consistent with objective of referring to connection points rather than generator terminals	Agreed. Draft Rule amended accordingly

4.1.5 Disturbances

NEMMCO proposal

As with proposed clauses S5.2.5.2A and S5.2.5.2B, this proposed clause S5.2.5.3C replaces current clause S5.2.5.3 and provides for more specific treatment of generating unit response to disturbances following contingency events. NEMMCO argued the changes were necessary because they explicitly state what events are covered, introduce automatic and minimum access standard and extends the requirement to distribution systems.

Views in submissions

Auswind, NGF, Pacific Hydro, REGA and Roaring 40s were concerned that a three phase fault was included in the fault definition and that extending a fault to include faults after reclose events in clause S5.2.5.3C(a) would make the requirements of S5.2.5.3C much harder to comply with, particularly for asynchronous generators connected to distribution systems where protection clearing times are usually very slow.

Several submissions (Auswind, NGF, REGA, Roaring 40s and Vestas) were, in relation to the automatic standard in proposed clause S5.2.5.3C(a)(1)(B), concerned about the lack of definition of the requirements of automatic reclose equipment; whether it included single pole or three pole reclosure and the number of reclose events to be catered for.

Auswind, NGF and Vestas were concerned that the automatic access standard is excessive, requiring a generator to assess matters beyond their knowledge, information that should be an NSP responsibility. They also submitted that clause S5.2.5.3C(b)(1)(iv) makes connection to a distribution system more difficult than for transmission.

The NGF submitted that, with respect to the requirements of S5.2.5.3C(b)(1)(iv) for transformer ended lines, where the fault clearance time may be of the order of seconds, no generator should be expected to stay online during faults of the proposed magnitude and duration.

Auswind, REGA and Vestas indicated that, for S5.2.5.3C(b)(2)(ii), the requirement appears to be directed to large power stations connected to transmission networks. Wind farms are commonly connected to distribution networks remote from main system supply points by long, high impedance lines. Achieving the performance proposed could require high cost for additional equipment. This performance requirement should be considered in the context of small generating systems embedded in weak distribution networks as well as large generating stations connected to strong transmission networks.

Auswind, REGA and Vestas submitted that, with respect to clause S5.2.5.3C(c)(2), it is not currently the role of a distribution connected wind farm to control the system voltage. The minimum standard should continue to recognise this.

Other issues

Other issues are outlined and addressed in Table 4.1.5.

Commission considerations

Clause S5.2.5.3C(a) defines the types of faults in respect of which the rest of clause S5.2.5.3C imposes requirements on generators. Those requirements are to ensure sufficient generators remain connected to the power system after such faults to avoid major disruptions or cascading failure of the power system leading to substantial load loss for reasonably foreseeable events.

The Commission understands that the underlying issue raised in submissions is that the proposed clause imposes a requirement to ride through faults that, under Chapter 4 of the Rules, would not be considered credible contingency events. Briefly, "credible contingency events" are the kinds of events that NEMMCO considers to be reasonably foreseeable. The question is whether plant should be required to be designed to ride through the additional events.

The Commission notes that other provisions of Chapter 5 of the Rules require NSPs to avoid widespread disruption and cascading failure for events that are defined in Chapter 4 as non-credible. It also understands that the events provided for (including three phase faults and tripping events followed by recloses) do occur and considers that the power system should be able to ride through them acceptably to avoid cascading failure of the power system. The Commission understands that a three phase fault is more likely to occur in distribution systems if the distribution lines are not protected by an overhead earth-wire. Tripping events followed by recloses are a relatively common occurrence on both transmission and distribution systems. The Commission understand that meeting the requirements of clause S5.2.5.3C is likely to impose additional costs on generators. However, the Commission considers that the costs associated with a power system security failure as the result of generators tripping off as the result of disturbances are likely to be larger.

With respect to the concerns regarding automatic recloses, the Commission understands that the requirements of automatic reclose equipment vary throughout the power system. The Commission considers that, under the clause, it will the responsibility of the NSP to provide information on the automatic reclose equipment requirements as part of the access process.

The Commission notes the NGF's submission that the automatic access standard makes the connection to a distribution system more difficult than to the transmission system and is too great for transformer ended lines and points remote from the main system. However, the Commission notes that this concerns the automatic access standard which outlines desirable performance. It is open to generators to negotiate access between the automatic and minimum access standard. The submissions did not raise these issues in relation to the minimum access standard.

The Commission believes that while the amount of distribution connected generation remains small, voltage control could be handled primarily by devices connected to the NSPs networks and transmission connected generators. The Commission recognises that requiring distribution connected generators to be able to assist in voltage control will add to the cost of such generation. However as the amount of distribution generation increases, it is reasonable for these generators to assist in controlling voltages as doing so assists in maintaining overall power system security. On balance the Commission concludes that the security benefits are likely to exceed the additional costs.

With respect to the concern raised by Auswind, REGA and Vestas in relation to proposed clause S5.2.5.3C(c)(2), the Commission notes that the minimum standard in fact continues to recognise that it is not the role of a distribution connected wind farm to control system voltage. The Commission does not therefore propose to amend the proposed clause.

Finally, the Commission notes that, in response to the concern that generators are not in a position to know certain information, the information in question would be conveyed by the NSP as part of the access negotiation process.

Other issues

Table 4.1.5.

Stakeholder	Clause	Issue	AEMC considerations
Auswind, NGF, REGA and Vestas	S5.2.5.3C(b)(1)(iii)	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 Table S5.1a.2). There is no definition for fault clearance times at lower voltages.	For voltages below 100kV the test requires the application of a fault (of the applicable type) for 430ms
NGF	S5.2.5.3C(b)(1)(iii)	No consideration has been given as to significant torque fluctuations on machines during these	These clauses set the automatic access standard. If a generator cannot meet

Stakeholder	Clause	Issue	AEMC considerations
		situations which may cause major damage.	these requirements it may seek negotiated access under paragraph (f).
Auswind, NGF, REGA and Vestas	S5.2.5.3C(b)(2) and S5.2.5.3C(b)(2)(iii)	Such amount not to exceed requirements under clause S5.2.5.1.	
NGF	S5.2.5.3C(c)(1)(ii)	Allowance should be made for small generators connected to transmission systems as well.	A small generator connected to the transmission system could be subject to the same conditions as clause (c)(1)(iii)(A), (B), and (C). These have been applied to (c)(1)(ii) as well.
Auswind, NGF, REGA and Vestas	S5.2.5.3C(d)	Unsynchronised automatic reclose must be avoided due to the high risk of damage to generators	This would be resolved during negotiation of access arrangements
Auswind, NGF, REGA and Vestas	S5.2.5.3C(e)	Abnormal conditions are mentioned in several cases and the intention should be clearly defined.	This clause needs to be expressed as it is as there are likely to be different issues needing to be addressed at different locations in the system. The Commission notes that recourse may be had to the Chapter 8 dispute resolution process in the event that differences in interpretation arise.

4.1.6 Partial load rejection

NEMMCO proposal

Partial load rejection describes the performance of a generator when it is subject to loss of some of the load supplied by it. The current clause S5.2.5.4 requires continuous uninterrupted operation following the loss of load. NEMMCO proposes that this clause be deleted as it has caused considerable confusion and because the key part of the clause has been addressed in the frequency rate of change requirements in new proposed clause S5.2.5.3A.

Views in submissions

VENCorp submitted that the proposed deletion of clause S5.2.5.4 is not supported as the requirements are not adequately covered by S5.2.5.3A. The clause needs to be retained to cover sudden load change events. While it is recognised that sudden load change events will generally be followed a few seconds later by a consequential frequency change, some generator control systems will initially move in the wrong direction in response to a sudden load change, making the disturbance more arduous from a generator viewpoint than a pure frequency disturbance.

Auswind, REGA and Vestas submitted that they could agree to deletion if the issues associated with proposed clause S5.2.5.3A can be resolved.

Commission considerations

The Commission has considered the comments above. Subsequent discussions with industry have indicated that the clause may be difficult to apply to wind generation and asynchronous generation technologies but that it has been satisfactorily applied to some wind connection applications. However, the Commission agrees that the proposed clause S5.2.5.3A does not satisfactorily cover all generator control systems. The Commission therefore accepts that the clause is still required to demonstrate that continuous uninterrupted operation can be maintained for such systems. The Commission has therefore retained the clause (renumbered as S5.2.5.7) and not accepted NEMMCO's proposal to delete it. In reaching this view the Commission has taken into account that the likely costs of compliance are small (and may only require changing settings on certain control systems) whereas the benefits in reducing the probability of cascading failure are likely to be great. The Commission has also made minor consequential changes to existing clause S5.2.5.4 to reflect the other changes being made as part of this draft Rule determination.

4.1.7 Protection of generation

NEMMCO proposal

This section deals with Schedules S5.2.5.8 (protection of generating units from power system disturbances), S5.2.5.9 (protection systems that impact on power system security) and S5.2.5.10 (protection to trip plant for unstable operation).

The changes to S5.2.5.8 are designed to base the requirements on generator size rather than whether they are classified as "scheduled" or "non-scheduled". The reason for this is that large wind generators are, under the current Rules, considered to be "non-scheduled" and, on that basis, are not required to meet the standards. The

methods of meeting power system security have also been clarified. Clause S5.2.5.9 has also been changed to remove technology specific wording.

Views in submissions

Hydro Tasmania and the NGF submitted in relation to S5.2.5.8(a)(2) that the clause appears to place controllability obligations on generating plant, rather than deal with issues relating to protection of plant from system disturbances, and imposes additional requirements on generators that are not currently required for non-scheduled generation.

Other issues are described in Table 4.1.7.

Commission considerations

The Commission agrees that proposed clause S5.2.5.8(a)(2) extends the requirement for transmission connected generators to reduce output (when frequency exceeds a specific level) to non-scheduled generating systems of more than 30MW. While non-scheduled generation currently represents a relatively small percentage of the total generation, as that proportion increases, those generators will be needed to assist in managing power system security. The Commission recognises that this clause will add additional cost to some generators, but considers that the needs of power system security must prevail. On balance, and subject to the matters below, the Commission has decided to proceed with the changes as proposed by NEMMCO.

Other issues

Table 4.1.7.

Stakeholder	Clause	Issue	AEMC considerations
Auswind, REGA and Vestas	S5.2.5.8(a)(1)	Refers to clauses S5.2.5.8(b)(2) and(b)(3) which do not exist	The references should be to S5.2.5.8(a)(2), (3) and (4). These have been corrected.
NGF	S5.2.5.8(a)(2)	Paragraph (ii) appears to override the requirement of paragraph (i).	A generator must have facilities that can meet the requirements of both paragraphs.
Vestas	S5.2.5.8(a)(2)(i)	This is highly subjective. There must be an objective criteria in this provision	The clause is quite explicit and no change required
NEMMCO	S5.2.5.8(a)(2)(i)(A)	6 seconds should be amended to 3 seconds. The latter correctly appeared in the marked up version of the proposed Rule and the change to the clean version is to ensure consistency	Agreed. Draft Rule reflects 3 seconds.

