CHAPTER 5

5. Network Connection

5.1 Statement of Purpose

5.1.1 [Deleted]

5.1.2 Purpose

(a) This Chapter*:*

(1) provides the framework for *connection* to a *transmission network* or a *distribution network* and access to the *networks* forming part of the *national grid*; and

(2) has the following purposes:

(i) to detail the principles and guidelines governing *connection* and access to a *network*;

(ii) to establish the process to be followed by a *Registered Participant* to establish or modify a *connection* to a *network*;

(iii) to address a *Connection Applicant's* reasonable expectations of the level and standard of *power transfer capability* that the relevant *network* should provide; and

(iv) to establish processes to ensure ongoing compliance with the technical requirements of this Chapter to facilitate management of the *national grid*.

(b) Any person who is not a *Registered Participant* may agree with a *Network Service Provider* to comply with this Chapter as part of a *connection agreement*.

(c) Nothing in the *Rules* is to be read or construed as preventing any person from constructing any *network* or *connection assets*.

5.1.3 Principles

This Chapter is based on the following principles relating to *connection* to the *national grid*:

(a) All *Registered Participants* should have the opportunity to form a *connection* to a *network* and have access to the *network services* provided by the *networks* forming part of the *national grid*.

(b) The terms and conditions on which *connection* to a *network* and provision of *network service* is to be granted are to be set out in commercial agreements on reasonable terms entered into between a *Network Service Provider* and other *Registered Participants*.

(b1) The technical terms and conditions of *connection agreements* regarding standards of performance must be established at levels at or above the *minimum access standards* set out in schedules 5.1, 5.2, 5.3 and 5.3a, with the objective of ensuring that the *power system* operates securely and reliably and in accordance with the *system standards* set out in schedule 5.1a.

(b2) A *Registered Participant* may request *connection* of a *facility* at a standard below an *automatic access standard* if the *connection* does not adversely affect other *Registered Participants*.

(c) In some jurisdictions separate agreements may be required for *connection services* and *use of system services*.

(d) The operation of the *Rules* should result in the achievement of:

(i) long term benefits to *Registered Participants* in terms of costs and *reliability* of the *national grid*; and

(ii) open communication and information flows between *Registered Participants* themselves, and between *Registered Participants* and *NEMMCO*, relating to *connections* while ensuring the security of *confidential information* belonging to competitors in the *market*.

5.2 Obligations

5.2.1 Obligations of Registered Participants

(a) All *Registered Participants* must maintain and operate (or ensure their authorised *representatives* maintain and operate) all equipment that is part of their *facilities* in accordance with:

(1) relevant laws;

(2) the requirements of the Rules; and

(3) *good electricity industry practice* and applicable *Australian Standards*.

(b) All *Registered Participants* must ensure that the *connection agreements* to which they are a party require the provision and maintenance of all required *facilities* consistent with *good electricity industry practice* and must operate their equipment in a manner:

(1) to assist in preventing or controlling instability within the *power system*;

(2) comply with the minimum standards *published* pursuant to clause 3.11.4(c);

(3) to assist in the maintenance of, or restoration to, a *satisfactory operating state* of the *power system*; and

(4) to prevent uncontrolled separation of the *power system* into isolated *regions* or partly combined *regions*, *intra-regional transmission* break-up, or *cascading outages*, following any *power system* incident.

5.2.2 Connection agreements

(a) If requested to do so by a *Network User*, *NEMMCO* or the *AER*, a *Network Service Provider* and a *Network User* must document the terms of any *network connection* arrangements made prior to 13 December 1998 and the resulting document will then be deemed to be a *connection agreement* for the purposes of the *Rules*.

(b) The *Rules* apply to:

(1) all *connection agreements* made after 13 December 1998;

(2) all deemed *connection agreements* created pursuant to clause 5.2.2(a); and

(3) all requests to establish *connection* or modify an existing *connection* after 13 December 1998.

(c) This Chapter is neither intended to have, nor is it to be read or construed as having, the effect of:

(1) altering any of the terms of a *connection agreement*; or

(2) altering the contractual rights or obligations of any of the parties under the *connection agreement* as between those parties; or

(3) relieving the parties under any such *connection agreement* of their contractual obligations under such an *agreement*.

(d) Notwithstanding the provisions of clause 5.2.2(c), if any obligation imposed or right conferred on a *Registered Participant* by this Chapter is inconsistent with the terms of a *connection agreement* to which the *Rules* apply and the application of the inconsistent terms of the *connection agreement* would adversely affect the quality or security of *network service* to other *Network Users*, the parties to the *connection agreement* must observe the provisions

of this Chapter as if they prevail over the *connection agreement* to the extent of the inconsistency.

5.2.3 Obligations of network service providers

(a) To be registered by *NEMMCO* as a *Network Service Provider*, a person must satisfy the relevant requirements specified in Chapter 2 and submit an application to *NEMMCO* in such form as *NEMMCO* may require.

(a1) **[Deleted]**

(a2) **[Deleted]**

(b) A *Network Service Provider* must comply with the *power system* performance and quality of *supply* standards:

(1) described in schedule 5.1;

(2) in accordance with any *connection agreement* with a *Registered Participant*,

and if there is an inconsistency between schedule 5.1 and such a *connection agreement*:

(3) if compliance with the relevant provision of the *connection agreement* would adversely affect the quality or security of *network service* to other *Network Users*, schedule 5.1 is to prevail;

(4) otherwise the *connection agreement* is to prevail.

(c) Where the provisions of the *connection agreement* vary the technical requirements set out in the schedules to this Chapter, the relevant *Network Service Provider* must report on such variations to *NEMMCO* on an annual basis. *NEMMCO* must allow access to such information to all other *Network Service Providers* and the *Network Service Providers* must keep such information confidential.

(d) A *Network Service Provider* must:

(1) review and process *applications to connect* or modify a *connection* which are submitted to it and must enter into a *connection agreement* with each *Registered Participant* and any other person to which it has provided a *connection* in accordance with clause 5.3 to the extent that the *connection point* relates to its part of the *national grid*;

(1A) co-operate with any other *Network Service Provider* who is processing a *connection* enquiry or *application to connect* to allow that *connection* enquiry or *application to connect* to be processed expeditiously and in accordance with clause 5.3;

(2) ensure that, to the extent that a *connection point* relates to its part of the *national grid*, every arrangement for *connection* with a *Registered Participant* or any other arrangement involving a *connection agreement* with that *Network Service Provider* complies with all relevant provisions of the *Rules*;

(3) co-ordinate the design aspects of equipment proposed to be *connected* to its *networks* with those of other *Network Service Providers* in accordance with clause 5.4 in order to seek to achieve *power system* performance requirements in accordance with schedule 5.1;

(4) together with other *Network Service Providers*, arrange for and participate in planning and development of their *networks* and *connection points* on or with those *networks* in accordance with clause 5.6;

(5) permit and participate in inspection and testing of *facilities* and equipment in accordance with clause 5.7;

(6) permit and participate in commissioning of *facilities* and equipment which are to be *connected* to its *network* in accordance with clause 5.8;

(7) advise a *Registered Participant* or other person with whom there is a *connection agreement* upon request of any expected interruption characteristics at a *connection point* on or with its *network* so that the *Registered Participant* or other person may make alternative arrangements for *supply* during such interruptions, including negotiating for an alternative or backup *connection*;

(8) use its reasonable endeavours to ensure that modelling data used for planning, design and operational purposes is complete and accurate and order tests in accordance with clause 5.7 where there are reasonable grounds to question the validity of data;

(9) provide to *NEMMCO* and other *Network Service Providers* all data available to it and reasonably required for modelling the static and *dynamic performance* of the *power system*;

(10) forward to *NEMMCO* and other *Network Service Providers* subsequent updates of the data referred to in clause 5.2.3(d)(9) and, to the best of its ability and knowledge, ensure that all data used for the purposes referred to in clause 5.3 is consistent with data used for such purposes by other *Network Service Providers*;

(11) provide to *NEMMCO* the information required from *Generators* under schedule 5.2 and from *Customers* under schedule 5.3 and from *Market Network Service Providers* under schedule 5.3a in relation to a

connection agreement and details of any *connection points* with other *Network Service Providers*; and

(12) where *network augmentations*, setting changes or other technical issues arise which could impact across *regional* boundaries, provide *NEMMCO* with a written report on the impact and its effects.

(e) A *Network Service Provider* must arrange for operation of that part of the *national grid* over which it has control in accordance with instructions given by *NEMMCO*.

(e1) A *Network Service Provider* must, except in so far as its *market network services* and parts of its *network* which are used solely for the provision of *market network services* are concerned, arrange for:

(1) management, maintenance and operation of its part of the *national grid* such that, in the *satisfactory operating state*, electricity may be transferred continuously at a *connection point* on or with its *network* up to the *agreed capability*;

(2) operation of its *network* such that the fault level at any *connection point* on or with that *network* does not exceed the limits that have been specified in a *connection agreement*;

(3) management, maintenance and operation of its *network* to minimise the number of interruptions to *agreed capability* at a *connection point* on or with that *network* by using *good electricity industry practice*; and

(4) restoration of the *agreed capability* at a *connection point* on or with that *network* as soon as reasonably practicable following any interruption at that *connection point*.

(f) A *Network Service Provider* must comply with *applicable regulatory instruments*.

(g) Each *Network Service Provider* must in respect of new or altered equipment owned, operated or controlled by it for the purpose of providing a *market network service*:

(1) submit an *application to connect* and enter into a *connection agreement* with a *Network Service Provider* in accordance with clause 5.3 prior to that equipment being connected to the *network* of that *Network Service Provider* or altered (as the case may be);

(2) comply with the reasonable requirements of *NEMMCO* and the relevant *Network Service Provider* in respect of design requirements of equipment proposed to be *connected* to the *network* of that *Network Service Provider* in accordance with clause 5.4 and schedule 5.3a;

(3) provide forecast information to the relevant *Network Service Provider* in accordance with clause 5.6;

(4) permit and participate in inspection and testing of *facilities* and equipment in accordance with clause 5.7;

(5) permit and participate in commissioning of *facilities* and equipment which are to be *connected* to a *network* for the first time in accordance with clause 5.8; and

(6) **[Deleted]**

(7) give notice of intended voluntary permanent *disconnection* in accordance with clause 5.9.

(h) **[Deleted]**

(h1) On receipt of a written request from Basslink Pty Ltd or another party nominated in writing to *NEMMCO* by the Basslink Development Board (collectively 'Basslink') together with a copy of the *application to connect* lodged by Basslink with the relevant *Transmission Network Service Provider*, including all necessary supporting information and data required under clause 5.3.3(c), the *Inter-regional Planning Committee* must in accordance with clause 5.6.3 advise *NEMMCO* of the requirements that should be imposed on Basslink as the intending *Market Network Service Provider* for the purposes of clause 5.2.3(g)(2).

(h2) The *Inter-regional Planning Committee* must, in preparing its advice to *NEMMCO* under 5.2.3(h1), conduct a review of the technical impacts of the proposed interconnector to be constructed by Basslink covering those matters in clause 5.6.6(b)(1), (2) and (4) and *publish* a report of its review.

(h3) *NEMMCO* must, following receipt of advice from the *Inter-regional Planning Committee* in accordance with clause 5.2.3(h1), advise the relevant *Transmission Network Service Provider* and Basslink of its reasonable design requirements in respect of the equipment proposed to be *connected* to the *network* as set out in clause 5.4 and schedule 5.3a, in addition to those reasonable design requirements of the relevant *Transmission Network Service Provider*, for the purposes of clause 5.2.3(g)(2).

(i) This Chapter is neither intended to require, nor is it to be read or construed as having the effect of requiring, a *Network Service Provider* to permit *connection* to or to *augment* any part of its *network* which is solely used for the provision of *market network services.*

5.2.4 Obligations of customers

(a) Each *Customer* must plan and design its *facilities* and ensure that its *facilities* are operated to comply with:

(1) its *connection agreement* with a *Network Service Provider*;

(2) subject to clause 5.2.4(a)(1), all applicable *performance standards*; and

(3) subject to clause 5.2.4(a)(2), the *system standards.*

(b) A *Customer* must:

(1) submit an *application to connect* in respect of new or altered equipment owned, operated or controlled by the *Customer* and enter into a *connection agreement* with a *Network Service Provider* in accordance with clause 5.3 prior to that equipment being *connected* to the *network* of that *Network Service Provider* or altered (as the case may be);

(2) comply with the reasonable requirements of the relevant *Network Service Provider* in respect of design requirements of equipment proposed to be *connected* to the *network* of that *Network Service Provider* in accordance with clause 5.4 and schedule 5.3;

(3) provide *load* forecast information to the relevant *Network Service Provider* in accordance with clause 5.6;

(4) permit and participate in inspection and testing of *facilities* and equipment in accordance with clause 5.7;

(5) permit and participate in commissioning of *facilities* and equipment which are to be *connected* to a *network* for the first time in accordance with clause 5.8; and

(6) **[Deleted]**

(7) give notice of any intended voluntary permanent *disconnection* in accordance with clause 5.9.

5.2.5 Obligations of generators

(a) Each *Generator* must plan and design its *facilities* and ensure that its *facilities* are operated to comply with:

(1) its *connection agreement* with a *Network Service Provider*;

(2) subject to clause 5.2.5(a)(1), all applicable *performance standards*; and

(3) subject to clause 5.2.5(a)(2), the *system standards*.