Stakeholder	Clause	Issue	AEMC considerations
Auswind, NGF, REGA and Vestas	S5.2.5.8(a)(4)(iii)	There is no clause S5.2.5.8(b)(3) referred to	S5.2.5.8(a)(4)(iii) has been corrected to refer to S5.2.5.8(a)(3).
Auswind, NGF, REGA and Vestas	S5.2.5.8(c)	Removal of this clause means that "abnormal conditions" becomes an undefined term	The term needs to be expressed as it is as there are likely to be different issues needing to be addressed at different locations in the system. The Commission notes that recourse may be had to the Chapter 8 dispute resolution process in the event that differences in interpretation arise.
Auswind, NGF, REGA and Vestas	S5.2.5.8(d)	This is a definition of an NSPs overall liability. It has no place in generator standards and the liability exemption is too wide	This is an existing requirement. It appears to be situated appropriately. In the absence of an alternative definition as to scope, the Commission has not amended the clause.
Vestas	S5.2.5.9(e)	Redundancy systems are required only at the substation system and should not be required on each individual generating unit	Refers to negotiated access standard. Where the redundancy systems are required would be part of that negotiation.
Auswind, NGF, REGA and Vestas	S5.2.5.10	Most pole-slip protection only detects pole slips and disconnects the units. It will not prevent a pole-slip from happening	Clause S5.2.5.10 needs to be reworded to "disconnect it promptly when a condition that would lead to pole slipping ….is detected"

4.1.8 Impact on network capability

NEMMCO proposal

This section deals with clause S5.2.5.12. NEMMCO argued the changes are necessary because the increase in the volume of intermittent (wind) generation raises the risk that networks may be unable to maintain supply capability. Thus, NEMMCO proposes that generators connected to the networks should be required not to have a net negative impact on network transfer capability. The proposed changes increase the current requirements to include other types of network impact including reductions of import capacity into another region. They also provide that the generator must, to the satisfaction of NEMMCO and the NSP, take into consideration in the design of the generating plant measures appropriate to mitigating any negative impact to the level of the minimum standard and at a maximum additional cost of five per cent of the capital cost of the generating system.

Views in submissions

Auswind, REGA and Vestas submitted that clause S5.2.5.12(c) should include a reference to appropriate Australian and international plant standards. They also submitted that, when considering the five per cent of the project cost at the discretion of NEMMCO and the NSP, the requirement for dynamic reactive power support must be directly related to the generation project and not an existing system shortfall.

Other issues are dealt with in Table 4.1.8.

Commission considerations

In relation to including in clause S5.2.5.12(c) relevant Australian and international standards, the Commission notes that the submissions did not identify the standards referred to nor make it clear what impact those standards would have on the required level of performance. Without that information, the Commission is not in a position to consider amending the clause in the manner suggested.

NEMMCO have proposed in clause S5.2.5.12(e) that up to five per cent of the project cost be allocated for measures to mitigate any reduction in power transfer capability due to the generator connection. The Commission notes that NEMMCO's proposal effectively provides a discretion to the NSP and NEMMCO to determine what the relevant requirements for connection are on a case by case basis and to require the generator to contribute to the cost of meeting the standard.

NEMMCO's proposal is based on the contention that it would be an inherently problematic exercise to detail in the Rules the technical requirements required to ensure the maintenance of network transfer capability in all circumstances. The proposal purports to provide a workable way forward that addresses the risks to the generator by:

- being as specific as practicable in the standard in the Rules; and
- only requiring additional expenditure to meet the minimum standard;
- in providing that the specific requirements be addressed on a case by case basis, capping the additional cost impact to the generator at five per cent.

The Commission notes that it is a central tenet of the access negotiation framework that a connection applicant be provided with all of the information concerning the relevant technical requirements during the negotiation process so that the applicant may make an informed commercial decision as to whether to enter the connection agreement. This is supported by the technical standards in the Rules being as clear as possible as to what those requirements are in advance with the detailed requirements being provided as part of the negotiation process.

In the current context, having being informed by the NSP as to the technical requirements, the generator should then be free to negotiate with the NSP to alter those requirements, pay for a network augmentation or both. If the generator decided not to fund mitigation of the reduction in power transfer capability then, subject to meeting its own performance requirements, it should then be open to the NSP to accept the reduction in network capability or to decline to connect the generator. The Commission considers that NEMMCO and the NSP should not be in a position to require the generator to undertake expenditure where it has not agreed to do so.

The view that the NSP should recover the cost of maintaining its network transfer capability from the generator via the connection agreement is consistent with the Commission's position in its recent Rule Proposal on transmission pricing[15]. There, the Commission considered that generation investment does not "cause" new transmission investment to be undertaken in the shared network. This is because shared transmission investment is primarily undertaken to serve the needs of reliable supply to loads. However, where a new generator imposes a negative impact on the transfer capacity of the network the needs of loads are no longer met to the same level they were before. That is, the generation investment has "caused" a reduction in the reliable supply to loads. The NSP should recover the costs of ensuring that the network is able to maintain its transfer capability from the generator. The Commission considers that this approach is consistent with the causer pays principle.

The Commission also notes that, even if it was of the view that NEMMCO's proposal to provide for capped discretionary expenditure was appropriate, NEMMCO has provided no justification to support the proposition that the five per cent figure is a reasonable cap in the circumstances.

In consequence of the above, the Commission has deleted this part of the proposed clause in the draft Rule. Subject to the further matters below, the Commission proposes to accept the balance of the clause.

15 *Transmission Pricing Rule Proposal Report* located on the Commission's website.

Other issues

Table 4.1.8.

Stakeholder	Clause	Issue	AEMC considerations
Auswind, NGF, REGA and Vestas	S5.2.5.12(a)	This is not well defined. It does not assist generators in defining physical obligations that are measurable and able to be tested for compliance.	The clause is satisfactory as it is. Different requirements at different locations will be spelled out by the NSP and NEMMCO as part of the connection process
VENCorp	S5.2.5.12(e)	The drafting of clause S5.2.5.12(e) is confusing. It is suggested that the requirements of this clause should be added to (b), as it is effectively an extension of the minimum standard.	The clause has been deleted for the reasons discussed above.

4.1.9 Control systems and stability

NEMMCO proposal

This section deals with schedule S5.2.5.13 (control systems and stability). The changes replaced the current clauses. NEMMCO have argued that the changes are required because they have been re-written in terms of scheduled and non-scheduled and synchronous and asynchronous generators, and set automatic and minimum standards.

Views in submissions

A number of submissions (Auswind, NGF, REGA, Roaring 40s and Vestas) submitted that, with respect to the proposed automatic access standard that:

- small plant would not be able to meet the requirements;
- it should allow generating system as well as units;
- it makes the generator responsible for controlling voltage within the power system;
- generating systems consisting of small generating units cannot comply;
- the requirement that generating systems must have a power system stabiliser is a technology specific requirement as stabilisers only pertain to synchronous machines;
- operational monitoring of key variables including inputs and outputs would be overly onerous for small plant;

- instability and impact are not appropriately defined; and

- the clause would cause uncertainty as to how support network voltages during faults would be quantified or tested.

TransGrid submitted that the proposed new clauses S5.2.5.13(b)(3)(i) and S5.2.5.13(c)(4)(i) are based on the assumption of an AVR gain of 200, equivalent to a voltage regulation tolerance (set point error) of 0.5%. This only holds under open circuit conditions.

VENCorp submitted that:

- in paragraph S5.2.5.13(b)(3)(vi), a ceiling voltage of 2 is considered unnecessarily high for AC exciter systems, but is not considered high enough for static self-excitation systems, where generator stator voltage would be severely depressed for close-in EHV faults. It is recommended that two categories of excitation system be included in the rules for this requirement (static self-excitation systems and rotating exciter systems), with a ceiling voltage of 2.3p.u. for static self-excitation systems and 1.5p.u. for rotating exciter systems;

- with respect to paragraph S5.2.5.13(b)(3)(viii), while a 0.5 second rise time would be acceptable for AC exciter systems, it would be undesirably slow for static self-excitation systems, resulting in undesirable generator flux decay during this time period, potentially impacting on generator transient stability. It is recommended that two categories of excitation system be included in the rules for this requirement (static self-excitation systems and rotating exciter systems), with a rise time of 0.05 seconds for static self-excitation systems and 0.5 seconds for rotating exciter systems;

- concerning paragraphs S5.2.5.13(b)(4)(v)(A) and (B) and item S5.2.5.13(c), the step size should be changed to 2.5%, as 5% is considered unnecessarily large (it would cause a large reactive power change of typically 20%, around 120MVAr on a 500MW generator). On-line step changes more than 2.5% are never used for generator testing in Victoria.

Vestas submitted that the wording in S5.2.5.13(b)(4)(v)(B) is unclear and needs to be improved.

Other issues are dealt with in Table 4.1.9.

Commission considerations

The Commission considers that the automatic access standard represents the desirable performance of a generator to assist NEMMCO in meeting their requirements for power system security. Any generator which cannot meet the automatic access standard has the opportunity to negotiate access, where the minimum acceptable performance will be related to no material adverse impact on customers.

The Commission accepts that the automatic access standard is defined in such a way as to not be technology neutral, but this is unavoidable. The Commission

understands that it may not be possible for an asynchronous generator to provide a power system stabiliser. In the Australian context, power system stabilisers are helpful in managing stability issues. The Commission also notes that the proposed changes by NEMMCO extend the requirements for power system stabilisers from their current level of generators greater than 100MW to all generators wishing to connect via the automatic access standard. The net effect of this could be to make all generators no matter what their size consider negotiated access. On balance the Commission considers that the requirements of the automatic access standard are appropriate.

With respect to the issue raised by TransGrid, the Commission notes that TransGrid has not indicated how the problem should be addressed. Accordingly, the Commission has not amended the draft Rule. However, it notes that TransGrid has stated its intention to work with NEMMCO to provide a solution as part of the NSP's submission on this draft determination.

The Commission agrees with the first two VENCorp issues as they deal with the reasonable requirements of different technologies of exciter systems. The third issue raised by VENCorp on the size of the voltage step change to be applied to a generator that the proposed change is requiring a generator's control system to hold it stable for a 5% change in voltage. The Commission notes that there are arguments for and against this. The argument for the change is that in order to ensure power system security it is necessary to require generators to prove they can stably ride-through a 5% change in voltage, because voltage changes of this magnitude can occur, and this value has not been changed in these proposed Rules changes. On the other hand applying a voltage change of this magnitude during tests risks running into non-linear behaviour of the control system, which will not give a real understanding of the control system's capability. The Commission believes on balance that the changed clauses as proposed should stand as a 5% step change can occur in practice.

The Commission considers that the wording of clause S5.2.5.13(b)(4)(v)(B) is acceptable and has therefore not revised the substance of the clause in the draft Rule.

Other issues

Table 4.1.9

Stakeholder	Clause	Issue	AEMC considerations
NGF	S5.2.5.13(b)	Referred to generating unit capability – should include generating systems.	Agreed and amended in draft Rule
VENCorp	S5.2.5.13(b)(1)(ii)	it is recommended that the draft words "any mode of oscillation" should be changed to "any critical mode of oscillation", so that slight degradation of any heavily damped mode of oscillation is excluded from	Agreed and amended in draft Rule

Stakeholder	Clause	Issue	AEMC considerations
		this consideration.	
Auswind, NGF, REGA and Vestas	S5.2.5.13(c)(3)	If transmission connected is intended then this should be stated rather than a voltage level. There are 132kV distribution lines in the network. Is clause (c)(3)(i) meant to relate to transmission and (c)(3)(ii) to distribution.	This clause is reasonable as drafted. High voltage installations greater than 100kV need to have a voltage regulator. It doesn't matter whether it is called transmission or distribution.
Roaring 40s	S5.2.5.13(c)(3)	The ability to test and verify the performance of control systems is inescapable but the requirements are very vague and need clarification.	This clause relates to the minimum access standard. The requirements of this clause would be spelt out by the NSP during connection negotiations. The clause is satisfactory.
Auswind, REGA and Vestas	S5.2.5.13(c)(5)(i)	The requirement to regulate the voltage possibly within the generation system and not at the connection point removes the flexibility with which a voltage control system could be implemented on a wind farm.	This clause relates to the minimum access standard. The location is subject to negotiation through the negotiated access arrangements. This potentially includes the connection point. There is no problem with the clause.
Hydro Tasmania	S5.2.5.13(d)	Clause is quite prescriptive in its description of the technology which is required to meet the automatic standard.	Agreed but needs to be to interact with all other stabilisers on the power system so keep as proposed.