(b) A *Generator* must:

(1) submit an *application to connect* in respect of new or altered equipment owned, operated or controlled by the *Generator* and enter into a *connection agreement* with a *Network Service Provider* in accordance with clause 5.3 prior to that equipment being *connected* to the *network* of that *Network Service Provider* or altered (as the case may be);

(2) comply with the reasonable requirements of the relevant *Network Service Provider* in respect of design requirements of equipment proposed to be *connected* to the *network* of that *Network Service Provider* in accordance with clause 5.4 and schedule 5.2;

(3) provide *generation* forecast information to the relevant *Network Service Provider* in accordance with clause 5.6;

(4) permit and participate in inspection and testing of *facilities* and equipment in accordance with clause 5.7;

(5) permit and participate in commissioning of *facilities* and equipment which are to be *connected* to a *network* for the first time in accordance with clause 5.8; and

(6) **[Deleted]**

(7) give notice of intended voluntary permanent *disconnection* in accordance with clause 5.9.

5.2.6 [Deleted]

5.3 Establishing or Modifying Connection

5.3.1 Process and procedures

(a) The process and procedures in this clause 5.3 must be followed by a *Registered Participant* and may be followed by any other person wishing to establish or modify a *connection* to a *network.*

(b) Establishing *connection* in this clause includes modifying an existing *connection* to the *national grid*.

5.3.2 Connection enquiry

(a) An existing or intending *Registered Participant*, or a person who is eligible to become a *Registered Participant*, who wishes to lodge or consider lodging an *application to connect* to a *network* must first make a *connection* enquiry by advising the *Local Network Service Provider* of the type, magnitude and timing of the proposed *connection* to the *network* of that *Local Network Service Provider*.

(a1) If the information submitted with a *connection* enquiry is inadequate to enable the *Local Network Service Provider* to process the enquiry the *Local Network Service Provider* must, within 5 *business days*, advise the *Connection Applicant* what other relevant preliminary information of the kind listed in schedule 5.4 is required before the *connection* enquiry can be further processed.

(b) The *Local Network Service Provider* must advise the *Connection Applicant* within 10 *business days* of receipt of the *connection* enquiry and the further information required in accordance with clause 5.3.2(a1) if the enquiry would be more appropriately directed to another *Network Service Provider*. The *Connection Applicant*, notwithstanding the advice, may if it is reasonable in all the circumstances, request the *Local Network Service Provider* to process the *connection* enquiry and the *Local Network Service Provider* must meet this request.

(c) Where the *Local Network Service Provider* considers that the *connection* enquiry should be jointly examined by more than one *Network Service Provider* then, with the agreement of the *Connection Applicant*, one of those *Network Service Providers* may be allocated the task of liaising with the *Connection Applicant* and the other *Network Service Providers* to process and respond to the enquiry.

(d) A *Network Service Provider* must, to the extent that it holds technical information necessary to facilitate the processing of a *connection* enquiry made in accordance with clause 5.3.2(a) or an *application to connect* in accordance with clause 5.3.4(a), provide that information to the *Connection Applicant* in accordance with the requirements of schedules 5.1, 5.2, 5.3 or 5.3a, as relevant.

5.3.3 Response to connection enquiry

(a) In preparing a response to a *connection* enquiry, the *Network Service Provider* must liaise with other *Network Service Providers* with whom it has *connection agreements*, if the *Network Service Provider* believes, in its reasonable opinion, that compliance with the terms and conditions of those *connection agreements* will be affected. The *Network Service Provider* responding to the *connection* enquiry may include in that response the

reasonable requirements of any such other *Network Service Providers* for information to be provided by the *Connection Applicant*.

(b) The *Network Service Provider* must provide the following information in writing to the *Connection Applicant* within 10 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under clause 5.3.2(a1) or, if the *Connection Applicant* has requested the *Local Network Service Provider* to process the *connection* enquiry under clause 5.3.2(b), within 10 *business days* after receipt of that request:

(1) the identity of other parties that the *Network Service Provider* considers:

(i) will need to be involved in planning to make the *connection*; and

(ii) must be paid for *transmission* or *distribution service*s in the appropriate jurisdiction;

(2) whether it will be necessary for any of the parties identified in clause 5.3.3(b)(1) to enter into an agreement with the *Connection Applicant* in respect of the provision of *connection* or other *transmission services* or *distribution services* to the *Connection Applicant* or both;

(3) whether any service the *Network Service Provider* proposes to provide is *contestable* in the relevant *participating jurisdiction*; and

(4) a *preliminary program* showing proposed milestones for *connection* and access activities which may be modified from time to time by agreement of the parties, which agreement must not be unreasonably withheld.

(b1) The *Network Service Provider* must, within 20 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under clause 5.3.2(a1) or, if the *Connection Applicant* has requested the *Local Network Service Provider* to process the *connection* enquiry under clause 5.3.2(b), within 20 *business days* after receipt of that request, provide the *Connection Applicant* with written details, for each technical requirement set out in the schedules to this Chapter and which are relevant to the proposed *plant*, of:

(1) the *automatic access standards*;

(2) the *minimum access standards*;

(3) the applicable *plant standards*; and

(4) which of the requirements *NEMMCO* will be involved in the negotiation of for the purposes of clause 5.3.4A(b),

in accordance with any relevant access standards set out in:

(5) schedule 5.1 for *connection* of a *network*;

(6) schedule 5.2 for *connection* of a *generating system*;

(7) schedule 5.3 for *connection* of a *Network User's connection point*; and

(8) schedule 5.3a for *connection* of a *market network service*.

(b2) A *Registered Participant*, *NEMMCO* or *interested party* may request the *Reliability Panel* to determine whether, in respect of one or more technical requirements for access, an existing Australian or international standard, or a part thereof, may be adopted as a *plant standard* for a particular class of *plant*.

(b3) Where, in respect of a technical requirement for access, the *Reliability Panel* determines a *plant standard* for a particular class of *plant* in accordance with clause 8.8.1(a)(8) as an acceptable alternative to a particular *minimum access standard* or *automatic access standard*, a *plant* which meets that *plant standard* is deemed to meet the applicable *automatic access standard* or *minimum access standard* for that technical requirement.

(b4) In making a determination in accordance with clause 5.3.3(b2) the *Reliability Panel* must consult *Registered Participants* and *NEMMCO* using the *Rules consultation procedures*.

(c) Within 20 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under clause 5.3.2(a1) or, if the *Connection Applicant* has requested the *Local Network Service Provider* to process the *connection* enquiry under clause 5.3.2(b), within 20 *business days* after receipt of that request, the *Network Service Provider* must provide to the *Connection Applicant* written advice of all further information which the *Connection Applicant* must prepare and obtain in conjunction with the *Network Service Provider* to enable the *Network Service Provider* to assess an *application to connect* including:

(1) details of the *Connection Applicant's connection* requirements, and the *Connection Applicant's* specifications of the *facility* to be connected, consistent with the requirements advised in accordance with clause 5.3.3(b1);

(2) details of the *Connection Applicant's* reasonable expectations of the level and standard of service of *power transfer capability* that the *network* should provide;

(3) a list of the technical data to be included with the *application to connect*, which may vary depending on the *connection* requirements and the type, rating and location of the *facility* to be *connected* and

will generally be in the nature of the information set out in schedule 5.5 but may be varied by the *Network Service Provider* as appropriate to suit the size and complexity of the proposed *facility* to be *connected*;

(4) commercial information to be supplied by the *Connection Applicant* to allow the *Network Service Provider* to make an assessment of the ability of the *Connection Applicant* to satisfy the prudential requirements set out in clauses 6.6 and 6.15;

(5) the amount of the application fee which is payable on lodgment of an *application to connect*, such amount not being more than necessary to:

(i) cover the reasonable costs of all work anticipated to arise from investigating the *application to connect* and preparing the associated offer to *connect*; and

(ii) meet the reasonable costs anticipated to be incurred by *NEMMCO* and other *Network Service Providers* whose participation in the assessment of the *application to connect* will be required; and

(6) any other information relevant to the submission of an *application to connect*.

5.3.4 Application for connection

(a) A person who has made a *connection* enquiry under clause 5.3.2 may, following receipt of the responses under clause 5.3.3, make an *application to connect* in accordance with this clause 5.3.4 and clause 5.3.4A.

(b) To be eligible for *connection*, the *Connection Applicant* must submit an *application to connect* containing the information specified in clause 5.3.3(c) and the relevant application fee to the relevant *Network Service Provider*.

(c) The *Connection Applicant* may submit *applications to connect* to more than one *Network Service Provider* in order to receive additional offers to *connect* in respect of *facilities* to be provided that are *contestable*.

(d) To the extent that an application fee includes amounts to meet the reasonable costs anticipated to be incurred by any other *Network Service Providers* or *NEMMCO* in the assessment of the *application to connect*, a *Network Service Provider* who receives the *application to connect* and associated fee must pay such amounts to the other *Network Service Providers* or *NEMMCO*, as appropriate.

(e) For each technical requirement where the proposed arrangement will not meet the *automatic access standards* nominated by the *Network Service Provider* pursuant to clause 5.3.3(b1), the *Connection Applicant* must submit with the *application to connect* a proposal for a *negotiated access standard* for each such requirement to be determined in accordance with clause 5.3.4A.

(f) The *Connection Applicant* may:

(1) lodge separate *applications to connect* and separately liaise with the other *Network Service Providers* identified in clause 5.3.3(b) who may require a form of agreement; or

(2) lodge one *application to connect* with the *Network Service Provider* who processed the *connection* enquiry and require it to liaise with those other *Network Service Providers* and obtain and present all necessary draft agreements to the *Connection Applicant*.

5.3.4A Negotiated access standards

(a) A *negotiated access standard* must:

(1) be no less onerous than the corresponding *minimum access standard* specified by the *Network Service Provider* in accordance with clause 5.3.3(b1)(2);

(2) be set at a level that will not adversely affect *power system security*; and

(3) be set at a level that will not adversely affect the quality of *supply* for other *Network Users*.

(b) A *Network Service Provider* must, following the receipt of a proposed *negotiated access standard* in accordance with clause 5.3.4(e) or clause 5.3.4A(f), consult *NEMMCO* on all matters allocated to *NEMMCO* under clause 5.3.3(b1)(4) and must accept *NEMMCO's* advice in respect of those matters in determining its response to each proposed *negotiated access standard* and any applicable terms or conditions of acceptance to be applied to each proposed *negotiated access standard*.

(c) *NEMMCO* must, within 20 *business day*s following the submission of a proposed *negotiated access standard* under clause 5.3.4(e) or clause 5.3.4A(f), respond to the *Network Service Provider* in writing in respect of all matters allocated to *NEMMCO*, in accordance with clause 5.3.3(b1).

(d) A *Network Service Provider* must, within 30 *business day*s following the receipt of a proposed *negotiated access standard* in accordance with clause 5.3.4(e) or clause 5.3.4A(f)(3):

(1) accept the proposed *negotiated access standard*; or

(2) reject the proposed *negotiated access standard* if *connection* at the *negotiated access standard* proposed by the *Connection Applicant* would:

(i) in *NEMMCO's* reasonable opinion, adversely affect *power system security*; or

(ii) in the *Network Service Provider's* reasonable opinion, adversely affect quality of *supply* for other *Network Users*; or

(iii) in the opinion of *NEMMCO* (in respect of a matter allocated to *NEMMCO* under clause 5.3.3(b1)(4)) or in the opinion of the *Network Service Provider* (in respect of a matter not allocated to *NEMMCO* under clause 5.3.3(b1)(4)), not meet the requirements of clause 5.3.4A(a).

(e) If a *Network Service Provider* rejects a proposed *negotiated access standard*, the *Network Service Provider* must, when rejecting the proposed *negotiated access standard*, advise the *Connection Applicant* of a *negotiated access standard* that the *Network Service Provider* will accept.

(f) The *Connection Applicant* may, in relation to a proposed *negotiated access standard* advised by a *Network Service Provide*r in accordance with clause 5.3.4A(e):

(1) accept the proposed *negotiated access standard*;

(2) reject the proposed *negotiated access standard*;

(3) propose an alternative proposed *negotiated access standard* to be further evaluated in accordance with the criteria in clause 5.3.4A(a); or

(4) elect to adopt the relevant *automatic access standard* or a corresponding *plant standard*.

(g) An *automatic access standard* or, if the procedures in this clause 5.3.4A have been followed, a *negotiated access standard* that forms part of the terms and conditions of a *connection agreement*, is taken to be the *performance standard* applicable to the *connected plant* for the relevant technical requirement.

5.3.5 Preparation of offer to connect

(a) The *Network Service Provider* to whom the *application to connect* is submitted:

(1) at the *automatic access standards* in accordance with clause 5.3.4;

(2) at a *negotiated access standard* that has been accepted by a *Network Service Provider* in accordance with clause 5.3.4A(d)(1); or

(3) at any applicable *plant standard*;

must proceed to prepare an offer to *connect* in response.

(b) The *Network Service Provider* must use its reasonable endeavours to advise the *Connection Applicant* of all risks and obligations in respect of the proposed *connection* associated with planning and environmental laws not contained in the *Rules.*

(c) The *Connection Applicant* must provide such other additional information in relation to the *application to connect* as the *Network Service Provider* reasonably requires to assess the technical performance and costs of the required *connection* and to enable the *Network Service Provider* to prepare an offer to *connect.*

(d) So as to maintain levels of service and quality of *supply* to existing *Registered Participants* in accordance with the *Rules*, the *Network Service Provider* in preparing the offer to *connect* must consult with *NEMMCO* and other *Registered Participants* with whom it has *connection agreements*, if the *Network Service Provider* believes, in its reasonable opinion, that compliance with the terms and conditions of those *connection agreements* will be affected, in order to assess the *application to connect* and determine:

(1) the performance requirements for the equipment to be *connected*;

(2) the extent and cost of *augmentations* and changes to all affected *networks*;

(3) any consequent change in *network service* charges; and

(4) any possible material effect of this new *connection* on the *network power transfer capability* including that of other *networks*.

(e) **[Deleted]**

(f) If the *application to connect* involves the *connection* of *generating units* having a *nameplate rating* of 10 MW or greater to a *distribution network*, the *Distribution Network Service Provider* must consult the relevant *Transmission Network Service Provider* regarding the impact of the

connection contemplated by the *application to connect* on fault levels, line reclosure protocols, and stability aspects. The *Transmission Network Service Provider* must determine the reasonable costs of addressing these matters for inclusion by the *Network Service Provider* in the offer to *connect* and the *Distribution Network Service Provider* must make it a condition of the offer to *connect* that the *Connection Applicant* pay these costs.

(g) If the *application to connect* involves the *connection* of a *scheduled generating unit* or *facilities* which, when *connected*, would be a *scheduled generating unit*, the *Network Service Provider* responsible for preparing the offer to *connect* must consult *NEMMCO*.

(h) The *Network Service Provider* preparing the offer to *connect* must include provision for payment of the reasonable costs associated with *remote control equipment* and *remote monitoring equipment* as required by *NEMMCO* and it may be a condition of the offer to *connect* that the *Connection Applicant* pay such costs.

5.3.6 Offer to connect

(a) Subject to clause 5.3.3(b)(4), the *Network Service Provider* processing the *application to connect* must make an offer to *connect* the *Connection Applicant's facilities* to the *network* within the time period specified in the *preliminary program*.

(a1) The *Network Service Provider* may amend the time period referred to in clause 5.3.6(a) to allow for any additional time taken in excess of the period allowed in the *preliminary program* for the negotiation of *negotiated access standards* in accordance with clause 5.3.4A.

(b) The offer to *connect* must contain the proposed terms and conditions for *connection* to the *network* including:

(1) for each technical requirement identified by the *Network Service Provider* under clause 5.3.3(b1), the *automatic access standard* or the *negotiated access standard* as determined in accordance with clauses 5.3.4 and 5.3.4A; and

(2) the terms and conditions of the kind set out in schedule 5.6,

and must be capable of acceptance by the *Connection Applicant* so as to constitute a *connection agreement.*

(b1) The proposed terms and conditions detailed in the offer to *connect* must be no lower than the applicable *minimum access standards*.

(c) The offer to *connect* must be fair and reasonable and must be consistent with the safe and *reliable* operation of the *power system* in accordance with the *Rules*. Without limitation, unless the parties otherwise agree, to be fair and reasonable an offer to *connect* must offer *connection* and *network services* consistent with schedule 5.1 and (as applicable) schedules 5.2, 5.3 and 5.3a and must not impose conditions on the *Connection Applicant* which are more onerous than those contemplated in schedules 5.1, 5.2, 5.3 or 5.3a.

(c1) An offer to *connect* and the resulting *connection agreement* must be consistent with any minimum standards set by *NEMMCO* under clause 3.11.4(b)(1).

(d) The *Network Service Provider* must use its reasonable endeavours to provide the *Connection Applicant* with an offer to *connect* in accordance with the reasonable requirements of the *Connection Applicant*, including without limitation, the location of the proposed *connection point* and the level and standard of *power transfer capability* that the *network* will provide.

(e) The *Network Service Provider* may offer terms and conditions which vary from those contemplated by the *Rules* where relevant considerations such as geographic factors make variation necessary or desirable provided that any such conditions are reasonable and are explicitly identified in the offer to *connect*.

(f) An offer to *connect* may contain options for *connection* to a *network* at more than one point in a *network* and/or at different levels of service and with different terms and conditions applicable to each *connection point* according to the different characteristics of *supply* at each *connection point*.

(g) Both the *Network Service Provider* and the *Connection Applicant* are entitled to negotiate with each other in respect of the provision of *connection* and any other matters relevant to the provision of *connection* and, if negotiations occur, the *Network Service Provider* and the *Connection Applicant* must conduct such negotiations in good faith.

(h) An offer to *connect* must define the basis for determining *transmission* or *distribution service* charges in accordance with Chapter 6 including the prudential requirements set out in clauses 6.6 and 6.15 as appropriate.

(i) An offer to *connect* made to a *Generator* must conform with the access arrangements for *Generators* set out in clause 5.5.

(j) An offer to *connect* made to a *Market Network Service Provider* must conform with the access arrangements for *Market Network Service Providers* set out in clause 5.5A.

(k) Nothing in the *Rules* is to be read or construed as imposing an obligation on a *Network Service Provider* to effect an *extension* of a *network* unless that *extension* is required to effect or facilitate the *connection* of a *Connection Applicant* and the *connection* is the subject of a *connection agreement.*

5.3.7 Finalisation of connection agreements

(a) If the *Connection Applicant* wishes to accept an offer to *connect*, the *Connection Applicant* must:

(1) **[Deleted]**

(2) enter into a *connection agreement* with each relevant *Network Service Provider* identified in accordance with clause 5.3.3(b)(2) and, in doing so, must use its reasonable endeavours to negotiate in good faith with all parties with which the *Connection Applicant* must enter into such a *connection agreement*.

(b) The provision of *connection* by any *Network Service Provider* may be made subject to gaining environmental and planning approvals for any necessary *augmentation* or *extension* works to a *network.*

(c) Where permitted by the applicable law in the relevant *participating jurisdiction*, the *connection agreement* may assign responsibility to the *Connection Applicant* for obtaining the approvals referred to in clause 5.3.7(b) as part of the project proposal and the *Network Service Provider* must provide all reasonable information and may provide reasonable assistance for a reasonable fee to enable preparation of applications for such approvals.

(d) Subject to clause 5.3.7(c), each *connection agreement* must be based on the offer to *connect* as varied by agreement between the parties.

(e) The *Network Service Provider* responsible for the *connection point* and the *Registered Participant* must jointly advise *NEMMCO* that a *connection agreement* has been entered into between them and forward to *NEMMCO* relevant technical details of the proposed *plant* and *connection*, including, as applicable:

(1) details of all *performance standards* that form part of the terms and conditions of the *connection agreement*;

(2) if a *Generator*, the arrangements for updating the information required in accordance with clause S5.2.4(b) of schedule 5.2;

(3) the proposed *metering installation*;

(4) arrangements for the *Metering Provider* to obtain physical access to the *metering installation*; and

(5) the terms upon which a *Registered Participant* is to supply any *ancillary services* under the *connection agreement*.

(f) *NEMMCO* must, within 20 *business days* of receipt of the notice under clause 5.3.7(e), advise the relevant *Network Service Provider* and the *Registered Participant* of whether the proposed *metering installation* is acceptable for those *metering installations* associated with those *connection points* which are classified as *metering installation* types 1, 2, 3 and 4 as specified in schedule 7.2.

5.3.8 Provision and use of information

(a) The data and information to be provided by a *Connection Applicant* under this clause 5.3 must be:

(1) prepared, given and used in good faith;

(2) treated as *confidential information*; and

(3) protected from being disclosed or made available by the recipient to a third party, except for the purpose of enabling *Network Service Providers* and *NEMMCO* to assess the effect of the proposed *facility* on the performance of the *power system* and determine the extent of any required *augmentation* or *extension* or for the purpose of enabling *Network Service Providers* to advise *NEMMCO* of *ancillary services* to be provided under a *connection agreement*.

(b) A person intending to disclose information under clause 5.3.8(a)(3) must first advise the relevant *Connection Applicant* of the extent of the disclosure.

(c) If a *Connection Applicant* or *Network Service Provider* becomes aware of any material change to any information contained in or relevant to an *application to connect* then it must promptly notify the other party in writing of that change.

(d) A *Registered Participant* must, within 5 *business days* of becoming aware that any information provided to *NEMMCO* in relation to a *performance standard* or other information of a kind required to be provided to *NEMMCO* under clauses 5.3.7(e)(1) or 5.3.7(e)(2) is incorrect, advise *NEMMCO* of the correct information.

5.4 Design of Connected Equipment

5.4.1 Applicability

This clause 5.4 applies only to new installations and modifications to existing installations after 13 December 1998 (in the case of installations located in *participating jurisdictions* other than Tasmania) and after the date that Tasmania becomes a *participating jurisdiction* in the case of installations located in Tasmania).

5.4.2 Advice of inconsistencies

(a) At any stage prior to commissioning the *facility* in respect of a *connection*, the *Registered Participant* must advise the relevant *Network Service Provider* in writing of any inconsistency between the proposed equipment and the provisions of the relevant *connection agreement* and, if necessary, the *Network Service Provider* and the *Registered Participant* must negotiate in good faith any necessary changes to the *connection agreement*.

(b) If there is an inconsistency in a *connection agreement* identified in clause 5.4.2(a), the *Registered Participant* and *Network Service Provider* must not commission the *facility* in respect of a *connection* unless the facility or the *connection agreement* has been varied to remove the inconsistency.

(c) Nothing in this clause 5.4.2 affects the operation of clause 5.3.6(c1).

5.4.3 Additional information

A *Registered Participant* must provide any additional information in relation to its *plant* or associated equipment as the relevant *Network Service Provider* reasonably requests.

5.4.4 Advice on possible non-compliance

(a) If the relevant *Network Service Provider* reasonably believes that the design of a proposed *facility* has potential to adversely and materially affect the performance of the *power system*, the *Network Service Provider* may require the *Registered Participant* to submit to it specified design information and drawings to enable the *Network Service Provider* to assess the performance of the *facility* in respect of its interaction with the *power system*:

(1) after the *Registered Participant* has entered into an agreement for the supply of *plant* or associated equipment to be connected; and

(2) when the relevant contractor's designs have progressed to a point where preliminary designs are available but prior to manufacture of equipment.

(b) The *Network Service Provider* must, within 40 *business days* of receipt of such information, use its reasonable endeavours to advise the *Registered Participant* in writing of any design deficiencies which the *Network Service Provider* believes would cause the design to be inconsistent with the *connection agreement* or the *Rules*.

(c) Notwithstanding clause 5.4.4(b), it is the *Registered Participant's* sole responsibility to ensure that all *plant* and equipment associated with the *connection* complies with the *connection agreement* and the *Rules*.

5.5 Access Arrangements for Generators

(a) The *Network Service Provider* referred to in this clause 5.5 is the *Network Service Provider* required under clause 5.3.3 to process and respond to a *connection* enquiry or required under clause 5.3.5 to prepare an offer to *connect* for the provision of *network service* to a *Generator's generating unit* or group of *generating units.*

(b) If requested by the *Generator*, whether as part of a *connection* enquiry, *application to connect* or the subsequent negotiation of a *connection agreement*, the *Network Service Provider* must negotiate in good faith with the *Generator* to reach agreement in respect of the *generator access* arrangements sought by the *Generator*.

(c) As a basis for negotiations under clause 5.5(b):

(1) the *Generator* must provide to the *Network Service Provider* such information as is reasonably requested relating to the expected operation of its *generating units*; and

(2) the *Network Service Provider* must provide to the *Generator* such information as is reasonably requested to allow the *Generator* to fully assess the commercial significance of the *generator access* arrangements sought by the *Generator* and offered by the *Network Service Provider.*

(d) A *Generator* may seek *generator access* arrangements at any level of *power transfer capability* between zero and the *maximum power input* of the *Generator's generating units* or group of *generating units*.

(e) The *Network Service Provider* must use reasonable endeavours to provide the *generator access* arrangements being sought by the *Generator* subject to those arrangements being consistent with *good electricity industry practice* considering:

(1) the *connection assets* to be provided by the *Network Service Provider* or otherwise at the *connection point*; and

(2) the potential *augmentations* or *extensions* required to be undertaken on all affected *transmission networks* or *distribution networks* to provide that level of *power transfer capability* over the period of the *connection agreement* taking into account the amount of *power transfer capability* provided to other *Registered Participants* under *generator access* or *market network service provider access* arrangements in respect of all affected *transmission networks* and *distribution networks.*

(f) The *Network Service Provider* and the *Generator* must negotiate in good faith to reach agreement as appropriate on the:

(1) *connection service* charge to be paid by the *Generator* in relation to *connection assets* to be provided by the *Network Service Provider*;

(2) *use of system services* charge to be paid by the *Generator* in relation to any *augmentations* or *extensions* required to be undertaken on all affected *transmission networks* and *distribution networks* (*"negotiated use of system charges"*);

(3) **[Deleted]**

(4) amount to be paid by the *Generator* to the *Network Service Provider* in relation to the costs reasonably incurred by the *Network Service Provider* in providing *generator access*;

(5) compensation to be provided by the *Network Service Provider* to the *Generator* in the event that the *generating units* or group of *generating units* of the *Generator* are *constrained off* or *constrained on* during a *trading interval*; and

(6) compensation to be provided by the *Generator* to the *Network Service Provider* in the event that *dispatch* of the *Generator's generating units* or group of *generating units* causes another *Generator's generating units* or group of *generating units* to be *constrained off* or *constrained on* during a *trading interval*.