4.1.10 Fault control

NEMMCO proposal

This section deals with Schedule S5.2.9. The changes proposed have resulted in a completely new section. NEMMCO argued the changes were necessary because they have included generating systems as well as generating units, and required NSPs to consider alternate network configurations.

Views in submissions

Auswind, REGA and Vestas submitted that NEMMCO has not justified the change, and there are no known issues with S5.2.9 as it is currently drafted. Auswind, the NGF and Vestas submitted that consideration of the change should be deferred as it does not concern wind generation specifically. A number of technical matters are raised and assessed in the Table below.

Commission considerations

The Commission notes that the submissions did not identify specific issues with the proposed clause other than to comment that it represents a "substantial change". The Commission agrees that NEMMCO did not provide sufficient comment in its proposal to justify why the changes should be made. Subsequent discussions with NEMMCO revealed that the changes were proposed as a consequence of NSP experience in dealing with wind farm connection applications. The Commission notes that the changes introduce automatic and minimum access standards and a requirement for generator equipment to withstand fault current. The Commission believe that these represent improvements on the current clause and, in the absence of specific reasons to the contrary, has decided to accept the changes to the clause recommended by NEMMCO.

Table 4.1.10

Stakeholder	Clause	Issue	AEMC considerations
VENCorp	S5.2.9(a)(1)(ii)	It is recommended that the meaning of this clause (ii) be clarified by adding the following to the beginning of this sentence: "the contributing level that will ensure that the total fault current can be safely interrupted…"	Agreed. Clause has been amended in draft Rule
Auswind, NGF, REGA and Vestas	S5.2.9(e)	It is inappropriate that a clause referring to a NSP's liability to everyone exists in a Generator standard.	This clause is virtually identical to the limitation appearing in relation to generation protection (S5.2.5.8). It appears to be situated appropriately.

4.1.11 Technical matters to be co-ordinated

NEMMCO proposal

This section deals with schedule S5.2.3. NEMMCO argued the changes were necessary because they ensure the standards to be applied to networks constructed by generators comply with appropriate design criteria.

Views in submissions

Auswind, NGF, REGA, VENCorp and Vestas submitted that clause S5.2.3(b) requires plant to not comply with the Australian standards, does not recognise international standards and may call for plant to exceed the Australian standards which is unreasonable.

Commission considerations

The Commission considers that the Australian and international standards are guidelines and that the Rules may set the relevant NEM standard including where this over-rides those standards. The Commission notes that the submissions do not identify what standards should apply or the impact they would, if adopted, have on the proposed performance levels. In the absence of that information, the Commission is satisfied that the changes as proposed by NEMMCO are appropriate.

4.1.12 Active power

NEMMCO proposal

Under clause 4.8.9 NEMMCO can issue directions to scheduled and market generators to maintain or re-establish the power system to a secure operating state, a satisfactory operating state, or a reliable operating state. This proposed change to the Rules:

- formalises the requirement that scheduled generators must be able to control their output to maintain system security and reliability; and

- extends this requirement such that all large generators, either scheduled or non-scheduled but larger than 30 MW, must be able to control their output in response to directions or instructions from NEMMCO.

Views in submissions

With respect to the proposed automatic access standard, the NGF suggested that the clause be changed to accept an allowable dispatch error of 1%. With respect to the negotiated access standard, Auswind and Vestas suggested that the word "automatically" be removed to allow both automatic and manual processes that occur within 5 minutes of receiving a dispatch instruction to occur. NEMMCO proposed a change to the wording of the clause to make the minimum standard subject to energy source availability to ensure consistency with the automatic standard.

Commission considerations

The NEMMCO dispatch process specifies the generation targets for scheduled generators with the aim of managing the flows in the network flows and hence system security. However, currently non-scheduled generators do not receive dispatch targets and the dispatch process cannot always optimize network flows and reliability outcomes. This is particularly true where the output of a non-scheduled generator increases the flows in the network element where it is connected, which in turn can constrain the flows on parallel network elements.

The Commission understands that some non-scheduled generators are connecting to the power system in areas where network limits can be exceeded. At present only the

scheduled generators are required to alter their active power output to ensure network limits are maintained. This can result in increased prices for generation and lead to problems with reliability in some instances. These Rule changes require that both scheduled and non-scheduled generation can be used to ensure network limits are maintained, which will allow the appropriate instruction to be used.

The Commission considers that the factors that determine whether a generator affects system security and reliability are its size and location, rather than it being registered as either scheduled or non-scheduled. The Commission acknowledges that the proposed Rule will impose additional costs on the proponents of non-scheduled generators. However, these costs are likely to be relatively small and only involve changes to control systems in most instances. The benefits are likely to be improved security and reliability, an increased technical envelope of network capability and reduced generation prices to the market. On balance the Commission supports requiring all large generators to have an active power control capability.

The Commission notes that the NGF's point is already met as the dispatch process already allows for some dispatch errors. The Commission considers that the word "automatically" in S5.2.5.14(e) should be replaced with the words "within five minutes of" as this will align the clause with the minimum access standard in S5.2.5.14. This has been addressed in the draft Rule. The Commission also accepts NEMMCO's proposed wording change.

4.1.13 Remote monitoring

NEMMCO proposal

Remote monitoring concerns participants' abilities to transmit to NEMMCO's control centres real time data to enable the system operator to carry out its market and power system responsibilities.

NEMMCO proposes to modify the remote monitoring requirements in clause S5.2.6.1 so that they apply to generators or generating systems greater than 30 MW in size regardless of whether they are classified as scheduled or non-scheduled. In addition, the proposal would require wind farms to provide remote monitoring of wind speed and direction which NEMMCO considers necessary to improve the accuracy of short-term forecasts of wind farm generation.

Views in submissions

The submissions supported the proposed changes. However, several submissions (Auswind, REGA and Vestas) commented that the amended clause S5.2.6.1(a)(2)(ii) would appear to require more information for a non-scheduled generating system of less than 30 MW size than clause S5.2.6.1(a)(2)(i) does for a non-scheduled generating unit with a nameplate rating of 30 MW or more.

Commission considerations

The Commission supports there being the same requirements on large non-scheduled generating units or systems that already apply to scheduled generators as it considers that the factors that determine whether a generator affects power system security and reliability are its size and location rather than how it has been classified. Scheduled generators provide forecasts of their output through the pre-dispatch and

projected assessment of system adequacy (PASA) processes set out in Chapter 3 of the Rules. It agrees that for consistency, other large generators should provide equivalent, or the best available, information if possible. In the case of wind generators, this includes measurement information concerning wind speed and direction and these variables should be made available to assist the process of forecasting wind farm generation.

With respect to the comment made in submissions, the Commission considers that the remote monitoring requirements on generators less than 30 MW and those greater than 30 MW appear reasonable.

4.1.14 Generating units and systems

NEMMCO proposal

NEMMCO has used the terms "generating units" and "generating systems" both separately and together throughout the proposed changes to the technical standards. These terms are defined in the Rules as follows:

A "generating unit" is the actual generator of electricity and all the related equipment essential to its functioning as a single entity.

A "generating system" is a system comprising of 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.

Views in submissions

Auswind, the NGF, REGA, Roaring40s, VENCorp and Vestas were concerned that obligations have been placed unfairly on individual generating units where it would be more appropriate to place the obligation on the generating system. This would allow more technologies to meet the required performance standard at potentially lower cost.

Commission considerations

The Commission agrees with the views raised in submissions. It also notes that NEMMCO expressed the same intention in its proposal and has provided that flexibility in a number of the proposed clauses. The Commission considers that the terms "generating units", "generating units and generating systems" and "generating units or generating systems" should be replaced by the term "generating system" in a number of the clauses of the draft Rule to give full effect to NEMMCO's intention and the views in submissions. It also considers that the term "generating unit" should be replaced with "generating system including all operating generating units" in several other clauses. The changes have been made in the draft Rule. The Commission has not identified any transitional issues in relation to this amendments as the Commission is of the view that the amendment is less onerous for existing units and systems. The Commission, however, seeks comments if any savings and transitional arrangements are required for any generating units.

4.1.15 Glossary definitions

NEMMCO proposal

NEMMCO proposed a number of new definitions as part of its proposed Rule changes.

Views in submissions

Continuous uninterrupted operation

The AER and ESIPC submitted the definition of continuous uninterrupted operation differs from that accepted in a recent case before the National Electricity Tribunal[16]. They submitted that NEMMCO's proposed definition is difficult to interpret and would lead to difficulties in the exercise of the AER's powers to enforce the relevant standards. The AER recommends retaining the status quo until the Commission's proposed wider review of technical standards is completed.

Adequately damped

Hydro Tasmania submit that reference to a damping ratio is also applicable to second order systems and, while second order approximations may be appropriate in some circumstances, this cannot be considered as universally possible with acceptable outcomes.

Commission considerations

Continuous uninterrupted operation

The Commission considers that the proposed definition is an improvement on the current Rules which leave the term undefined. The Commission considers that NEMMCO have proposed the new definition to move from ride-through provisions that are currently unable to be met by some technologies to a more reasonable position. This definition is central to NEMMCO's proposals for the requirements of ride-through capability of generators. However, as noted in Section 4.3.2 above, the Commission is concerned to ensure that the compliance and enforcement regime is as effective as possible and invites specific feedback from stakeholders on the impact that the definition would be likely to have in this regard.

Adequately damped

The Commission notes that there is no definition of adequately damped in the current Rules. Discussions with NEMMCO indicated that the term is difficult to define and that if there is clearly a single dominant frequency then this indicates that a second order approximation can be used and the damping ratio calculated. Otherwise the measurement can be decomposed into separate frequencies and the test for adequate damping can be applied to each identifiable frequency. The definition is a step in the right direction. Given that the submission provided no alternative to this definition, the Commission accepts the definition as proposed by NEMMCO.

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16 *NECA v NRG Flinders Operating Services Pty Ltd: Final Determination* (15 August 2005).

4.2 Provision of information

NEMMCO's proposal

NEMMCO and NSPs use technical data and models of generation control systems to assess the power system's transfer capabilities under a range of conditions. NEMMCO submitted that it has experienced difficulty obtaining adequate models for some new generation proposals, particularly wind farms, because some wind farm technologies are relatively new and accurate models have not yet been determined, manufacturers are reluctant to provide the information due to commercial sensitivity and because of limitations in the Rules concerning NEMMCO's ability to specify the relevant information and test model parameters. The proposed Rules:

- clarify NEMMCO's power to obtain the relevant models and information;
- expand the requirements to cover generating systems of 30 MW or larger in size irrespective of whether they are classified as scheduled or non-scheduled;
- remove technical details from the Rules and include them in guidelines and procedures to be developed by NEMMCO concerning the information required to be provided; and
- provide for NEMMCO to have the models verified through testing.