(g) The maximum charge that can be applied by the *Network Service Provider* in respect of *negotiated use of system charges* for the *transmission network* and/or *distribution network* is that determined in accordance with schedule 6.3.

(h) A *Distribution Network Service Provider* must pass through to an *Embedded Generator* the amount calculated in accordance with clause 5.5(i) for *Customer TUOS usage charges* that would have been payable by the *Distribution Network Service Provider* to a *Transmission Network Service Provider* had the *Embedded Generator* not been *connected* to its *distribution network* (*"avoided Customer TUOS usage charges"*).

(i) To calculate the amount to be passed through to an *Embedded Generator* in accordance with clause 5.5(h), a *Distribution Network Service Provider* must, if *Customer TUOS usage prices* were in force at the relevant *transmission network connection point* throughout the relevant *financial year*:

(1) determine the *Customer TUOS usage charges* that would have been payable by the *Distribution Network Service Provider* for the relevant *financial year* if the *Embedded Generator* had not injected any *energy* at its *connection point* during that *financial year*; and

(2) determine the amount by which the charges calculated in clause 5.5(i)(1) exceed the *Customer TUOS usage charges* actually payable by the *Distribution Network Service Provider*, which amount will be the relevant amount for the purposes of clause 5.5(h).

Where *Customer TUOS usage prices* were not in force at the relevant *transmission network connection point* throughout the relevant *financial year*, the *Distribution Network Service Provider* must apply an equivalent procedure to that described above in relation to that component of its *transmission use of system service* charges which is deemed by the relevant *Transmission Network Service Provider* to represent the marginal cost of *transmission*, less an allowance for locational signals present in the *spot market*, to determine the relevant amount for the purposes of clause 5.5(h).

(j) Any payments to *Generators* and *Embedded Generators* under clause 5.5(h) are to be included as part of the *aggregate annual revenue requirement* of the relevant *Transmission Network Service Provider* or *Distribution Network Service Provider*, respectively, and are to be recovered in the same manner as payments to *Embedded Generators* under clauses 6.13.3(c) and (d) (except that, where the *Generator* is *connected* to a *transmission network*, all references in clause 6.13.3(d) and schedule 6.3 to "*distribution*" are to be read as references to "*transmission*").

5.5A Access Arrangements for Market Network Service Providers

(a) This clause 5.5A applies to circumstances in which a *Market Network Service Provider* has made a *connection* enquiry under clause 5.3.2 or has made an *application to connect* under clause 5.3.4 in relation to *network elements* used in the provision of a *market network service.*

(b) The other *Network Service Provider* referred to in this clause 5.5A is a *Network Service Provider* required under clause 5.3.3 to process and respond to the *connection* enquiry referred to in clause 5.5A(a) or required under clause 5.3.5 to prepare an offer to *connect* in response to the *application to connect* referred to in clause 5.5.A(a).

(c) If requested by the *Market Network Service Provider*, whether as part of the *connection* enquiry, *application to connect* or the subsequent negotiation of

a *connection agreement*, the *Network Service Provider* must negotiate in good faith with the *Market Network Service Provider* to reach agreement in respect of the *market network service provider access* arrangements sought by the *Market Network Service Provider*.

(d) As a basis for negotiations under clause 5.5A(c):

(1) the *Market Network Service Provider* must provide to the *Network Service Provider* such information as is reasonably requested relating to the expected operation of its *network elements*; and

(2) the *Network Service Provider* must provide to the *Market Network Service Provider* such information as is reasonably requested to allow the *Market Network Service Provider* to fully assess the commercial significance of the *market network service provider access* arrangements sought by the *Market Network Service Provider* and offered by the *Network Service Provider*.

(e) A *Market Network Service Provider* may seek *market network service provider access* arrangements at any level of *power transfer capability* between zero and the *power transfer capability* of the *network elements* referred to in clause 5.5A(a).

(f) The *Network Service Provider* must use reasonable endeavours to provide the *market network service provider access* arrangements being sought by the *Market Network Service Provider* subject to those arrangements being consistent with *good electricity industry practice* considering:

(1) the *connection assets* to be provided by the *Network Service Provider* or otherwise at the *connection point*; and

(2) the potential *augmentations* or *extensions* required to be undertaken on all affected *transmission networks* or *distribution networks* to provide that level of *power transfer capability* over the period of the *connection agreement* taking into account the amount of *power transfer capability* provided to other *Registered Participants* under *generator access* or *market network service provider access* arrangements in respect of all affected *transmission networks* and *distribution networks*.

(g) The *Network Service Provider* and the *Market Network Service Provider* must negotiate in good faith to reach agreement as appropriate on the:

(1) *connection service* charge to be paid by the *Market Network Service Provider* in relation to *connection assets* to be provided by the *Network Service Provider*;

(1A) service level standards to which the *Market Network Service Provider* requires the *Network Service Provider* to adhere in providing it services;

(2) *use of system services* charge to be paid:

(A) to the *Market Network Service Provider* in respect of any reduction in the long run marginal cost of *augmenting* the *network* as a result of it being *connected* to the *network;* and

(B) by the *Market Network Service Provider* in relation to any *augmentations* or *extensions* required to be undertaken in respect of all affected *transmission networks* and *distribution networks*.

("*negotiated use of system charges*");

(3) amount to be paid by the *Market Network Service Provider* to the *Network Service Provider* in relation to the costs reasonably incurred by the *Network Service Provider* in providing *market network service provider access*;

(4) compensation to be provided by the *Network Service Provider* to the *Market Network Service Provider* in the event that the relevant *market network service provider access* is not provided; and

(5) compensation to be provided by the *Market Network Service Provider* to the *Network Service Provider* in the event that *dispatch* of the relevant *market network service* causes a *Generator's generating units* or group of *generating units* to be *constrained off* or *constrained on* during a *trading interval* or causes the *dispatch* of another *market network service* to be *constrained*.

(h) The maximum charge that can be applied by the *Network Service Provider* in respect of *negotiated use of system charges* for the *transmission network* and/or *distribution network* is that determined in accordance with the methods specified for *Generators* in schedule 6.3, except that references to "*Generators*" in that schedule are to be read as references to "*Market Network Service Providers*" together with any other necessary changes.

(i) A *Distribution Network Service Provider* must pass through to a *Market Network Service Provider* the amount calculated in accordance with clause 5.5A(j) for *Customer TUOS usage charges* that would have been payable by the *Distribution Network Service Provider* to a *Transmission Network Service Provider* had the *Market Network Service Provider* not been *connected* to its *distribution network* ("*avoided Customer TUOS usage charges*").

(j) To calculate the amount to be passed through to a *Market Network Service Provider* in accordance with clause 5.5A(i), a *Distribution Network Service Provider* must, if *Customer TUOS usage prices* were in force at the relevant *transmission network connection point* throughout the relevant *financial year*:

(1) determine the *Customer TUOS usage charges* that would have been payable by the *Distribution Network Service Provider* for the relevant *financial year* if the *Market Network Service Provider* had not been *connected* to the *Distribution Network Service Provider's distribution network* during that *financial year*; and

(2) determine the amount by which the charges calculated in clause 5.5A(j)(1) exceed the *Customer TUOS usage charges* actually payable by the *Distribution Network Service Provider*, which amount will be the relevant amount for the purposes of clause 5.5A(i).

Where *Customer TUOS usage prices* were not in force at the relevant *transmission network connection point* throughout the relevant *financial year*, the *Distribution Network Service Provider* must apply an equivalent procedure to that described above in relation to that component of its *transmission use of system service* charges which is deemed by the relevant *Transmission Network Service Provider* to represent the marginal cost of *transmission*, less an allowance for locational signals present in the *spot market*, to determine the relevant amount for the purposes of clause 5.5A(i).

(k) Any payments to *Market Network Service Providers* under clauses 5.5A(g)(2) and 5.5A(i) are to be included as part of the *aggregate annual revenue requirement* of the relevant *Transmission Network Service Provider* or *Distribution Network Service Provider*, respectively, and are to be recovered in the same manner as payments to *Embedded Generators* under clauses 6.13.3(c) and (d) (except that, where the *Market Network Service Provider* is *connected* to a *transmission network*, all references in clause 6.13.3(d) and schedule 6.3 to "*distribution*" are to be read as references to "*transmission*").

5.6 Planning and Development of Network

5.6.1 Forecasts for connection points to transmission network

(a) The relevant *Network Service Provider* must give at least 40 *business days'* written notice to each relevant *Registered Participant* of the annual date by which the *Registered Participant* must provide the relevant *Network Service Provider* with the short and long term electricity *generation, market network service* and *load* forecast information listed in schedule 5.7 in relation to each *connection point* which *connects* the *Registered Participant* to a *transmission network* of that *Network Service Provider* and any other

relevant information as reasonably required by the *Network Service Provider*.

(b) Details of planned future *generating units*, *market network services* and *loads*, being details regarding the proposed commencing date, *active power capability* and *reactive power capability*, *power transfer capability*, operating times/seasons and special operating requirements, must be given by each relevant *Registered Participant* to the relevant *Network Service Provider* on reasonable request.

(c) Each relevant *Registered Participant* must use reasonable endeavours to provide accurate information under clause 5.6.1(a) which must include details of any factors which may impact on *load* forecasts or proposed *facilities* for *generation* or *market network services*.

(d) If the *Network Service Provider* reasonably believes any forecast information to be inaccurate, the *Network Service Provider* may modify that forecast information and must advise the relevant *Registered Participant* and *NEMMCO* in writing of this action and the reason for the modification. The *Network Service Provider* is not responsible for any adverse consequences of this action or for failing to modify forecast information under this clause 5.6.1(d).

5.6.2 Network Development

(a1) The terms *Network Service Provider*, *Transmission Network Service Provider* and *Distribution Network Service Provider* when used in this clause 5.6.2 are not intended to refer to, and are not to be read or construed as referring to, any *Network Service Provider* in its capacity as a *Market Network Service Provider*.

(a2) **[Deleted]**

(a) Each *Transmission Network Service Provider* and *Distribution Network Service Provider* must analyse the expected future operation of its *transmission networks* or *distribution networks* over an appropriate planning period, taking into account the relevant forecast *loads*, any future *generation*, *market network service*, demand side and *transmission* developments and any other relevant data.

(b) Each *Transmission Network Service Provider* must conduct an annual planning review with each *Distribution Network Service Provider connected* to its *transmission network* within each *region.* The annual planning review must incorporate the forecast *loads* submitted by the *Distribution Network Service Provider* in accordance with clause 5.6.1 or as modified in accordance with clause 5.6.1(d) and must include a review of the adequacy of existing *connection points* and relevant parts of the *transmission system* and planning proposals for future *connection points*.

(c) Where the necessity for *augmentation* or a non-network alternative is identified by the annual planning review conducted under clause 5.6.2(b), the relevant *Network Service Providers* must undertake joint planning in order to determine plans that can be considered by relevant *Registered Participants*, *NEMMCO* and *interested parties.*

(d) The minimum planning period for the purposes of the annual planning review is 5 years for *distribution networks* and 10 years for *transmission networks.*

(e) Each *Network Service Provider* must extrapolate the forecasts provided to it by *Registered Participants* for the purpose of planning and, where this analysis indicates that any relevant technical limits of the *transmission or distribution systems* will be exceeded, either in normal conditions or following the contingencies specified in schedule 5.1, the *Network Service Provider* must notify any affected *Registered Participants* and *NEMMCO* of these limitations and advise those *Registered Participants* and *NEMMCO* of the expected time required to allow the appropriate corrective network *augmentation* or non-*network* alternatives, or modifications to *connection facilities* to be undertaken.

(f) Within the time for corrective action notified in clause 5.6.2(e) the relevant *Distribution Network Service Provider* must consult with affected *Registered Participants*, *NEMMCO* and *interested parties* on the possible options, including but not limited to demand side options, *generation* options and *market network service* options to address the projected limitations of the relevant *distribution system* except that a *Distribution Network Service Provider* does not need to consult on a *network* option which would be a *new small distribution network asset*.

(g) Each *Distribution Network Service Provider* must carry out an economic cost effectiveness analysis of possible options to identify options that satisfy the *regulatory test*, while meeting the technical requirements of schedule 5.1, and where the *Network Service Provider* is required by clause 5.6.2(f) to consult on the option this analysis and allocation must form part of the consultation on that option.

(h) Following conclusion of the process outlined in clauses 5.6.2(f) and (g), the *Distribution Network Service Provider* must prepare a report that is to be made available to affected *Registered Participants, NEMMCO* and *interested parties* which:

(1) includes assessment of all identified options;

(2) includes details of the *Distribution Network Service Provider's* preferred proposal and details of:

(A) its economic cost effectiveness analysis in accordance with clause 5.6.2(g); and

(B) its consultations conducted for the purposes of clause 5.6.2(g);

(3) summarises the submissions from the consultations; and

(4) recommends the action to be taken.

(i) *Registered Participants* may dispute the recommendation of the report prepared under clause 5.6.2(h) within 40 *business days* after the report is made available in respect of any proposal that is a *new large distribution network asset* or is reasonably likely to change the *distribution use of system service* charges applicable to that *Registered Participant* by more than 2% at the date of the next price review, based on the assumption that the same approach to *distribution network* pricing is taken for the next review period as that taken for the current review period.

(j) Where any *Registered Participant* disputes a recommendation under clause 5.6.2(i), the *Distribution Network Service Provider* and the affected *Registered Participants* must negotiate in good faith with a view to reaching agreement on the action to be taken.

(k) Following:

(1) completion of the 40 *business day* period referred to in clause 5.6.2(i) or on resolution of any dispute in accordance with clause 8.2, in relation to proposals to which clause 5.6.2(j) applies; or

(2) completion of the report referred to in clause 5.6.2(h), in relation to any other *network* option recommended by the report,

the relevant *Distribution Network Service Provider* must arrange for the *network* options (if any) recommended by its report made in accordance with clause 5.6.2(h) to be available for service by the agreed time.

(k1) The *Distribution Network Service Provider* must include the cost of the relevant assets of the *network options* referred to in clause 5.6.2(k) in the calculation of *distribution service* prices determined in accordance with Chapter 6.

(l) If a *use of system service* or the provision of a service at a *connection point* is directly affected by a *transmission network* or *distribution network augmentation,* appropriate amendments to relevant *connection agreements* must be negotiated in good faith between the parties to them.

(m) Where the relevant *Transmission Network Service Provider* or *Distribution Network Service Provider* decides to implement a *generation* option as an alternative to *network augmentation*, the *Network Service Provider* must:

(1) register the *generating unit* with *NEMMCO* and specify that the *generating unit* may be periodically used to provide a *network* support function and will not be eligible to set *spot prices* when *constrained on* in accordance with clause 3.9.7; and

(2) include the cost of this *network* support service in the calculation of *transmission service* and *distribution service* prices determined in accordance with Chapter 6.

(n) *NEMMCO* must provide to the *Inter-Regional Planning Committee*, and to other *Network Service Providers* on request, a copy of any report provided to *NEMMCO* by a *Network Service Provider* under clause 5.2.3(d)(12). If a *Registered Participant* reasonably considers that it is or may be adversely affected by a development or change in another *region*, the *Registered Participant* may request the preparation of a report by the relevant *Network Service Provider* as to the technical impacts of the development or change. If so requested, the *Network Service Provider* must prepare such a report and provide a copy of it to *NEMMCO*, the *Registered Participant* requesting the report and, on request, any other *Registered Participant*.

5.6.2A Annual Planning Report

(a) By 30 June each year all *Transmission Network Service Providers* must *publish* an *Annual Planning Report* setting out the results of the annual planning review conducted in accordance with clause 5.6.2(a) and (b).

(b) The *Annual Planning Report* must set out:

(1) the forecast *loads* submitted by a *Distribution Network Service Provider* in accordance with clause 5.6.1 or as modified in accordance with clause 5.6.1(d);

(2) planning proposals for future *connection points*;

(3) a forecast of *constraints* and inability to meet the *network* performance requirements set out in schedule 5.1 or relevant legislation or regulations of a *participating jurisdiction* over 1, 3 and 5 years;

(4) for all proposed *augmentations* to the *network* the following information, in sufficient detail relative to the size or significance of the project and the proposed operational date of the project:

(i) project/asset name and the month and year in which it is proposed that the asset will become operational;

(ii) the reason for the actual or potential *constraint*, if any, or inability, if any, to meet the *network* performance requirements

set out in schedule 5.1 or relevant legislation or regulations of a *participating jurisdiction*, including *load* forecasts and all assumptions used;

(iii) the proposed solution to the *constraint* or inability to meet the *network* performance requirements identified in clause 5.6.2A(b)(4)(ii), if any;

(iv) total cost of the proposed solution;

(v) whether the proposed solution will have a *material inter-network impact*. In assessing whether an *augmentation* to the *network* will have a *material inter-network impact* a *Transmission Network Service Provider* must have regard to the objective set of criteria *published* by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(i) (if any such criteria have been *published* by the *Inter-regional Planning Committee*); and

(vi) other reasonable *network* and non-*network* options considered to address the actual or potential *constraint* or inability to meet the *network* performance requirements identified in clause 5.6.2A(b)(4)(ii), if any. Other reasonable *network* and non-*network* options include, but are not limited to, *interconnectors*, *generation* options, demand side options, *market network service* options and options involving other *transmission* and *distribution networks*;

(5) for all proposed *new small transmission network assets*:

(i) an explanation of the ranking of reasonable alternatives to the project including non-*network* alternatives. This ranking must be undertaken by the *Transmission Network Service Provider* in accordance with the principles contained in the *regulatory test*;

(ii) an *augmentation technical report* prepared by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(j) if, and only if, the asset is reasonably likely to have a *material inter-network impact* and the *Transmission Network Service Provider* has not received the consent to proceed with the proposed solution from all *Transmission Network Service* Providers whose *transmission networks* are materially affected by the *new small transmission network asset*. In assessing whether a *new small transmission network asset* is reasonably likely to have a *material inter-network impact*, a *Transmission Network Service Provider* must have regard to the objective set of criteria *published* by the *Inter-regional Planning Committee*

in accordance with clause 5.6.3(i) (if any such criteria have been *published* by the *Inter-regional Planning Committee*); and

(iii) analysis of why the *Transmission Network Service Provider* considers that the *new small transmission network asset* satisfies the *regulatory test* and, where the *Transmission Network Service Provider* considers that the *new small transmission network asset* satisfies the *regulatory test* as the *new small transmission network asset* is a *reliability augmentation*, analysis of why the *Transmission Network Service Provider* considers that the *new small transmission network asset* is a *reliability augmentation*. In assessing whether a *new small transmission network asset* is a *reliability augmentation*, a *Transmission Network Service Provider* must consider whether the *new small transmission network asset* satisfies the criteria for a *reliability augmentation published* by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(l) (if any such criteria have been *published* by the *Inter-regional Planning Committee*).

5.6.3 Inter-regional planning committee

(a) *NEMMCO* must establish an *Inter-regional Planning Committee*. The functions of the *Inter-regional Planning Committee* include to:

(1) provide such assistance as *NEMMCO* reasonably requests in connection with the preparation of the *statement of opportunities* and any update of it;

(2) provide such assistance as *NEMMCO* reasonably requests in connection with the carrying out of the *ANTS review*;

(3) *publish* an objective set of criteria for assessing whether a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact* in accordance with clause 5.6.3(i);

(4) *publish augmentation technical reports* in accordance with clause 5.6.3(j);

(5) *publish* an objective set of criteria for assessing whether a proposed *new small transmission network asset* or *new large transmission network asset* is a *reliability augmentation*, in accordance with clause 5.6.3(l);

(6) *publish* guidelines to assist *Registered Participants* to determine when an *inter-network test* may be required, in accordance with clause 5.7.7(k); and

(7) make recommendations to *NEMMCO* in relation to draft *test programs* in accordance with clause 5.7.7(o) and (q).

(b) The *Inter-regional Planning Committee* is to consist of:

(1) a *NEMMCO representative* as *Convener* of the *Inter-regional Planning Committee*;

(2) a *representative* from any entity that has been nominated by the relevant *Minister* of a *participating jurisdiction* as having *transmission system* planning responsibility in that *participating jurisdiction*; and

(3) such other persons appointed by *NEMMCO* that *NEMMCO* considers have the appropriate expertise to be members of the *Inter-regional Planning Committee*,

provided that a person appointed under clause 5.6.3(b)(2) must not take part in any decision or determination of the *Inter-regional Planning Committee* where the entity which they represent has a material financial interest in the matter to be decided or determined by the *Inter-regional Planning Committee*.

(c) A person appointed under clause 5.6.3(b)(2) will serve on the *Inter-regional Planning Committee* until such time as the relevant entity nominates a different person or the *Minister* of the *participating jurisdiction* who nominated the relevant entity notifies *NEMMCO* that another entity is to replace the previous entity as having *transmission system* planning responsibility in that *participating jurisdiction*.

(d) The term of office of members appointed under clause 5.6.3(b)(3) may be terminated at any time by *NEMMCO*.

(e) The *Inter-regional Planning Committee* must meet during the year at a frequency to be determined by the *Inter-regional Planning Committee*.

(f) The *Convener* of the *Inter-regional Planning Committee* must convene a meeting of the *Inter-regional Planning Committee* within a reasonable time after a reasonable request from a member of the *Inter-regional Planning Committee* is received setting out the business to be considered.

(g) *NEMMCO* and each entity from which a member of the *Inter-regional Planning Committee* has been appointed under clause 5.6.3(b)(2) must procure the availability of reasonable resources to enable the *Inter-regional Planning Committee* to carry out its responsibilities.

(h) *NEMMCO* and each entity from which a member of the *Inter-regional Planning Committee* has been appointed under clause 5.6.3(b)(2) must share the costs involved in conducting studies and analysis required to be

undertaken by the *Inter-regional Planning Committee* under the *Rules* on a basis to be agreed between them.

(i) The *Inter-regional Planning Committee* must develop and *publish*, and may vary from time to time, an objective set of criteria for assessing whether or not a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact*, in accordance with the *Rules consultation procedures*. In developing the objective set of criteria referred to in this clause, the *Inter-regional Planning Committee* must have regard to the relevant guiding objectives and principles provided by the *AEMC* in accordance with clause 5.6.3(n).

(j) Immediately upon receipt of a written request for an *augmentation technical report*, which must include sufficient information to enable the *Inter-regional Planning Committee* to carry out a review pursuant to this clause 5.6.3(j), together with payment of any reasonable fees to recover the *Inter-regional Planning Committee's* direct costs and expenses of the preparation of the *augmentation technical report*, the *Inter-regional Planning Committee* must:

(1) undertake a review of all matters referred to it by the *Transmission Network Service Provider* in order to assess the *augmentation* proposal and determine:

(i) the performance requirements for the equipment to be *connected*;

(ii) the extent and cost of *augmentations* and changes to all affected *transmission networks*; and

(iii) the possible material effect of the *new connection* on the *network power transfer capability* including that of other *transmission networks*;

(2) within 90 *business days*, or such other period as may be agreed by the *Transmission Network Service Provider* and the *Inter-Regional Planning Committee*, of receipt of such written request *publish* an *augmentation technical report*. The *Inter-Regional Planning Committee* must use reasonable endeavours to *publish* an *augmentation technical report* in as short a period as is reasonably practicable. The *augmentation technical report* must set out:

(i) the determinations of the *Inter-Regional Planning Committee* referred to in clause 5.6.3 (j)(1);

(ii) the information considered; and

(iii) the assumptions used.

(k) For the purposes of clause 5.6.3(j), the period in which the *Inter-regional Planning Committee* must *publish* an *augmentation technical report* will be automatically extended by the period of time taken by the *Transmission Network Service Provider* to provide additional information requested by the *Inter-regional Planning Committee*.

(l) The *Inter-regional Planning Committee* must develop and *publish*, and may vary from time to time, an objective set of criteria for assessing whether a proposed *new small transmission network asset* or *new large transmission network asset* is a *reliability augmentation*, in accordance with the *Rules consultation procedures*. In developing the objective set of criteria referred to in this clause, the *Inter-regional Planning Committee* must have regard to the relevant guiding objectives and principles provided by the *AEMC* in accordance with clause 5.6.3(n).

(m) Should the objective set of criteria referred to in clauses 5.6.3(i) or (l) be changed after an application notice (referred to in clause 5.6.6(b)) has been made available to *Registered Participants* and *NEMMCO*, in the case of a *new large transmission network asset*, or after the *publication* of the *Annual Planning Report*, in the case of a *new small transmission network asset*, then the relevant *Network Service Provider* is entitled to choose whether the new criteria, or the criteria that existed at the time the application notice was made available to *Registered Participants* and *NEMMCO* or the *Annual Planning Report* was *published*, is to be applied.

(n) The AEMC must, in consultation with *NEMMCO*, provide the *Inter-regional Planning Committee* with guiding objectives and principles for the development by the *Inter-regional Planning Committee* of the criteria for assessing whether a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact* and/or whether a proposed *new small transmission network asset* or *new large transmission network asset* is a *reliability augmentation* under clauses 5.6.3(i) and 5.6.3(l), respectively.

5.6.4 [Deleted]

5.6.5 Annual National Transmission Statement

(a) *NEMMCO* must each year conduct a review of:

(1) *national transmission flow paths*;

(2) forecast *constraints* in respect of *national transmission flow paths*;

(3) those options which, in *NEMMCO's* reasonable opinion, have the technical capability of relieving forecast *constraints* in respect of *national transmission flow paths*,

and prepare and *publish* an *Annual National Transmission Statement* by 31 October each year setting out the results of that review.

(b) *NEMMCO* must, in the course of conducting the *ANTS review*, consult with *Registered Participants* and *interested parties* in relation to:

(1) the data and assumptions to be used as part of the *ANTS review*; and

(2) the content of the *Annual National Transmission Statement*.