NEMMCO also proposes to provide for the staged disclosure of plant technical information to prospective connection applicants so that they may assess the performance impact of their own plant on the power system and also to other parties to increase the base of expert opinion available.

Views in submissions

A number of submissions were made with respect to the proposed changes. These stated that the changes:

- provide inadequate protection for commercially sensitive information — for example, simply declaring that information is confidential would not be sufficient to protect the rights of the owners of such information;
- allow an absolute, rather than a reasonable or confined, discretion to NEMMCO to provide information to third parties for the purposes of undertaking research or providing advice to Registered Participants or potential investors;
- in relation to releasing registered offer and bid data, appears to conflict with the confidentiality obligations under clauses 5.3.8 and 5.2.3(c);
- introduce requirements that are unduly specific for the purpose for which they are required, are onerous and are poorly drafted; and
- would have the effect of delaying wind farm development in the NEM and, in any event, would require a period of transition before they could be complied with.

Under NEMMCO's proposed clause 5.3.2(e), NSPs would be required to provide information to a connection applicant sufficient to identify the impact that another project may have on that connection. The Electricity Transmission Network Owners' Forum (ETNOF) submitted that the term "another project" is insufficiently defined to enable NSPs to fulfil this obligation. It also submitted that further consideration should be given as to whether NEMMCO should, as proposed, have sole responsibility for the dissemination of plant information.

Commission considerations

The Commission agrees that NEMMCO and the relevant NSPs should have access to sufficient information, including modelling information, necessary to assess the impact of proposed connections on the power system and that, consistent with other changes included in NEMMCO's Rule change proposal, this should be applied to both scheduled and non-scheduled generation for generating systems of 30 MW or more in size.

The Commission also recognises that allowing that information to be provided to relevant third parties such as:

- parties in the process of considering connecting may assist in preventing overinvestment; and

- other persons undertaking research or advising Registered Participants or potential investors would also promote greater industry expertise with respect to the relevant technologies.

The Commission understands that doing so has the potential to result in more efficient and effective outcomes for electricity users over time. In seeking the ability to release information, NEMMCO is attempting to encourage the development of the local market for wind generation technology in particular. However, the Commission notes that the benefits of disclosure must be balanced against the need to ensure that commercially sensitive material is appropriately protected.

In addressing the above issues, it needs to be clear:

- what the information is that NEMMCO and the relevant NSPs require and why it is needed;

- what parts of that information are commercially sensitive and therefore require protection;

- how the processes NEMMCO has proposed will ensure appropriate protection; and

- that there are appropriate transitional arrangements in place.

The issues are interrelated. A lack of clarity as to the information required makes it difficult to be satisfied that the information is appropriately protected. Without confidence as to that level of protection, it also becomes difficult to assess whether the discretion a party has to release that information is reasonable. For example, if NEMMCO considers it necessary that it have an absolute discretion to release

information to a generator's potential competitors, then it becomes important that there be strong confidence that the version of the material that is released is non-confidential.

The Commission notes that the concerns of those parties who made submissions relate principally to three sets of information proposed to be provided to NEMMCO and/or the relevant NSP. The three sets are:

- the functional block diagram and associated information in proposed revised clause S5.2.4(b)(4);

- the simulation source code referred to in proposed clause S5.2.4(b)(5); and

- the information proposed to be contained in the generating system model guidelines, generating system design data sheet and generating system settings data sheet referred to in proposed new clause S5.5.7(a).

NEMMCO stated that the purpose of all three sets of information is to allow generating plant to be modelled in load flow and dynamic stability assessments with sufficient accuracy to permit power system operating limits to be assessed, proposed access and performance standards to be assessed and plant and control system settings to be assessed to ensure the best performance of the power system.

Under proposed clause S5.5.7, the content of the guidelines and data sheets are to be developed by NEMMCO in accordance with the Rules consultation procedures. The Commission understands NEMMCO's intention to be that, initially, the two data sheets will replicate existing Schedules 5.5.1 and 5.5.2 and that the information required that is specific to wind generation technologies will be developed and incorporated into the guidelines and data sheets during the consultation process.

The Commission understands that submissions on this issue are being driven principally by concerns in relation to wind generation and the fact that the technology is relatively new. It understands that parties who made submissions were strongly concerned that:

- the processes proposed by NEMMCO to protect the commercial value of the three sets of information referred to above are inadequate; and

- there is a lack of detail in the proposed Rule as to the content of the guidelines and data sheets — in particular, wind farm connection applicants may be unable to comply with the requirements to lodge the relevant information as part of the connection and registration process with any failure to comply would presumably result in a refusal by NEMMCO to register the plant.

The Commission notes that the risks identified in theory apply to all forms of generation. It also notes that:

- the functional block diagram and associated information, but not the simulation source code, and what is expected to be the initial content of the data sheets, is information that is currently required of connecting generators, including wind farms; and

- at the time of writing this draft determination, NEMMCO has available on its website a Wind Farm Model Guidelines and Checklist document[17] that identifies material that NEMMCO considers relevant to the existing S5.2.4 requirements — it is understood that NEMMCO intends that a version of that material should form part of the detailed requirements under the revised clause S5.2.4 and/or the guidelines and data sheets.

The Commission recognises that wind technology is relatively recent and that it will take a further period of time to develop the appropriate detailed information requirements.

However, the Commission agrees that the three sets of information referred to are crucial in providing NEMMCO with the ability to manage the impact of new connections on power system security. The information is also important to enable NSPs to manage the impact on quality of supply for network users.

On the basis of the material referred to above, the Commission considers that relevant stakeholders currently have sufficient experience in relation to, and understanding of, the nature of the information likely to be required that makes it appropriate that parties who wish to connect to the power system must provide that material to NEMMCO and the NSP as part of the connection process. This is irrespective of the fact that the detailed requirements will not be finalised for a further short period of time.

Overall, the Commission proposes to address the issues raised in NEMMCO's proposal and in submissions by amending the draft Rule to reflect the following:

- that new connection applicants must provide the three sets of information to NEMMCO and the NSP as proposed;

- that they must also provide non-confidential versions suitable for release to relevant third parties other than NEMMCO and the relevant NSP of the functional block diagram and associated information in proposed clause S5.2.4(b)(4) and the material to be provided in accordance with the guidelines and data sheets — the Commission considers it would not be possible to specify a non-confidential version of the simulation source code referred to in proposed clause S5.2.4(b)(5) and has accordingly made it clear that the information not be released to those third parties; and

- that NEMMCO and the NSP may only release to third parties the non-confidential versions of the functional block diagram and associated information and the guidelines and data sheets.

The Commission considers that these requirements should provide connection applicants with appropriate protection in relation to information that they consider to be commercially sensitive. It should also ensure that NEMMCO and the NSPs receive the information they require to meet their system security and quality of supply obligations.

[17] NEMMCO's website is located at www.nemmco.com.au.

The potential benefits to both electricity investors and users to be derived from relevant third parties being able to access non-confidential versions of the information referred to are also important. In practice, the extent of those benefits will ultimately depend on whether those non-confidential versions provide material sufficient to address the needs of those third parties. In order to ensure that this is in fact being achieved, the Commission also proposes to review the effectiveness of the above requirements within two years of the date of commencement of the Rule.

The Commission recognises the importance of these issues. Accordingly, it strongly encourages feedback from stakeholders as to the way forward outlined above including specific options for improving the arrangements. As part of that feedback, the Commission invites comments in relation to ETNOF's submission that consideration should be given to the appropriateness of parties other than NEMMCO being able to release information to relevant third parties other than the connection applicant.

The Commission notes that it is not within the scope of the Rules to provide remedies or penalties for breach of confidentiality obligations in the circumstances discussed above. As discussed, the Commission proposes to require that non-confidential versions of such information be provided to NEMMCO and the NSP to be made available for release to relevant third parties. Beyond this, if there is a breach of the confidentiality mechanism provided for in the Rules, aggrieved parties must resolve the issue between themselves through contractual arrangements or otherwise.

The Commission notes ETNOF's view that the term "another project" in proposed clause 5.3.2(e) is too broad. This comment also relates to the proposed definition of "considered project" in Chapter 10 of the Rules. Both attempt to identify the projects of other parties that appear reasonably close to connecting to the power system and that would, if connected, have an impact on the connection applicant's own project. As noted above, requiring the NSP to provide the connection applicant with information in this regard would minimise the risk of the applicant overinvesting.

The issue identified by ETNOF is that too wide a definition may impose an unworkable obligation on the NSP to so advise. The Commission has amended both definitions to reflect that the NSP's reasonable opinion as to whether the project would materially affect the connection applicant's plant, should be the relevant test

Finally, several stakeholders submitted that the term "synchronised" in proposed clause S5.2.4(c) should be replaced with "connected" on the basis that the former has a technology bias. The Commission agrees with this change and has amended the draft Rule accordingly.

4.3 Access negotiation and compliance

NEMMCO's proposal

NEMMCO submitted that the current Rules for negotiating access:

- do not provide sufficient guidance as to the technical requirements leading to a lack of consistency between the completed performance standards applicable to different connecting parties;

- do not allow the adverse impact of the connection on supply reliability to customers to be taken into consideration;

- limit the effectiveness and efficiency of compliance monitoring and enforcement by:

    - exempting some owners of older plant from complying with performance standards;

    - restricting NEMMCO's input into the assessment and wording of proposed performance standards during the negotiation process;

    - restricting the ability to revise performance standards except where plant has been modified; and

    - requiring a review of all performance standards where plant has been modified rather than just those that are affected by the modification.

NEMMCO proposes a range of changes to the access negotiation framework contained in Chapter 5 of the Rules and also to the participant registration process set out in Chapter 2 of the Rules. According to NEMMCO, the changes would provide enhanced guidance as to the relevant technical requirements, introduce reliability of supply as a basis for access negotiation, streamline the compliance process by recording performance standards in a performance agreement outside of the connection agreement, relaxing some restrictions on how generator performance standards can be modified and requiring NEMMCO input to the wording of performance agreements before connection agreements could be executed.

Views in submissions

Reliability of supply

ESIPC indicated that introducing requirements on generator connection applicants not to impact on reliability of supply was not solely an issue for the negotiation of performance standards. That is, ensuring reliability of supply is a complicated task involving the performance of many elements of the supply chain and it would be inappropriate to place the responsibility for doing so solely on generators.

Performance standards for existing plant

The AER, ETNOF, the NGF and PacificHydro submitted that consideration of the changes to do with revisiting the content of the performance standards for existing plant should be deferred until completion of the Commission's review into the enforcement and compliance with technical standards. As noted previously, that review has now been completed. Those stakeholders also submitted that those performance standards should be based strictly on the access standards that applied at the time and not those that have been introduced subsequently. They also submitted that proposed changes would, in certain circumstances, deem performance to be at the level of the automatic standard. This would be unrealistic and many generators would be unable to comply with that standard.

Performance standards for new plant

A large number of submissions were received with respect to these changes. Stakeholders were concerned that the proposed changes would fundamentally change, serve to frustrate and/or unnecessarily complicate, the access negotiation process, potentially leading to delays and higher costs to connection applicants and consumers. Specific concerns raised were that the amendments would:

- change the existing negotiation framework so that NEMMCO effectively became a party to the negotiations rather than its role as an advisor to the NSP on technical matters concerning power system security and reliability;

- give NEMMCO a power of veto over the access negotiation process by preventing the NSP and connecting party from executing a connection agreement they had negotiated unless NEMMCO determined that the performance standards that resulted from that process were satisfactory;

- allow NEMMCO to weaken the access negotiation process by treating the performance standards as part of a separate performance agreement made between the applicant and NEMMCO rather than as standards included in the connection agreement between the applicant and the NSP; and

- allow NEMMCO to circumvent the process by affording it a largely unfettered power to impose terms and conditions on connection applicant registration in relation to ensuring power system security, reliability or quality of supply.

VENCorp disagreed with NEMMCO's proposal to delete paragraphs 5.2.2.(c) and (d) submitting that those paragraphs assist in preserving the obligations contained in connection agreements. VENCorp also submitted that it would be inappropriate for NEMMCO to be involved in assessing performance standards in relation to quality of supply matters as these fall under the NSPs area of responsibility. Finally, VENCorp submitted that existing clause 5.3.6(e) should not be deleted as it allows NSPs to negotiate access terms and conditions that vary from the Rules where relevant consideration such as geographic factors make such variation necessary.

A number of other issues were raised in submissions and these are identified and addressed in Table 4.3.1 below.

Performance standards for modified plant

AusWind, the NGF, REGA, Roaring 40s and Vestas submitted that the changes would require that the amended performance standards submitted to the NSP and NEMMCO as part of the proposal to modify generation plant must be no less than the relevant minimum access standard. They submitted that generators should only be required to meet the performance levels indicated in their existing performance standards and that the process should not be used to require them to meet upgraded standards.

A number of other issues were raised in submissions and these are identified and addressed in Table 4.3.2 below.

Upgrading performance standards when technical standards change

Stakeholders submitted that NEMMCO's proposal to require that performance standards be upgraded when there is a change or addition to the technical standards should not be adopted as they are unacceptable. The requirement is open-ended and provides no regulatory certainty that generators will be able to comply with the Rules in the future. Participants would be required to upgrade their plant after building them and agreeing to a set of performance standards. As with the proposed changes above, the proposal also appears to diminish the importance of the connection agreement negotiated between the connected party and the NSP.

Commission considerations

Reliability of supply

The Commission notes that ensuring reliability of electricity supply to customers is a key objective for the operation of the power system and, as noted in Chapter 2, for the technical standards framework. NEMMCO's proposal is to set:

- a general obligation that access standards negotiated for generating plant must be set at a level that will not adversely affect supply reliability; and

- a technical standard (clause S5.2.5.12) which provides that the impact a generator has on network capability is a specific way that a generator can affect reliability of supply (and also power system security).

The Commission agrees that the connection of generating plant may, in certain situations, have an adverse impact on supply reliability, including the specific situation addressed in proposed clause S5.2.5.12, and that it is in the interests of consumers to ensure that this risk is appropriately managed. This is particularly the case in view of the increasing amount of wind generation in the NEM. The Commission's view as to proposed clause S5.2.5.12 is discussed in Section 4.1.8 above.

More generally, the Commission notes that supply reliability is a term that can be interpreted relatively broadly and that the technical application of the term remains undefined other than proposed clause S5.2.5.12. The Commission is concerned there is a risk that the general obligation may be construed in a way that permits NEMMCO or the NSP to impose unreasonable access conditions on a generator. It recognises that it is inherently difficult to define supply reliability extensively to mitigate this risk. Accordingly, the Commission has amended the general obligation to make it clear that its interpretation is to be restricted to the specific situations provided for by the technical standards.

Performance standards for existing plant

As noted in Chapter 2, the National Electricity Code provided a specific process for settling performance standards for plant connected to the network at the launch of the market. The intention was to reflect the fact that such plant had a variety of capabilities based on requirements that existed at the time of their connection[18]. The

[18] Rules, clauses 4.13 and 14.

resulting performance standards, whether below the minimum access standard or not, were preserved or "grandfathered".

NEMMCO submitted that the results of the grandfathering process have turned out to be unsatisfactory in practice with elements of the resulting performance standards being either difficult to interpret, inaccurate or missing. It proposed that, in any reassessment by NEMMCO of those performance standards, those standards must meet the technical standards applicable to that plant and must also provide an effective basis for compliance and enforcement.

NEMMCO also proposed that generators, market customers or MNSPs who:

- were not registered with NEMMCO at the time the performance standards for those existing plant commenced[19] and who subsequently became registered; or

- were a party to a connection agreement but who are not registered as at the date the Rule the subject of this draft determination comes into effect,

be required to submit performance standards to, and have those standards assessed by, NEMMCO. The intention behind this proposal is to ensure that performance standards are settled for plant that was extant at the time, but was not properly captured by, the grandfathering process.

As noted above, the Commission has indicated in its recent report to the MCE on the enforcement of, and compliance with, the technical standards[20] that there were material deficiencies in the grandfathering process. In particular, the part of the process that deemed the content of performance standards where they could not otherwise be agreed between the parties was a failure. Consistent with the recommendations contained in the report, the Commission now notes that:

- a joint NEMMCO/industry process has been established to revisit and settle by 30 June 2007 the content of the relevant performance standards for both the grandfathered generator plant and generator plant extant at the time but not properly captured by the grandfathering process; and

- NEMMCO and the NGF have recently lodged a Rule change proposal to make the performance standards that result from that process enforceable.

The Commission notes that the new Rule change proposal addresses, and offers an alternative potential solution to, the same issue raised by NEMMCO as part of the current proposal with respect to generating plant. The solution, or a variation upon it, may also be applicable to those market customers and MNSPs extant at the time but not properly captured by the grandfathering process. The Commission is currently in the process of assessing the new proposal.

For present purposes, the Commission has determined to not accept the changes to the Rules on this issue proposed as part of the current determination. The reason is

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19 16 November 2003 for plant in a region of the NEM other than Tasmania or 29 May 2005 for those in Tasmania (definition, Rules Chapter 10).

20 Op cit, footnote 2.

that the changes attempt to restore the deeming process that was central to the failure of the grandfathering process originally. They would therefore not satisfactorily address the issue raised by NEMMCO. The Commission notes that the new Rule change proposal from NEMMCO and the NGF is designed around a negotiate/expert decision model and so avoids the need to deem any content.

Performance standards for new plant

The access negotiation process in Chapter 5 of the Rules is a core component of the national access regime for electricity networks. As an effective access regime, the Rules must satisfy the criteria for an effective access regime under Part IIIA of the Trade Practices Act (C'th) 1974 (TPA). The Commission has been mindful of the relevant requirements of the TPA, and in particular, the criteria listed in the Competition Principles Agreement[21] in the preparation of the amendments to the negotiating process under Chapter 5 of the Rules. In particular, that to the fullest extent possible, terms of access should be on terms agreed between owners of facilities and the person seeking access.

However, under the NEL and the Rules, NEMMCO has specific responsibility for ensuring the safe, secure and reliable operation of the power system for the benefit of users of the system. It is therefore recognised that NEMMCO has a strong and legitimate interest in ensuring that the performance requirements that result from the access negotiation process are clear, able to be complied with and do not threaten the safe, secure and reliable operation of the system. In a similar way, NSPs have an interest in the process resulting in performance requirements that ensure that connected plant does not impact unduly on the quality of supply provided to other local network customers.

The current access negotiation process recognises NEMMCO's interests by requiring that:

- at the outset of the negotiation process, the NSP must seek information from NEMMCO as to the technical requirements concerned with power system security and reliability (the relevant mandatory, automatic and minimum access standards) and must then advise the connecting party of those requirements; and

- should the connecting party then wish to negotiate a particular standard between the automatic and minimum levels, the NSP must seek and accept the advice of NEMMCO in relation to whether the proposed performance standard is acceptable in terms of the power system security and reliability requirements.

The Commission understands that NEMMCO's experience has been that, having received NEMMCO's advice, the NSP and connecting party then proceed to negotiate and agree performance standards that are often not clear, able to be complied with or require acceptable levels of plant performance. However, under the current Rules, NEMMCO has no ability to reject the performance standards after the

[21] See NCC guidelines – *The National Access Regime: A Guide to Part IIIA of the Trade Practices Act* (Appendix 3).

connection agreement has been entered into. NEMMCO may then be placed in the position where it must operate the power system more conservatively, and therefore less efficiently, in order to ensure that the system is not put at risk. Poor quality standards also make it more difficult to monitor whether the connected party is complying with its performance obligations and to enforce actions for breach. The changes proposed by NEMMCO are designed to provide it with powers to ensure that an effective set of performance standards can be put in place to address those risks.

The Commission accepts NEMMCO's argument that elements of the way in which the existing access negotiation process in Chapter 5 of the Rules are expressed can result in inadequate performance standards. However, the Commission also accepts the views put in submissions that the solutions that NEMMCO proposes in order to address the issue would effectively make NEMMCO a third party to what is intended fundamentally to be a bilateral commercial negotiation process and also allow it to circumvent parts of that process should it so desire.

In the Commission's view, the underlying issue about NEMMCO's role is more effectively addressed by improving the wording concerning the current process to make it clearer where the relevant responsibilities lie. In particular, it must be made clear that any proposed negotiated performance standard, where it may impact on power system security or supply reliability, must only be accepted by the NSP on the advice of NEMMCO. The Commission has made the necessary changes in the draft Rule. The Commission has given NEMMCO the option to advise on all matters relating to its functions under the NEL. However, only the advice noted above relating to system security and supply reliability (and as it relates to the schedules in Chapter 5) will be binding on the NSP.

The Commission also notes that under proposed new clause 2.9.2(d), NEMMCO would have the power to impose terms and conditions on connection applicant participant registration in relation to ensuring power system security, reliability or quality of supply. The Commission understands that this addition was designed to operate such that any inadequacies in the performance standards that resulted from the access negotiation process could be addressed at registration. The Commission has not accepted this aspect of the proposal on the basis that the proposed clause would confer a very broad power to impose conditions on registration that go far beyond the scope of the current Rule proposal. The Commission is satisfied that the changes it has made to the access negotiation process made in the draft Rule discussed above adequately address the concern identified by NEMMCO.

For the same reasons outlined above, the Commission agrees with VENCorp's submission that existing paragraphs 5.2.2(c) and (d) should be retained. Those paragraphs are important in ensuring the central role of the connection agreement subject to any overriding power system security, supply reliability and quality of supply obligations on the parties to those agreements contained in the Rules.

The Commission is not accepting the changes proposed by NEMMCO to clause 5.3.1 which would have the effect of placing limits on the access regime in terms of voluntariness and who may seek access. The Commission is aware that there are ambiguities contained within the current Chapter 5 rules, but takes the view that these matters should be the subject of a separate and comprehensive review or Rule

proposal, and are not appropriately addressed in an ad hoc way in the context of NEMMCO's current proposal.

The Commission agrees with NEMMCO's proposal to delete existing clause 5.3.6(e). Doing so is consistent with the technical standards framework whereby room to negotiate is, where feasible, provided to account for differences in plant technology and location but subject to the requirement that access standards may not be negotiated below the minimum.

Finally, the Commission has moved proposed paragraph 5.3.2(e) to clause 5.3.4 to reflect the fact that the paragraph concerns information to be provided to the connection applicant at the application to connect stage, not the connection enquiry stage, of the negotiation process.

A number of other issues were raised in submissions and these are addressed below.