(c) In carrying out the *ANTS review*, *NEMMCO* must consider the following:

(1) the location of the current *national transmission flow paths* and the current capacities, *constraints* and congestion points on those flow paths;

(2) the location of the potential *national transmission flow paths* over the next 10 years, and the likely capacities, *constraints* and congestion points on those flow paths;

(3) the quantity of electricity which flowed, the periods in which the electricity flowed, and *constraints*, on the *national transmission flow paths* over the previous *financial year* or such other period as determined by *NEMMCO* having regard to data which is available to *NEMMCO*;

(4) the forecast quantity of electricity which is expected to flow, and the periods in which the electricity is expected to flow, the magnitude and significance of future *network losses* and *constraints* on the current and potential *national transmission flow paths* over the current *financial year* or such other period as determined by *NEMMCO* having regard to data which is available to *NEMMCO*;

(5) the projected capabilities of the existing *transmission network* and the *network control ancillary services* required to support existing and future *transmission network* capabilities;

(6) demand forecasts for the next 10 *financial years*;

(7) possible scenarios for additional *generation* and demand side options to meet demand forecasts;

(8) relevant intra-jurisdictional developments and any incremental works which may be needed to co-ordinate *national transmission flow path* planning with intra-jurisdictional planning;

(9) those *transmission network* options for relieving forecast *constraints* on the *national transmission flow paths*, which in *NEMMCO's* opinion, deliver technically feasible solutions that meet the projected

capabilities, demands, congestion and capacity for the *generation* expansion scenarios, taking into account committed projects; and

(10) such other matters as *NEMMCO*, in consultation with the *participating jurisdictions*, considers are appropriate.

(d) In considering the matters described in clause 5.6.5(c), *NEMMCO* must have regard to:

(1) the *Annual Planning Reports published* in the year in which the *ANTS review* is being conducted; and

(2) information obtained for the purposes of preparing the *statement of opportunities* to be *published* in the year in which the *ANTS review* is being conducted,

and may include information from the *Annual Planning Reports* and the *statement of opportunities* in the *Annual National Transmission Statement*.

(e) In carrying out the *ANTS review*, *NEMMCO* may seek the assistance of the *Inter-regional Planning Committee*.

(f) *NEMMCO* may by written notice request an entity nominated under clause 5.6.3(b)(2) to provide *NEMMCO* with any additional information or documents reasonably available to it that *NEMMCO* reasonably requires for the purpose of the *ANTS review*.

(g) An entity nominated under clause 5.6.3(b)(2) must comply with a written notice from *NEMMCO* issued pursuant to clause 5.6.5(f).

(h) *NEMMCO* may only use information or documents provided in accordance with clauses 5.6.5(f) and 5.6.5(g) for the purpose of preparing the *Annual National Transmission Statement* or, where relevant, the *statement of opportunities* or any update of it.

5.6.5A Regulatory Test

The *AER* must:

(a) promulgate the *regulatory test* (and may vary the *regulatory test* from time to time);

(b) have regard to the need to ensure that the *regulatory test* is consistent with the basis of asset valuation determined by the *AER* for the purposes of clause 6.2.3; and

(c) have regard to the obligations imposed on *Network Service Providers* to meet the *network* performance requirements set out in schedule 5.1 and

relevant legislation and regulations of a *participating jurisdiction*, in developing and maintaining the *regulatory test*.

5.6.6 Applications to establish new large transmission network assets

(a) In addition to the process and procedures to establish a *connection* to a *network* in clause 5.3, all applications to establish a *new large transmission network asset* must conform to the access arrangements in this clause 5.6.6 and follow the process set out in this clause 5.6.6.

(b) An applicant who proposes to establish a *new large transmission network asset* must consult all *Registered Participants*, *NEMMCO* and *interested parties* about the proposed *new large transmission network asset* in accordance with this clause 5.6.6. The applicant must make available to all *Registered Participants* and *NEMMCO* a notice *(*an *'application notice')* which must set out:

(1) a detailed description of:

(i) the proposed *new large transmission network asset*;

(ii) the reasons for proposing to establish the *new large transmission network asset* (including, where applicable, the actual or potential *constraint* or inability to meet the *network* performance requirements set out in schedule 5.1 or relevant legislation or regulations of a *participating jurisdiction*, including *load* forecasts and all assumptions used); and

(iii) all other reasonable *network* and non-*network* alternatives to address the identified *constraint* or inability to meet the *network* performance requirements identified in clause 5.6.6(b)(1)(ii). These alternatives include, but are not limited to, *interconnector*s, *generation* options, demand side options, *market network service* options and options involving other *transmission* and *distribution networks*;

(2) all relevant technical details concerning the proposed *new large transmission network asset* and the construction timetable and commissioning date for the *new large transmission network asset*;

(3) an analysis of the ranking of the proposed *new large transmission network asset* and all reasonable alternatives. This ranking must be undertaken by the applicant in accordance with the principles contained in the *regulatory test*;

(4) an *augmentation technical report* prepared by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(j) if, and only if, the asset is reasonably likely to have a *material inter-network impact*

and the applicant has not received the consent to proceed with such construction from all *Transmission Network Service Providers* whose *transmission networks* will be materially affected by the *new large transmission network asset*. In assessing whether a *new large transmission network asset* is reasonably likely to have a *material inter-network impact*, an applicant must have regard to the objective set of criteria *published* by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(i) (if any such criteria have been *published* by the *Inter-regional Planning Committee*); and

(5) detailed analysis of why the applicant considers that the *new large transmission network asset* satisfies the *regulatory test* and, where the applicant considers that the *new large transmission network asset* satisfies the *regulatory test* as the *new large transmission network asset* is a *reliability augmentation*, analysis of why the applicant considers that the *new large transmission network asset* is a *reliability augmentation*. In assessing whether a *new large transmission network asset* is a *reliability augmentation*, the applicant must consider whether the *new large transmission network asset* satisfies the criteria for a *reliability augmentation published* by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(l) (if any such criteria have been *published* by the *Inter-regional Planning Committee*).

(c) The applicant must provide a summary of the *application notice* to *NEMMCO*. Within 3 *business days* of receipt of the summary, *NEMMCO* must *publish* the summary on its website. The applicant must, upon request by an *interested party*, provide a copy of the *application notice* to the *interested party* within 3 *business days* of the request.

(d) Within 30 *business days* of publication of the summary of the *application notice* on *NEMMCO's* website *interested parties* may make written submissions to the applicant on any matter in the *application notice*. A written submission may state whether the *interested party* considers that a meeting is necessary.

(e) The applicant must consider all submissions received in accordance with the requirements of clause 5.6.6(d) within a further 30 *business days*. The applicant must use its best endeavours to hold meetings with *interested parties* who have requested meetings within a further 21 *business days* if:

(1) after having considered all submissions received in accordance with the requirements of clause 5.6.6(d), it concludes that it is desirable or necessary to hold any such meetings; or

(2) a meeting is requested by 2 or more *interested parties*.

(f) The applicant must prepare a final report, that is to be made available to all *Registered Participants, NEMMCO* and *interested parties* who responded to the *application notice*, which must set out the matters detailed in clause 5.6.6(b) and summarises the submissions received from *interested parties* and the applicant's response to each such submission.

(g) The applicant must provide a summary of the final report to *NEMMCO*. Within 3 *business days* of receipt of the summary, *NEMMCO* must publish the summary on its website.

(h) *Registered Participants*, *NEMMCO* and *interested parties* may dispute the contents, assumptions, findings or recommendations of the final report prepared under clause 5.6.6(f) with respect to:

(1) possible alternatives considered and their ranking under clause 5.6.6(b)(3);

(2) whether the *new large transmission network asset* will have a *material inter-network impact*;

(3) the basis on which the applicant has assessed that the *new large transmission network asset* satisfies the *regulatory test*; and

(4) whether the *new large transmission network asset* is a *reliability augmentation* and (if any such criteria had been *published* by the *Inter-regional Planning Committee* at the time of preparation of the final report under clause 5.6.6(f)) whether the *new large transmission network asset* satisfies the criteria for a *reliability augmentation published* by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(l),

using the dispute resolution process in clause 8.2. The Stage 1 dispute resolution process set out in clause 8.2.4 does not apply to a dispute of a type referred to in this clause 5.6.6(h) and the dispute must be referred to the *Adviser* under clause 8.2.5 within 30 *business days* after publication of the summary of the final report on *NEMMCO's* website. For the avoidance of doubt, *Registered Participants*, *NEMMCO* and *interested parties* may not dispute any matters set out in the final report prepared in accordance with clause 5.6.6(f) which are regarded as externalities by the *regulatory test*.

(i) Where a dispute is referred to the *Adviser* in accordance with clause 5.6.6(h), clause 8.2 applies generally to the dispute (subject to clause 5.6.6(h)) except to the extent that the following provisions apply to the dispute:

(1) The *Adviser* must refer the dispute for resolution by a *DRP* under clause 8.2.5(c)(2) and must not attempt to resolve the dispute in accordance with clause 8.2.5(c)(1).

(2) The *DRP* may only extend the time for determination of the dispute with the agreement of the *AER* and of all parties to the dispute.

(3) The *DRP* may only determine factual issues referred to it, except to the extent that clauses 5.6.6(i)(4) and (5) expressly provide to the contrary.

(4) The *DRP* may determine, in a dispute regarding the contents of the final report prepared under clause 5.6.6(f), that the final report prepared in accordance with clause 5.6.6(j) include findings or recommendations on specified matters.

(5) The *DRP* may determine whether the *new large transmission network asset* will have a *material inter-network impact* and/or is a *reliability augmentation*. In doing so, the *DRP* must take into account the *Inter-regional Planning Committee*'s objective set of criteria for assessing whether the *new large transmission network asset* is reasonably likely to have a *material inter-network impact* or whether it is a *reliability augmentation* (if any such criteria had been *published* by the *Inter-regional Planning Committee* at the time of preparation of the final report under clause 5.6.6(f)).

(6) The *DRP* cannot determine whether the *new large transmission network asset* satisfies the *regulatory test*.

(7) The *DRP* has the power to disregard any frivolous matter set out by the *complainant* or raised by a party in the dispute resolution process.

(8) The *DRP* has power to bar any person from further participation in the dispute resolution process.

(9) All disputes relating to the same *new large transmission network asset* must be determined contemporaneously in the same proceeding by the *DRP*.

(10) The *DRP* must *publish* the reasons for its determination.

(j) Following the resolution of a dispute raised in accordance with clause 5.6.6(h), the applicant must *publish* a final report which includes the matters set out in clause 5.6.6(f), incorporating any agreed or amended matters and any determination by the *DRP*.

(k) The applicant must provide a summary of the final report prepared in accordance with clause 5.6.6(j) to *NEMMCO*. Within 3 *business days* of receipt of the summary, *NEMMCO* must publish the summary on its website. The applicant must, upon request by an *interested party*, provide a copy of the final report prepared in accordance with clause 5.6.6(j) to the *interested party* within 3 *business days* of the request.

(l) *Registered Participants*, *NEMMCO* and *interested parties* may dispute the finding in a final report prepared in accordance with clause 5.6.6(j), or if no dispute is raised under clause 5.6.6(h) a final report prepared in accordance with clause 5.6.6(f), that the *new large transmission network asset* satisfies the *regulatory test*, provided the *new large transmission network asset* is not a *reliability augmentation*. To be valid, the dispute must be raised within 10 *business days* after *publication* of the final report as described in clause 5.6.6(j) or, if no dispute is raised in accordance with clause 5.6.6(h), within 10 *business days* after the time allowed for raising a valid dispute under clause 5.6.6(h) ends.

(m) Where a dispute is raised in accordance with clause 5.6.6(l), the applicant must apply to the *AER* for a determination whether the *new large transmission network asset* satisfies the *regulatory test* prior to construction.

(n) The *AER* must use the findings and recommendations in the final report prepared in accordance with clause 5.6.6(f) or, if a dispute is raised under clause 5.6.6(h) the final report prepared in accordance with clause 5.6.6(j), and may have regard to any other matter it considers relevant when determining whether or not the *new large transmission network asset* satisfies the *regulatory test*.

(o) Subject to clause 5.6.6(q), where the applicant makes an application to the *AER* in accordance with clause 5.6.6(m), the *AER* must determine whether the *new large transmission network asset* satisfies the *regulatory test* within 120 *business days* of receipt from an applicant of:

(1) a referral setting out the details required by the *AER* from time to time;

(2) a copy of the *application notice*;

(3) a copy of the final report prepared in accordance with clause 5.6.6(f) or, if a dispute is raised under clause 5.6.6(h), the final report prepared in accordance with clause 5.6.6(j); and

(4) a copy of the determination of the *DRP*, if any.

The period in which the *AER* must determine whether the *new large transmission network asset* satisfies the *regulatory test* will be automatically extended by the period of time taken by the applicant to provide additional information on request by the *AER*.

(p) The determination of the *AER* pursuant to clause 5.6.6(o) will only apply until the end of the *regulatory control period* in which the determination is made.