Table 4.3.1

Stakeholder	Clause	Issue	AEMC considerations
Vestas	2.9.2(a)(3)	Concern with NEMMCO's ability to assess whether participant "will continue to be able to comply"	Agree that requirement is unworkable. Words not included in draft Rule
Vestas	5.3.4A(a)	Words "adverse effect" appear to lack objectivity or level of materiality	These are the existing requirement and have not been amended
VENCorp	5.3.4A(a)	Add sub-paragraph (6) "for generating plant that was in service prior to 1988, a negotiated standard below the minimum access standard may be agreed, provided it is consistent with the design performance for such generating plant, and documented as agreed performance standards in the relevant Connection Agreement"	As indicated above, the NEMMCO/NGF Rule change proposal regarding the performance standards for existing plant is currently being assessed by the Commission. No amendment has been made to the draft Rule
Vestas	5.3.4A(d)	The timelines set out in this revised clause do not align with other clauses which require NEMMCO's adjudication.	These timelines reflect the existing process and are acceptable
VENCorp	5.3.7(a3)	Amend to recognise that NEMMCO doesn't need to "accept" standards relating to	This clause to be excluded from the draft Rule for the reasons

Stakeholder	Clause	Issue	AEMC considerations
		quality of supply as an NSP responsibility.	discussed further above
Auswind, NGF, REGA, Roaring 40s, VENCorp and Vestas	5.3.7A and 5.11.2(a)	Where NEMMCO have the words "copy of the proposed connection agreement" - this should be limited to the relevant technical and operational sections of the connection agreement.	These clauses to be excluded from the draft Rule for the reasons discussed further above
VENCorp	5.3.7A(d)	It is not considered appropriate that NEMMCO should be involved with quality of supply standards, as this is a TNSP area of responsibility, not NEMMCO's.	
NGF and REGA	5.11.2(a)	Replace words “up-to-date” with “current”	
Auswind, NGF, REGA and Vestas	5.4.2(a)	NEMMCO should also be required to negotiate in good faith	NEMMCO is not a formal party to the negotiations. Clause has therefore not been amended
Roaring 40s	5.7.3(a)	Add 'or generating system' where NEMMCO refer to "generating unit" as for wind farms some standards are only met at the connection point	Agreed and draft Rule amended
VENCorp	5.7.3(e)	The concluding paragraph the words be modified to read "…. Submits evidence reasonably satisfactory to NEMMCO and the relevant TNSP that the generating unit or generating system is complying…"	The clause concerns power system security and is therefore a NEMMCO issue. Change not agreed
Auswind and NGF	5.12(a)(3)	This should be assessed at the time of connection and not impose an ongoing requirement that may require plant upgrades in the future	This is an existing requirement. Clause is important to power system security and so obligation should be

Stakeholder	Clause	Issue	AEMC considerations
			continuous. Clause does not require plant upgrades. No change made in the draft Rule other than the clause remains in its original position as clause 4.15 for the reasons described above
Auswind, NGF, REGA and Vestas	5.12.(b)	Duplication with 5.7.3(b)	This refers to an existing requirement. Agree there appears to be an overlap. Propose not to remove but to address in Commission's broader technical standards review to be completed by 30 June 2008. As with the above, the clause remains as clause 4.15
Vestas	5.12.(b)	Requirement to institute and maintain compliance program may involve cost to generators	This is an existing requirement and central to the effectiveness of the compliance and enforcement regime. No change made in the draft Rule. As with the above, the clause remains as clause 4.15

Performance standards for modified plant

The Commission agrees that generators should be able to be refurbished in a way that ensures that any change to plant performance that impacts on power system security or supply reliability is addressed via revised performance standards but without the generators being required, as they currently are under the Rules, to revisit all of the performance standards by repeating the Chapter 5 access negotiation process in its entirety.

The Commission notes the concerns raised in submissions that the proposed changes would require that any proposed revised performance standards must not be lower than the applicable minimum access standards and that this could be used as a way of requiring plant performance to be upgraded over time. This raises an issue of intergenerational equity which is discussed in detail in the next section below. The Commission proposes to address this issue more comprehensively as part of its upcoming review into the scope and content of the technical standards. In the interim, the Commission notes that it is strictly for a generator to decide whether to

upgrade its plant. In doing so, the generator should be aware that there is a prospect that different performance standards may result from that decision. However, consistent with the technical standards framework outlined in Chapter 2 above, the Commission agrees that the current exception with respect to plant with grandfathered performance standards should be preserved where those standards lie below the minimum.

As discussed above, the Commission notes that the content of the grandfathered performance standards is currently being revisited under a joint NEMMCO and NGF process due to be completed by 30 June 2007. This raises the possibility that a generator owner may wish to modify its plant prior to the content of the grandfathered standards that currently apply to that plant being settled. The Commission considers that the timeframe associated with having that revision approved would be consistent with the NEMMCO and NGF timeframes and therefore is highly unlikely to present a practical issue.

The Commission also refers to the discussion above in relation to the changes proposed by NEMMCO concerning its role in approving performance standards for new plant. The Commission considers that the changes proposed in relation to approving revised performance standards for modified plant must likewise remain consistent with the allocation of responsibilities under the existing access negotiation model, namely, that the NSP retain the right to approve particular proposed standards but must follow the advice of NEMMCO in doing so.

The Commission therefore accepts NEMMCO's proposal to require that generators submit revised performance standards that relate to the modified aspects of the plant. This is subject to the exception in relation to grandfathered performance standards and changes made by the Commission in the draft Rule to ensure that NEMMCO's role in relation to the proposed revised performance standards remains to advise the NSP whether to accept or reject them.

A number of additional issues were raised in submissions. These are addressed in the Table below.

Table 4.3.2

Stakeholder	Clause	Issue	AEMC considerations
NGF	5.3.9	Generator to submit to the NSP and NEMMCO details of any prospective changes, rather than just those changes that in its opinion lead to a change in the performance standard.	The clause is adequately worded, as it only requires a submission only for those changes that will affect the performance of the generating system.
NGF	5.3.9(c)	The table is not necessarily accurate. Modifications may be made to equipment (eg rewinding a machine or changing an AVR) without changing its performance. Statements on design or test data	The requirements are appropriate

Stakeholder	Clause	Issue	AEMC considerations
		should satisfy and a submission under 5.3.9(b)(4) should not be required.	
Vestas	5.3.9(e)	The clause is open-ended and contractually infers unlimited liability	The clause as written is acceptable as it deals with reasonable costs of NEMMCO and other NSPs.
Hydro Tasmania	5.7.6	The clause lacks incentives on NEMMCO and TNSPs to limit the cost of generating tests	The provisions of clause 5.7.6 contain a number of requirements that should have the effect of preventing unreasonable testing
Roaring 40s	5.7.6(a1)	Words such as "NEMMCO reasonably considers" are too vague.	Unworkable to specify options in detail. The phrase is acceptable
Roaring 40s	5.7.6(a1)	Amend clause to refer to 'generating system'	The words as they are currently written are appropriate.
Roaring 40s	5.7.6(a1)	Performance standards should be defined at the connection point of the to the power system	Defining by connection point not applicable to clause 5.7.6(a1).
Auswind, NGF, REGA, Roaring 40s and Vestas	5.7.6(h)	should require that the cost of tests required by NEMMCO under clause 5.7.6(a1) should be able to be recovered from NEMMCO.	Previously the clause required generators to bear their own costs of tests. It has been extended to include NEMMCO and NSPs. Proposed clause to remain.

Upgrading performance standards when technical standards change

NEMMCO's proposed new clause 5.10.2 provides that, where a technical standard changes or a new technical standard is introduced, the relevant connected party must submit to NEMMCO a proposed performance standard in respect of the altered or new technical standard.

The issue raised is one of intergenerational equity, namely, the complementary concerns that:

- incumbent plant owners may gain a competitive advantage if new plant is required to meet higher standards when connecting at a later point in time; and

- incumbent plant may be placed at a disadvantage if required to retrofit to meet new higher standards as this may involve a greater cost than building new plant to meet those standards.

This issue was discussed by NECA in its December 2001 report on the technical standards framework[22]. It proposed as follows:

> - a facility that has been allowed to connect based on access standards at the time, including any allowed variations below that standard, not be required to upgrade to meet new standards except in exceptional circumstances; and
>
> - standards for new plant should not be set at a level to compensate for any shortcomings of existing plant.
>
> If participants wish to modify their plant to the extent that it would require a change to their connection agreement, then the same provisions would apply to them as to a new connection applicant and they would need to comply with the standards existing at the time. Under extreme circumstances, where the performance of a plant to its existing registered performance standards was causing material harm to the power system or substantial risks to security, there are arrangements proposed that would allow NEMMCO to order a plant upgrade. Any decision to require an upgrade would be subject to restrictions and to review.

The current Rules do not reflect NECA's proposals. Rather, once performance standards have been agreed, they remain in force until renegotiated. Were the performance of a connected party to become inadequate relative to the evolving needs of the system over time, NEMMCO would presumably be required to direct that participant under its powers set out in clause 4.8.9 of the Rules in order to maintain power system security and reliability. That power concerns operational directions only and anything more than an infrequent use of those powers would be problematic from the perspectives of power system operation, compliance and enforcement.

It is important to note that the power system is expected to evolve over time as the nature and patterns of both demand and supply change. It is essential that both the technical and performance standards are able to evolve to meet those changes in a way that balances the need for investment certainty with the fundamental concern to ensure power system security, reliability and quality of supply. The Commission considers that, in principle, the technical standards framework should operate to minimise intergenerational inequities in the same way that it attempts to minimise technological or geographical inequities, subject to meeting those fundamental objectives.

The Commission notes that NEMMCO's proposal is an attempt to address this difficult issue. The amendments would constitute a major change to the existing

[22] Op cit, footnote 6, p 16.

arrangements. The Commission further notes that NEMMCO provided no explicit rationale for the changes in its proposal. During discussions with the Commission, NEMMCO submitted that the changes were intended only to require the documentation of existing performance against a new or altered technical standard, not a formal revision of the relevant performance standards themselves. This does not reflect the proposed clause as drafted. Further, the Commission is concerned that the outcome would be the same, namely, that there would be an expectation of performance referenced to a new or altered technical standard that had not been agreed between the parties. Finally, the Commission notes that NEMMCO did not provide evidence as to how the changes may impact on connected parties and network customers sufficient to demonstrate that there would be likely to be a net benefit to consumers resulting from their adoption.

The Commission has determined not to accept the amendments but notes that, as indicated in Chapter 2, it has recommended as part of its report to the MCE on the enforcement and compliance with technical standards that the Commission conduct a review prior to 2008 concerning the scope of the technical standards. The Commission intends to fully address the issue of intergenerational equity as part of that review including, in particular, the way in which the technical and performance standards evolve and interact over time.

4.4 Summary of differences between NEMMCO's proposed Rule and the draft Rule

This section briefly identifies and the modifications and enhancements that the Commission has made to the Rule proposed by NEMMCO. This section is not meant to be exhaustive. The Commission has redrafted various provisions of the NEMMCO proposed Rule to ease understanding of the Rules that are highly technical and complex. In particular, the Commission has included subheadings in Schedule 5.2 to separate automatic, minimum, negotiated and general access standards. The Commission has also taken the opportunity where appropriate to renumber clauses to improve readability of the Rules. A concordance has been attached to this draft determination to assist readers to relate the clause references in the draft Rule with those contained in NEMMCO's proposal.

The Commission invites comment from interested parties on any further drafting changes that it considers would improve the drafting of the Rules in relation to the issues addressed in this draft Rule determination.

The Commission has removed all references to NEMMCO's proposed clauses 5.3.7A, 5.10, 5.11 and 5.12 in light of the Commission's decision not to proceed with this part of NEMMCO's proposal.

Clause 2.9.2(b): The Commission has modified the requirement that NEMMCO must be satisfied that a person intending to become a registered person will comply with the Rules. Instead, NEMMCO must be satisfied that the applicant has demonstrated a commitment to comply with the Rules.

Clause 3.13.3: The Commission has redrafted this clause given its length. The Commission has modified NEMMCO's proposal in relation to the information that NEMMCO can provide Registered Participants and other third parties so that the

information that can be provided by NEMMCO will information that is in a non-confidential form provided by the generator.

Clause 5.3.1: The Commission has adopted NEMMCO's proposed changes to this clause with a slight modification. The Commission has retained NEMMCO's objective of this clause but retained voluntary compliance for non Registered Participants.

Clause 5.3.4: Although NEMMCO proposed no changes to this clause, the Commission has included a paragraph that NEMMCO proposed to include in clause 5.3.2 relating to the connection enquiry regarding other projects that could affect a connection applicant. The Commission considers that the proposed paragraph relates more to the connection application and therefore is more appropriately located in this clause.

Clause 5.3.4A: The Commission has modified this clause as it considers that the appropriate role of NEMMCO in relation to access standards is an advisory role. The Commission considers that NEMMCO being able to advise on all matters relating to its functions under the NEL will ensure NEMMCO provides the necessary advice in the negotiations of negotiated access standards. The Commission considers that requiring the NSP to accept NEMMCO's advice in particular circumstances relating to system security and reliability more accurately reflects NEMMCO's role in relation to the connection agreement.

Clause 5.3.8: The Commission has adopted NEMMCO's proposed Rule with a modification. The modification relates to information the NSP may provide to a connection applicant as the Commission considers that the information that should be provided should be non confidential in nature. The Commission also considers that information that can be provided to third parties under rule 5.3 should be in aggregate form.

Clause S5.2.4: The Commission adopted NEMMCO's proposed information requirements in this clause. However, given that this clause as proposed by NEMMCO is referenced throughout the proposed Rule in relation to information that can be disclosed, the Commission has included an additional paragraph that requires the person providing the information to also provide a non confidential version to the recipient. This non confidential version is then the version that NEMMCO and the NSP can release to other parties under clauses 3.13.3 and 5.3.4.

Clause S5.2.5.3: This clause relates to the generating unit response to frequency disturbances and includes new defined terms suggested by NEMMCO in its submission to its proposed Rule. The diagrams in this clause have also been included as notes to the clause.

Clause S5.2.5.6: This clause is a new clause that the Commission has included in accordance with a submission by VENCorp. It relates to the quality of electricity generated and continuous uninterrupted operation.

Clause S5.2.5.7: This clause is the existing clause S5.2.5.4 relating to partial load rejection. NEMMCO proposed to delete this clause, however, the Commission is of the view that the clause still serves a purpose under the Draft Rule. The Commission

has made one modification to the clause relating to the meaning of minimum load as it cross references schedule 5.5.1 which has been deleted in the Draft Rule.

Clause S5.5.7: The Commission has adopted NEMMCO's proposal to develop data sheets and guidelines in accordance with the Rules consultation procedures. The Commission has enhanced this clause to include a regime for NEMMCO to make amendments to the data sheets and guidelines in accordance with the Rules consultation procedures. Any person can request a change to NEMMCO and NEMMCO does not have to conduct the Rules consultation procedures for changes that are minor or administrative in nature. Provisions proposed by NEMMCO related to deeming the first sheets and guidelines compliant with the Rules consultation procedures have been moved to the savings and transitional rules. Similarly, provisions exempting NEMMCO from the requirement from conducting the Rules consultation procedures if the sheets are substantially similar to S5.5.1 and S5.5.2 have also been relocated in the savings and transitional section.

Clause 8.6.2: This clause has been slightly modified from NEMMCO's proposed Rule to exclude certain information that can be provided to a connection applicant. This information relates to the confidential information provided by the generator under S5.2.4 to NEMMCO. The Commission accepts that certain information is needed for modelling objectives but considers the information in S5.2.4(a) and (b)(4) to be commercially sensitive and should not be released.

Definition of "considered project": The Commission has made minor enhancements to this clause to ensure the clause is consistent with requirements in the Draft Rule in relation to considered projects particularly in relation to clause 5.3.4.

Definition of "performance standard": The Commission has not adopted NEMMCO's proposed definition given the performance standards regime has not been amended in accordance with NEMMCO's proposal.

Use of the definition of "generating system": Consistent with the Commission's decision in this draft Rule determination, the Commission has substituted the term "generating system" for "generating unit" in relation to certain standards in schedule 5.2 and relevant provisions in the draft Rule.

Clause 11.5.1: This clause includes certain defined terms for the purposes of the savings and transitional rules.

Clause 11.5.2: This clause intends to ensure that any application for registration that is currently being considered at the time this Rule is made is not required to comply with the additional information requirements of this Rule.

Clause 11.5.3: This clause intends to ensure that any access standards that applied to generating units and generating systems under the existing rules continues to apply to those systems and units as if the new Rule had not been made.

Clause 11.5.4: This clause deals with transitional arrangements for generators who have proposed to modify plant and are currently negotiating the access standards. This clause preserves those negotiations as if this Rule had not been made.

Clause 11.5.5: This relates to transitional issues arising from NEMMCO commencing consultation on the data sheets and guidelines prior to the Rule commencing operation. This clause ensures that any action taken by NEMMCO in this regard is to be taken to be the equivalent action under the Rules. It also exempts NEMMCO from the Rules consultation procedures if it develops the data sheets to be substantially similar to schedules 5.5.1 and 5.5.2 (that were in force before this Rule).

A number of minor wording changes and corrections of errors suggested by NEMMCO have also been incorporated into the draft Rule.

4.5 Savings and transitional provisions and other consequential issues

The Commission is aware that the amendments to the Rules by this Rule require transitional arrangements to take into account those generating systems and units that developed their standards in accordance with the current Rules. Accordingly, the Commission has included in this Draft Rule (in rule 11.5) savings and transitional provisions to ensure that any generating system or generating unit that met an access standard under the existing Rules continues to apply that access standard.

In relation to performance standards still being negotiated at the commencement of this Rule, the Commission has also provided that those standards can continue to be negotiated as if the amending Rule had not commenced. However, they may be negotiated under the new Rules if the relevant NSP and generator agree.

The Commission also notes that as a result of the above savings and transitional arrangements, generating systems and units that complied with existing access standards will not be affected by the Commission's amendment in the Draft Rule that certain access standards are only required to be met by the generating system as opposed to each generating unit. The Commission invites comment on whether existing generating systems and units should be able to meet the new broader requirement placed on generating systems and how this could be implemented in the savings and transitional regime for this Rule.

The Commission has also taken into account that the amendments to clause 2.9.2 in this Draft Rule will have an effect on applicants for registration as the new clause 2.9.2 may place additional information responsibilities on an applicant. The Commission has therefore included a provision that any application that is currently being considered and is yet to be registered by NEMMCO will not be required to comply with the new information requirements. However, such applicant will be deemed to have satisfied the requirements of the Rules.

The Commission has also included aspects of NEMMCO's proposed Rule in this section of the Draft Rule as it more appropriately relates to transitional arrangements. NEMMCO proposed that any action taken by NEMMCO in relation to the Generating System Design Data Sheet, Generating System Setting Data Sheet or the Generating System Model Guidelines for the purposes of the new requirements in relation to these sheets and guidelines is taken to comply with the equivalent actions under the Rules. The Commission has also included a provision that in the event that the first Generating Design Data Sheet and the Generating System Setting Data Sheet are substantially similar to schedules 5.5.1 and 5.5.2 of the Rules as in

force prior to this Rule commencing operation, NEMMCO is not required to conduct the Rules consultation procedures as required under the new Rules.

The Commission invites comment on any other savings and transitional arrangements that are required as a result of this Draft Rule.

The Commission notes that as a result of amendments to schedule 5.2, derogations in the Rules may be affected. The Commission has identified some consequential changes required. These changes are primarily a result of the renumbering of provisions and not substantive in nature. However, the Commission notes that Schedule 9A3(11) relates to a derogation for to specific generating units belonging to Southern Hydro Ltd and located in Victoria in respect of the requirements to do with asynchronous operation under clause S5.2.5.10 of Schedule 5.2. Clause S5.2.5.10 has been deleted in accordance with NEMMCO's proposal in the Draft Rule and a new clause relating to protections to trip plant for unstable operation.

The Commission has not made amendments to this derogation in the Draft Rule and the Commission seeks comments from Victoria, as the relevant jurisdiction, and Southern Hydro Ltd has to appropriate method of amending this derogation to still capture the substance of the derogation in light of the new clause S5.2.5.10.

5 Assessment of the draft Rule — the Rule making test and the NEM objective

5.1 Factors that the Commission may consider in interpreting the NEM Objective

Under s.88 of the NEL, the Commission may only make a Rule if:

> "It is satisfied that the Rule will or is likely to contribute to the achievement of the national electricity market objective."

The NEM objective, as set out in s.7 of the NEL, is to:

> "Promote efficient investment in, and efficient use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system."

In Section 4 of this determination, the Commission considered the likely advantages and disadvantages of the proposal in contributing to more economically efficient operation and performance of the NEM based on the analysis and the quantitative modelling the Commission has undertaken. This Section presents the main conclusions of that analysis and provides the Commission's assessment of the extent to which NEMMCO's proposal promotes the NEM objective and satisfies the Rule making test.

5.2 Assessment of the proposal against the NEM objective

On the basis of its analysis, the Commission has decided to approve, subject to a number of amendments, the majority of the changes requested in the Rule proposal. For the reasons given below the Commission is satisfied that the proposal as amended will promote improvements in competition and efficiency in the NEM compared to maintaining the status quo. That is, the proposal will be in the long term interests of consumers of electricity services.

The Commission's considerations with respect to the NEM objective in relation to each of the three main areas of NEMMCO's proposal are discussed below.

Technical standards

Efficient investment in electricity

The Commission notes that the changes to the technical standards are likely to generate a number of benefits to investors in the NEM, namely:

- more transparency in the processes by which performance standards are settled as part of the access negotiation process;
- more certainty in the processes for managing the impact of generating units on the national electricity system and therefore reducing the risk of being constrained off or directed by the NSP or NEMMCO in day to day operations;

- in meeting the technical requirements, being able to use alternative, potentially less expensive, solutions to those currently permitted; and

- potentially removing the need for more restrictive jurisdictionally-imposed requirements, moratoriums or limits on the amount of intermittent generation on the market (for example, the Essential Services Commission of South Australia (ESCOSA's) current licensing requirements).

Under the current NEM arrangements, a significant increase in the number of alternative energy sources such as wind generation would see network capability steadily degrade. At some point, it would become necessary to augment the network so that reliability and security of supply and the level of competition in the NEM could be maintained. The proposed Rule would benefit network users by maintaining the capability of the network, potentially deferring network augmentations that would otherwise be needed.

The Commission notes that the technical standards proposed to be imposed on asynchronous generation are likely to require additional control, monitoring and communications equipment that is likely to increase the cost of building wind farms. As noted by NEMMCO in its proposal, the most significant costs are expected to be in the areas of fault ride through capability, voltage control and reactive power capability and communications facilities for the provision of real-time data to NSP and NEMMCO's control centres. The changes may also have a cost impact on generators constructed with other technologies although this appears unlikely to be to the same degree as with wind farms. The proposal provided a high level indication of the potential costs in relation to one aspect (reactive power capability) of the proposed changes.