(q) The *AER* may, prior to the expiry of the time period referred to in clause 5.6.6(o), render the applicant an invoice in relation to the costs incurred by the *AER* in engaging a consultant to assist the *AER* in its determination under clause 5.6.6(o) as to whether or not a *new large transmission network asset* satisfies the *regulatory test*. If such an invoice is rendered, the *AER* is not required to make a *regulatory test* determination until the expiry of a period of 7 *business days* from the payment to the *AER* of the full amount of the invoice.

5.6.6A Construction of new small transmission network assets

(a) Each *Transmission Network Service Provider* must consult with any *interested parties* on any matter relating to a proposed *new small transmission network asset* set out in the *Annual Planning Report*. *Interested parties* may make written submissions to the *Transmission Network Service Provider*. To be valid, a submission must be received within 20 *business days* of *publication* of the *Annual Planning Report*.

(b) At the conclusion of the consultation process in clause 5.6.6A(a):

(1) if there is any material change in the matters referred to in clauses 5.6.2A(b)(4) and (5) with respect to the *new small transmission network asset* as a result of the consultation process, the *Transmission Network Service Provider* must *publish* again the matters set out in clauses 5.6.2A(b)(4) and (5) in relation to such *new small transmission network asset*, incorporating the agreed or amended matters; and

(2) the *AER* must take into account the report *published* by the *Transmission Network Service Provider* in accordance with clause 5.6.6A(b)(1) and all material submitted to the *Transmission Network Service Provider* in the consultation process in the process of its determination of the *Transmission Network Service Provider's revenue cap* and whether the *new small transmission network asset* the subject of the consultation satisfies the *regulatory test*.

(c) In relation to a *new small transmission network asset* which was not identified in an *Annual Planning Report* or if a matter set out in the *Annual Planning Report* pursuant to clause 5.6.2A(b) has materially changed since the *publication* of the *Annual Planning Report* the *Transmission Network Service Provider* must prepare a report that is to be published to all *Registered Participants*, *NEMMCO* and *interested parties* which sets out the matters referred to in clauses 5.6.2A(b)(4) and (5) in relation to that *new small transmission network asset*.

(d) Each *Transmission Network Service Provider* must consult with any *interested parties* on any matter relating to a proposed *new small transmission network asset* set out in a report prepared pursuant to

clause 5.6.6A(c). *Interested parties* may make written submissions to the *Transmission Network Service Provider*. To be valid, a submission must be received within 20 *business days* of publication of the report prepared pursuant to clause 5.6.6A(c).

(e) At the conclusion of the consultation process in clause 5.6.6A(d):

(1) if there is any material change in the matters referred to in clauses 5.6.2A(b)(4) and (5) with respect to the *new small transmission network asset* as a result of the consultation process the *Transmission Network Service Provider* must *publish* again the matters set out in clauses 5.6.2A(b)(4) and (5) in relation to such *new small transmission network asset*, incorporating the agreed or amended matters; and

(2) the *AER* must take into account the matters raised in the consultation process in its determination of the *Transmission Network Service Provider's revenue cap* and its determination of whether the *new small transmission network asset* the subject of the consultation satisfies the *regulatory test.*

5.6.6B Construction of Funded Augmentations

(a) The term *Transmission Network Service Provider* when used in this clause 5.6.6B is not intended to refer to, and is not to be read or construed as referring to, any *Transmission Network Service Provider* in its capacity as a *Market Network Service Provider*.

(b) A *Transmission Network Service Provider* who proposes to construct a *funded augmentation* must make available to all *Registered Participants* and *NEMMCO* a notice which must set out:

(1) a detailed description of the proposed *funded augmentation*;

(2) all relevant technical details concerning the proposed *funded augmentation*, the impact of the *funded augmentation* on the relevant *transmission network's Transmission Network Users* and the construction timetable and commissioning date for the *funded augmentation*;

(3) an *augmentation technical report* prepared by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(j) if, and only if, the *funded augmentation* is reasonably likely to have a *material inter-network impact* and the *Transmission Network Service Provider* has not received consent to proceed with construction from all *Transmission Network Service Providers* whose *transmission networks* are materially affected by the *funded augmentation*. In assessing whether a *funded augmentation* is reasonably likely to have

a *material inter-network impact*, the *Transmission Network Service Provider* must have regard to the objective set of criteria *published* by the *Inter-regional Planning Committee* in accordance with clause 5.6.3(i) (if any such criteria have been *published* by the *Inter-regional Planning Committee*).

(c) The *Transmission Network Service Provider* must provide a summary of the notice prepared in accordance with clause 5.6.6B(b) to *NEMMCO*. Within 3 *business days* of receipt of the summary, *NEMMCO* must publish the summary on its website.

(d) The *Transmission Network Service Provider* must consult with any *interested parties*, in accordance with the *Rules consultation procedures*, on any matter set out in the notice prepared in accordance with clause 5.6.6B(b).

5.6.6C Review of clause 5.6

[Deleted]

5.7 Inspection and Testing

5.7.1 Right of entry and inspection

(a) If a *Registered Participant* who is party to a *connection agreement* reasonably believes that the other party to the *connection agreement* (being a party who is also a *Registered Participant*) is not complying with a technical provision of the *Rules* and that, as a consequence, the first *Registered Participant* is suffering, or is likely to suffer, a material adverse effect, then the first *Registered Participant* may enter the relevant *facility* at the *connection point* of the other *Registered Participant* in order to assess compliance by the other *Registered Participant* with its technical obligations under the *Rules*.

(b) A *Registered Participant* who wishes to inspect the *facilities* of another *Registered Participant* under clause 5.7.1(a) must give that other *Registered Participant* at least 2 *business days'* notice of its intention to carry out an inspection.

(c) A notice given under clause 5.7.1(b) must include the following information:

(1) the name of the *representative* who will be conducting the inspection on behalf of the *Registered Participant*;

(2) the time when the inspection will commence and the expected time when the inspection will conclude; and

(3) the nature of the suspected non-compliance with the *Rules*.

(d) Neither a *Registered Participant* nor *NEMMCO* may carry out an inspection under this clause 5.7 within 6 *months* of any previous inspection except for the purpose of verifying the performance of corrective action claimed to have been carried out in respect of a non-conformance observed and documented on the previous inspection or (in the case of *NEMMCO*) for the purpose of investigating an operating incident in accordance with clause 4.8.15.

(e) At any time when the *representative* of a *Registered Participant* is in another *Registered Participant's facility*, that *representative* must:

(1) cause no damage to the *facility;*

(2) only interfere with the operation of the *facility* to the extent reasonably necessary and approved by the relevant *Registered Participant* (such approval not to be unreasonably withheld or delayed); and

(3) observe "permit to test" access to sites and clearance protocols of the operator of the *facility*, provided that these are not used by the operator of the *facility* solely to delay the granting of access to site and inspection.

(f) Any *representative* of a *Registered Participant* conducting an inspection under this clause 5.7.1 must be appropriately qualified to perform the relevant inspection.

(g) The costs of inspections under this clause 5.7.1 must be borne by the *Registered Participant* requesting the inspection.

(h) *NEMMCO* or any of its *representatives* may, in accordance with this clause 5.7, inspect a *facility* of a *Registered Participant* and the operation and maintenance of that *facility* in order to:

(1) assess compliance by the relevant *Registered Participant* with its operational obligations under Chapter 3 or 4, or an *ancillary services agreement*;

(2) investigate any possible past or potential threat to *power system security*; or

(3) conduct any periodic familiarisation or training associated with the operational requirements of the *facility*.

(i) Any inspection under clause 5.7.1(a) or (h) must only be for so long as is reasonably necessary.

(j) Any equipment or goods installed or left on land or in premises of a *Registered Participant* after an inspection conducted under clause 5.7.1 do not become the property of the relevant *Registered Participant* (notwithstanding that they may be annexed or affixed to the relevant land or premises).

(k) In respect of any equipment or goods left on land or premises of a *Registered Participant* during or after an inspection, a *Registered Participant*:

(1) must not use any such equipment or goods for a purpose other than as contemplated in the *Rules* without the prior written approval of the owner of the equipment or goods;

(2) must allow the owner of any such equipment or goods to remove any such equipment or goods in whole or in part at a time agreed with the relevant *Registered Participant*, such agreement not to be unreasonably withheld or delayed; and

(3) must not create or cause to be created any mortgage, charge or lien over any such equipment or goods.

(l) A *Registered Participant* (in the case of an inspection carried out under clause 5.7.1(a)) or *NEMMCO* (in the case of an inspection carried out under clause 5.7.1(h)) must provide the results of that inspection to the *Registered Participant* whose *facilities* have been inspected, any other *Registered Participant* which is likely to be materially affected by the results of the test or inspection and *NEMMCO* (in the case of an inspection carried out under clause 5.7.1(a)).

5.7.2 Right of testing

(a) A *Registered Participant*, who has reasonable grounds to believe that equipment owned or operated by a *Registered Participant* with whom it has a *connection agreement* (which equipment is associated with the *connection agreement)* may not comply with the *Rules* or the *connection agreement*, may request testing of the relevant equipment by giving notice in writing to the other *Registered Participant*.

(b) If a notice is given under clause 5.7.2(a) the relevant test is to be conducted at a time agreed by *NEMMCO*.

(c) The *Registered Participant* who receives a notice under clause 5.7.2(a) must co-operate in relation to conducting tests requested under clause 5.7.2(a).

(d) The cost of tests requested under clause 5.7.2(a) must be borne by the *Registered Participant* requesting the test, unless the equipment is determined by the tests not to comply with the relevant *connection*

agreement and the *Rules*, in which case all reasonable costs of such tests must be borne by the owner of that equipment.

(e) Tests conducted in respect of a *connection point* under clause 5.7.2 must be conducted using test procedures agreed between the relevant *Registered Participants*, which agreement is not to be unreasonably withheld or delayed.

(f) Tests under clause 5.7.2 must be conducted only by persons with the relevant skills and experience.

(g) A *Transmission Network Service Provider* must give *NEMMCO* adequate prior notice of intention to conduct a test in respect of a *connection point* to that *Network Service Provider's network*.

(h) The *Registered Participant* who requests a test under this clause 5.7.2 may appoint a *representative* to witness a test and the relevant *Registered Participant* must permit a *representative* appointed under this clause 5.7.2(h) to be present while the test is being conducted.

(i) A *Registered Participant* who conducts a test must submit a report to the *Registered Participant* who requested the relevant test, *NEMMCO* and to any other *Registered Participant* which is likely to be materially affected by the results of the test, within a reasonable period after the completion of the test and the report is to outline relevant details of the tests conducted, including but not limited to the results of those tests.

(j) A *Network Service Provider* may attach test equipment or *monitoring equipment* to *plant* owned by a *Registered Participant* or require a *Registered Participant* to attach such test equipment or *monitoring equipment*, subject to the provisions of clause 5.7.1 regarding entry and inspection.

(k) In carrying out monitoring under clause 5.7.2(j) the *Network Service Provider* must not cause the performance of the monitored *plant* to be *constrained* in any way.

5.7.3 Tests to demonstrate compliance with connection requirements for generators

(a) Each *Generator* must, prior to the *Generator* implementing a compliance program in accordance with clause 4.15(b), provide evidence to any relevant *Network Service Provider* with which that *Generator* has a *connection agreement* and *NEMMCO* that each of its *generating units* complies with the applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant *connection agreement* and the *performance standards* for that *generating unit*.

(b) Each *Generator* must negotiate in good faith with the relevant *Network Service Provider* and *NEMMCO* to agree on a compliance monitoring program, including an agreed method, for each of its *generating units* to confirm ongoing compliance with the applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant *connection agreement* and the *performance standards* for that *generating unit*.

(c) If, prior to the *Generator* implementing a compliance program in accordance with the requirements of clause 4.15(b), a performance test or monitoring of in-service performance demonstrates that a *generating unit* is not complying with one or more technical requirements of clause S5.2.5 of schedule 5.2 and the relevant *connection agreement* or one or more of the *performance standards* for that *generating unit* then the *Generator* must:

(1) promptly notify the relevant *Network Service Provider* and *NEMMCO* of that fact;

(2) promptly advise the *Network Service Provider* and *NEMMCO* of the remedial steps it proposes to take and the timetable for such remedial work;

(3) diligently undertake such remedial work and report at monthly intervals to the *Network Service Provider* on progress in implementing the remedial action; and

(4) conduct further tests or monitoring on completion of the remedial work to confirm compliance with the relevant technical requirements or *performance standards* (as the case may be).

(d) If *NEMMCO* reasonably believes that a *generating unit* is not complying with one or more applicable *performance standards* or one or more applicable technical requirements of clause S5.2.5 of schedule 5.2 and the relevant *connection agreement*, *NEMMCO* may instruct the *Generator* to conduct tests within 25 *business days* to demonstrate that the relevant *generating unit* complies with those *performance standards* or technical requirements and if the tests provide evidence that the relevant *generating unit* continues to comply with those requirement(s) *NEMMCO* must reimburse the *Generator* for the reasonable expenses incurred as a direct result of conducting the tests.