The Commission is concerned that, given the breadth and probable impact of the proposed changes, NEMMCO did not provide more detailed information as to the likely cost implications on investors as part of its proposal. The Commission also notes that comments made in submissions in relation to costs were qualitative rather than quantitative. While the Commission is satisfied that, on balance, the overall benefits of the proposal are likely to exceed the costs, including those to investors, it invites stakeholders to provide further information in this regard as part of their submissions on this draft determination and draft Rule.

Efficient use of electricity

Making the technical standards more technology-neutral encourages lower cost forms of generation to enter the market and to displace higher cost forms of generation in meeting the demands of customers for electricity. This is provided that the minimum requirements for those lower cost technologies are not excessive and that the system impact that such generation causes does not impose higher costs on other market participants. The Commission is satisfied that the technical standards proposed, including the mechanisms for addressing the risks to power system security, supply reliability and local quality of supply are likely to result in a net lower cost outcome for electricity consumers.

Provision of information

Efficient investment in electricity

The proposals on provision of information will require manufacturers of all types of generating technology to develop and provide dynamic models of their plant. The Commission understands that the cost of doing so is not expected to be significant and will reduce as experience is gained with the development of the models. The new requirements for testing arising from those models will impose costs on new developments. However, as noted below, the reduction to the system risk profile that results from those tests is likely to be greater as the tests will be based on more accurate information.

Investors in wind farms will benefit from the changes by being able to optimise the cost of meeting the technical requirements through having access to current and accurate models of plant connected to the power system. Similarly, by making information available on proposed considered projects, investors will not need to make onerous assumptions about the interaction of their projects and other concurrently proposed projects.

The Commission notes that the exact size of the net benefits depends upon NEMMCO and stakeholders being able to reach effective outcomes concerning the detailed content of the information requirements and the degree to which the non-confidential versions of that material contain information suitable to address the needs of relevant third parties. The process to be used should provide a means of ensuring that the detailed information requirements are not excessive and the amendments to the proposal in the draft Rule should ensure that investors do not face increased costs in protecting commercially sensitive information.

Efficient use of electricity

The benefits of the proposed Rules concerning provision and disclosure of information arising from maintaining the capability of the existing network by reducing the reliance on operating margins on the network to ensure power system security, reliability and quality of supply. These benefits are similar in nature to those discussed above in relation to the proposed technical standards.

Access negotiation and compliance

Efficient investment in electricity

Including reliability of supply considerations in access negotiations can be expected to increase the cost of a proportion of new generation projects that might be required to modify a proposed connection or accept the prospect of being constrained off. However, when this is balanced against the benefit in reliability of supply to electricity consumers, the Commission is satisfied that there are likely to be overall benefits to the proposed solution.

The clarification and improvements to the process of negotiating access are likely to result in more consistent and less costly negotiations. This should ultimately lead to reduced costs being passed through to consumers. The Commission has not accepted the proposed changes in relation to the process for determining performance standards for existing plant on the basis that, as the changes propose to reinstate a

previous process already known to be flawed, they would not contribute to the NEM objective.

Efficient use of electricity

The proposed changes to the access negotiation arrangements will improve the quality and accuracy of the resulting negotiated performance standards. This is likely to lead to the more effective and efficient management of power system security, reliability and local quality of supply as those bodies responsible for operation of the system (NEMMCO and the NSPs) and the organisation responsible for monitoring compliance and enforcement of the technical standards (the AER) will have more accurate and up-to-date information on plant performance.

Appendix 1 Draft Rule

See separate attached draft Rule.

Appendix 2 Concordance

Draft Rule	Current clause reference	NEMMCO's proposed clause reference
2.2.1(e)	2.2.1(e)	2.2.1(e)
2.9.2(a)	2.9.2(a)	2.9.2(a)
2.9.2(b)	2.9.2(b)	2.9.2(b)
2.9.2(c)	2.9.2(c)	2.9.2(d)
3.13.3(k)	3.13.3(k)	3.13.3(k)
N/A	N/A	3.13.3(k2)(k3)
3.13(m)	N/A	3.13.3(k1)
3.13.B(n)	3.13.3(l)	N/A
3.13.3(l) - new	N/A	N/A
3.13.3(o)	3.13.3(o)	N/A
3.13.3(n)	3.13.3(p)	N/A
3.13.3(q)	3.13.3(q)	N/A
3.13.3(r)	3.13.3(o)	N/A
3.13.3(s)	3.13.3(o1)	N/A
3.13.3(t)	3.13.3(o2)	N/A
3.13.3(u)	3.13.3(p)	N/A
4.9.2(a)	4.9.2(a)	N/A
4.9.2(b)	4.9.2(b)	4.9.2(b)
4.9.2(c)	4.9.2(b1)	4.9.2(b1)
4.9.2(d)	4.9.2(c)	N/A
5.1.2(a)	5.1.2(a)	5.1.2(a)

Draft Rule	Current clause reference	NEMMCO's proposed clause reference
5.1.3(a)	5.1.3(a)	N/A
5.1.3(b)	5.1.3(b)	N/A
5.1.3(c)	5.1.3(b1)	N/A
5.1.3(d)	5.1.3(b2)	5.1.3(b2)
5.1.3(e)	5.1.3(c)	N/A
5.1.3(f)	5.1.3(d)	N/A
5.2.2(b)	5.2.2(b)	5.2.2(b)
5.2.5(a)	5.2.5(a)	5.2.5(a)
5.2.5(b)(1) & (2)	5.2.5(b)(1) & (2)	5.2.5(b)(1) & (2)
5.2.5(6)	5.2.5(7)	N/A
5.3.1(a)	5.3.1(b)	5.3.1(b)
5.3.1(b)	5.3.1(a)	5.3.1(a)
5.3.1(d)	N/A	5.3.1(c)
5.3.1(c)	N/A	5.3.1(a)
5.3.2(a)	5.3.2(a)	5.3.2(a)
5.3.2(b)	5.3.2(a1)	N/A
5.3.2(c)	5.3.2(b)	N/A
5.3.2(d)	5.3.2(b)	N/A
5.3.2(e)	5.3.2(c)	N/A
5.3.2(f)	5.3.2(d)	N/A
5.3.4(g)	N/A	5.3.2(e)
5.3.4A(a)	N/A	N/A

Draft Rule	Current clause reference	NEMMCO's proposed clause reference
5.3.4(b)	5.3.4(a)	5.3.4(a)
5.3.4(c)	5.3.4(b)	5.3.4(b)
5.3.4(d)	New	5.3.4(c)
5.3.4(e)	5.3.4(c)	5.3.4(d)
5.3.4(f)	5.3.4(d)	5.3.4(d)
5.3.4(g)	5.3.4(e)	N/A
5.3.4(h)	5.3.4(f)	N/A
5.3.4(i)	5.3.4(g)	N/A
5.3.5(a)	5.3.5(a)	5.3.5(a)
5.3.5(d1)	5.3.5(d1)	5.3.5(d1)
5.3.5(e)	5.3.5(f)	N/A
5.3.5(f)	5.3.5(f)	N/A
5.3.5(g)	5.3.5(h)	N/A
deleted	5.3.5(g)	deleted
5.3.7(a)	5.3.7(a)	5.3.7(a)
5.3.7(b)	N/A	5.3.7(d)
5.3.7(c)	N/A	5.3.7(a2)
N/A	N/A	5.3.7(a3)
5.3.7(d)	5.3.7(b)	N/A
5.3.7(e)	5.3.7(c)	N/A
5.3.7(f)	5.3.7(d)	N/A
5.3.7(f)	5.3.7(e)	N/A

Draft Rule	Current clause reference	NEMMCO's proposed clause reference
5.3.7(g)	5.3.7(f)	N/A
5.3.8(a)	5.3.8(a)	5.3.8(a)
5.3.8(b)	N/A	5.3.8(a1)
5.3.8(c)	N/A	5.3.8(a2)
5.3.8(d)	N/A	5.3.8(a3)
5.3.8(e)	5.3.8(b)	5.3.8(b)
5.3.8(f)	5.3.8(c)	N/A
5.3.8(g)	5.3.8(d)	N/A
5.3.9(a)	N/A	5.3.9(a)
5.3.9(b)	N/A	5.3.9(b)
5.3.9(c)	N/A	5.3.9(c)
5.3.9(d)	N/A	5.3.9(c)
5.3.9(e)	N/A	5.3.9(e)
5.3.9(f)	N/A	5.3.9(e)
5.3.9(g)	N/A	5.3.9(e)
5.3.9(h)	N/A	5.3.9(f)
5.3.10(a)	N/A	5.3.10(a)
5.3.10(b)	N/A	5.3.10(a)
5.7.6(a)	5.7.6(a)	5.7.6(a)
5.7.6(b)	N/A	5.7.6(a1)
5.7.6(c)	5.7.6(b)	N/A
5.7.6(d)	5.7.6(c)	N/A

Draft Rule	Current clause reference	NEMMCO's proposed clause reference
5.7.6(e)	5.7.6(d)	N/A
5.7.6(f)	5.7.6(e)	N/A
5.7.6(g)	5.7.6(f)	N/A
5.7.6(h)	5.7.6(g)	N/A
5.7.6(i)	5.7.6(h)	N/A
S5.2.1(a)	S5.2.1(a)	S5.2.1(a)
S5.2.1(b)	S5.2.1(b)	N/A
S5.2.1(c)	S5.2.1(a1)	N/A
S5.2.1(d)	S5.2.1(a2)	N/A
S5.2.1(e)	S5.2.1(c)	N/A
S5.2.1(f)	S5.2.1(d)	deleted
S5.2.3(a)	N/A	S5.2.3(a)
S5.2.3(b)	N/A	S5.2.3(b)
S5.2.4(a)	S5.2.4(a)	S5.2.4(a)
S5.2.4(b)	S5.2.4(b)	S5.2.4(b)
S5.2.4(c)	S5.2.4(b)	S5.2.4(b1)
S5.2.4(d)	N/A	S5.2.4(b2)
S5.2.4(e)	S5.2.4(c)	S5.2.4(c)
S5.2.4(f)	N/A	S5.2.4(d)
S5.2.4(g)	N/A	N/A
S5.2.5.1	S5.2.5.1	S5.2.5.1
S5.2.5.2	S5.2.5.2	S5.2.5.1

Draft Rule	Current clause reference	NEMMCO's proposed clause reference
S5.2.5.3	S5.2.5.3	S5.2.5.3A
S5.2.5.4	N/A	S5.2.5.3B
S5.2.5.5	N/A	S5.2.5.3C
S5.2.5.6	N/A	N/A
S5.2.5.7	S5.2.5.4	deleted
S5.2.5.8	S5.2.5.8	S5.2.5.8
S5.2.5.9	S5.2.5.9	S5.2.5.9
S5.2.5.10	deleted	S5.2.5.10 (new)
S5.2.5.11	S5.2.5.11	S5.2.5.11
S5.2.5.12	N/A	S5.2.5.12 (new)
S5.2.5.13	S5.2.5.13	S5.2.5.13
S5.2.5.14	N/A	S5.2.5.14
S5.2.6.1	S5.2.6.1	S5.2.6.1
S5.2.6.2	S5.2.6.3	S5.2.6.3
S5.2.7	S5.2.8	S5.2.8
S5.2.8	S5.2.9	S5.2.9