(e) If *NEMMCO*:

(1) is satisfied that a *generating unit* does not comply with one or more technical requirements of clause S5.2.5 of schedule 5.2 and the relevant *connection agreement*;

(2) does not have evidence demonstrating that a *generating unit* complies with the technical requirements set out in clause S5.2.5 of schedule 5.2; and

(3) holds the reasonable opinion that there is or could be a threat to the *power system security* because of the performance of the *generating unit*,

NEMMCO may direct the relevant *Generator* to operate the relevant *generating unit* at a particular *generated* output or in a particular mode until the relevant *Generator* submits evidence reasonably satisfactory to *NEMMCO* that the *generating unit* is complying with the relevant technical requirement(s).

(f) Each *Generator* must maintain records for 7 years for each of its *generating units* and *power stations* setting out details of the results of all technical performance and monitoring conducted under this clause 5.7.3 and make these records available to *NEMMCO* on request.

5.7.4 Routine testing of protection equipment

(a) A *Registered Participant* must co-operate with any relevant *Network Service Provider* to test the operation of equipment forming part of a *protection system* relating to a *connection point* at which that *Registered Participant* is *connected* to a *network* and the *Registered Participant* must conduct these tests:

(1) prior to the *plant* at the relevant *connection point* being placed in service; and

(2) at intervals specified in the *connection agreement* or in accordance with an asset management plan agreed between the *Network Service Provider* and the *Registered Participant*.

(a1) A *Network Service Provider* must institute and maintain a compliance program to ensure that its *facilities* of the following types, to the extent that the proper operation of a *facility* listed in this clause may affect *power system security*, operate reliably and in accordance with their performance requirements under schedule 5.1:

(1) *protection systems*;

(2) *control systems* for maintaining or enhancing *power system* stability;

(3) *control systems* for controlling *voltage* or *reactive power*; and

(4) *control systems* for *load shedding.*

(a2) A compliance program under clause 5.7.4(a1) must:

(1) include monitoring of the performance of the *facilities*;

(2) to the extent reasonably necessary, include provision for periodic testing of the performance of those *facilities* upon which *power system security* depends;

(3) provide reasonable assurance of ongoing compliance of the *facilities* with the relevant performance requirements of schedule 5.1; and

(4) be in accordance with *good electricity industry practice*.

(a3) A *Network Service Provider* must immediately notify *NEMMCO* if it reasonably believes that a *facility* of a type listed in clause 5.7.4(a1) does not comply with, or is likely not to comply with, its performance requirements.

(a4) A notice issued under clause 5.7.4(a3) must:

(1) identify the *facility* and the requirement with which the *facility* does not comply;

(2) give an explanation of the reason why the *facility* failed to comply with its performance requirement;

(3) give the date and time when the *facility* failed to comply with its performance requirement;

(4) give the date and time when the *facility* is expected to again comply with its performance requirement; and

(5) describe the expected impact of the failure on the performance of the *Network Service Provider's transmission system* or *distribution system.*

(b) Each *Registered Participant* must bear its own costs of conducting tests under this clause 5.7.4.

5.7.5 Testing by Registered Participants of their own plant requiring changes to normal operation

(a) A *Registered Participant* proposing to conduct a test on equipment related to a *connection point*, which requires a change to the normal operation of that equipment, must give notice in writing to the relevant *Network Service Provider* of at least 15 *business days* except in an emergency.

(b) The notice to be provided under clause 5.7.5(a) must include:

(1) the nature of the proposed test;

(2) the estimated start and finish time for the proposed test;

(3) the identity of the equipment to be tested;

(4) the *power system* conditions required for the conduct of the proposed test;

(5) details of any potential adverse consequences of the proposed test on the equipment to be tested;

(6) details of any potential adverse consequences of the proposed test on the *power system*; and

(7) the name of the person responsible for the co-ordination of the proposed test on behalf of the *Registered Participant*.

(c) The *Network Service Provider* must review the proposed test described in a notice provided under clause 5.7.5(a) to determine whether the test:

(1) could adversely affect the normal operation of the *power system*;

(2) could cause a threat to *power system security*;

(3) requires the *power system* to be operated in a particular way which differs from the way in which the *power system* is normally operated; or

(4) could affect the normal *metering* of *energy* at a *connection point*.

(d) If the *Network Service Provider* determines that the proposed test does fulfil one of the conditions specified in clause 5.7.5(c), then the *Registered Participant* and *Network Service Provider* must seek *NEMMCO's* approval prior to undertaking the test, which approval must not be unreasonably withheld or delayed.

(e) If, in *NEMMCO's* reasonable opinion, a test could threaten public safety, damage or threaten to damage equipment or adversely affect the operation of the *power system*, *NEMMCO* may direct that the proposed test procedure be modified or that the test not be conducted at the time proposed.

(f) *NEMMCO* must advise *Network Service Providers* of any test which may have a possible effect on normal *metering* of *energy* at a *connection point.*

(g) *NEMMCO* must advise any other *Registered Participants* who might be adversely affected by a proposed test and consider any reasonable requirements of those *Registered Participants* when approving the proposed test.

(h) The *Registered Participant* who conducts a test under this clause 5.7.5 must ensure that the person responsible for the co-ordination of a test promptly advises *NEMMCO* when the test is complete.

(i) If *NEMMCO* approves a proposed test, *NEMMCO* must use its reasonable endeavours to ensure that *power system* conditions reasonably required for that test are provided as close as is reasonably practicable to the proposed start time of the test and continue for the proposed duration of the test.

(j) Within a reasonable period after any such test has been conducted, the *Registered Participant* who has conducted a test under this clause 5.7.5 must provide the *Network Service Provider* with a report in relation to that test including test results where appropriate.

5.7.6 Tests of generating units requiring changes to normal operation

(a) A *Network Service Provider* may, at intervals of not less than 12 months per *generating unit*, require the testing by a *Generator* of any *generating unit connected* to the *network* of that *Network Service Provider* in order to determine analytic parameters for modelling purposes or to assess the performance of the relevant *generating unit* for the purposes of a *connection agreement*, and the *Network Service Provider* is entitled to witness such tests.

(b) Adequate notice of not less than 15 *business days* must be given by the *Network Service Provider* to the *Generator* before the proposed date of a test under clause 5.7.6(a).

(c) The *Network Service Provider* must use its best endeavours to ensure that tests permitted under this clause 5.7.6 are conducted at a time which will minimise the departure from the *commitment* and *dispatch* that are due to take place at that time.

(d) If not possible beforehand, a *Generator* must conduct a test under clause 5.7.6 at the next scheduled *outage* of the relevant *generating unit* and in any event within 9 months of the request.

(e) A *Generator* must provide any reasonable assistance requested by the *Network Service Provider* in relation to the conduct of tests.

(f) Tests conducted under clause 5.7.6 must be conducted in accordance with test procedures agreed between the *Network Service Provider* and the relevant *Generator* and a *Generator* must not unreasonably withhold its agreement to test procedures proposed for this purpose by the *Network Service Provider*.

(g) The *Network Service Provider* must provide to a *Generator* such details of the analytic parameters of the model derived from the tests referred to in

clause 5.7.6 for any of that *Generator's generating units* as may reasonably be requested by the *Generator*.

(h) Each *Generator* must bear its own costs associated with tests conducted under this clause 5.7.6 and no compensation is payable for financial losses incurred as a result of these tests or associated activities.

5.7.7 Inter-network power system tests

(a) For each kind of development or activity described in the first column of chart 1 below, the *Proponent* is as set out in the second column and the *Relevant Transmission Network Service Provider* ("*Relevant TNSP*") is as set out in the third column, respectively, opposite the description of the development or activity.

Chart 1

No.	**Kind of development or activity**	***Proponent***	***Relevant TNSP***
	column 1	**column 2**	**column 3**
1.	A new *transmission line* between two *networks*, or within a *transmission network*, that is anticipated to have a *material inter-network impact* is commissioned.	*Network Service Provider* in respect of the new *transmission line*.	*Proponent* and the *Transmission Network Service Provider* in respect of any *network* to which the *transmission line* is *connected*.
2.	An existing *transmission line* between two *networks*, or within a *transmission network*, that is anticipated to have a *material inter-network impact* is *augmented* or substantially modified.	*Network Service Provider* in respect of the *augmentation* or modification of the *transmission line*.	*Proponent* and the *Transmission Network Service Provider* in respect of any *network* to which the *transmission line* is *connected*.

No.	**Kind of development or activity**	***Proponent***	***Relevant TNSP***
	column 1	**column 2**	**column 3**
3.	A new *generating unit* or *facility* of a *Customer* or a *network* development is commissioned that is anticipated to have a *material inter-network impact*.	*Generator* in respect of the *generating unit* and associated *connection assets*. *Customer* in respect of the *facility* and associated *connection assets*. *Network Service Provider* in respect of the relevant *network*.	*Transmission Network Service Provider* in respect of any *network* to which the *generating unit*, *facility* or *network* development is *connected* and, if a *network* development, then also the *Proponent*.
4.	Setting changes are made to any *power system* stabilisers as a result of a *generating unit*, *facility* of a *Customer* or *network development* being commissioned, modified or replaced.	*Generator* in respect of the *generating unit*. *Customer* in respect of the *facility*. *Network Service Provider* in respect of the relevant *network*.	*Transmission Network Service Provider* in respect of any *transmission network* to which the *generating unit*, *facility* or *network* development is *connected*.
5.	Setting changes are made to any *power system* stabilisers as a result of a decision by the *Inter-regional Planning Committee* or *NEMMCO*, which are not covered by item 4 in this chart.	*NEMMCO*.	None.
6.	*NEMMCO* determines that a test is required to verify the performance of the *power system* in light of the results of planning studies or simulations or one or more system incidents.	*NEMMCO*.	None.

(b) A *Registered Participant*, not being a *Transmission Network Service Provider*, determined in accordance with clause 5.7.7(a) to be a *Proponent* for a development or activity detailed in chart 1, may require the *Relevant TNSP* corresponding to that development or activity to undertake on their behalf their obligations as the *Proponent* and, where the *Relevant TNSP* receives a written request to undertake those obligations, the *Relevant TNSP* must do so.

(c) Where, in this clause 5.7.7, there is a reference to a *Proponent* that reference includes a *Relevant TNSP* required in accordance with clause 5.7.7(b) to undertake the obligations of another *Registered Participant*.

(d) If a *Relevant TNSP* is required by a *Registered Participant* in respect of a *scheduled generating unit*, a *scheduled load* or a *market network service*, any of which have a *nameplate rating* in excess of 30 MW, to act as a *Proponent* in accordance with clause 5.7.7(b), that *Relevant TNSP* is entitled to recover all reasonable costs incurred from the *Registered Participant* that required the *Relevant TNSP* to act as the *Proponent*.

(e) A *Registered Participant* wishing to undertake a development or conduct an activity listed in item 1, 2, 3 or 4 of chart 1 must notify *NEMMCO* not less than 80 *business days* before the *transmission line*, *generating unit*, *facility* or *network* development is planned to be commissioned, modified or replaced, giving details of the development or activity.

(f) If *NEMMCO* receives a notice under clause 5.7.7(e), then it must provide a copy of the notice to each member of the *Inter-regional Planning Committee* and consult with the *Inter-regional Planning Committee* about the potential impact of the development or activity.

(g) *NEMMCO* or the *Relevant TNSP* in respect of a development or activity may notify the *Proponent* of the development or activity that *NEMMCO* or the *Relevant-TNSP* believes that an *inter-network test* is required in relation to that development or activity.

(h) *NEMMCO* or the *Relevant TNSP* may only give a notice under clause 5.7.7(g) if *NEMMCO* or the *Relevant TNSP* considers that:

(1) the development or activity may have a material impact on the magnitude of the *power transfer capability* of more than one *transmission network* and, in the circumstances, an *inter-network test* is required; or

(2) if the *Inter-regional Planning Committee* has *published* guidelines under clause 5.7.7(k), an *inter-network test* is required having regard to those guidelines and the surrounding circumstances.

(i) If *NEMMCO* or the *Relevant TNSP* gives a notice under clause 5.7.7(g), then they must also promptly give a copy of the notice to each member of the *Inter-regional Planning Committee*.

(j) A *Registered Participant* undertaking a development or activity listed in chart 1 must provide such information to *NEMMCO* or the *Relevant TNSP* in respect of the development or activity as *NEMMCO* or the *Relevant TNSP* reasonably requests in order to make an assessment under this clause 5.7.7.

(k) The *Inter-regional Planning Committee* may develop, *publish* and amend from time to time, in accordance with the *Rules consultation procedures*, a set of guidelines to assist *Registered Participants* to determine when an *inter-network test* may be required.

(l) If the *Inter-regional Planning Committee* has *published* guidelines in accordance with clause 5.7.7(k), then *NEMMCO* and the *Relevant TNSP* must consider those guidelines in determining whether an *inter-network test* is required under clause 5.7.7(g) or 5.7.7(n).

(m) If *NEMMCO* or the *Relevant TNSP* gives notice under clause 5.7.7(g), then the *Proponent* must, in consultation with *NEMMCO*, prepare a draft *test program* for the *inter-network test* and submit it to each member of the *Inter-regional Planning Committee* and the *Relevant TNSP* (if the *Relevant TNSP* gave the notice given under clause 5.7.7(g)).

(n) If *NEMMCO* determines that an *inter-network test* is required for a reason contemplated in item 5 or 6 of chart 1, then it must prepare a draft *test program* for the *inter-network test* and submit it to each member of the *Inter-regional Planning Committee* at least 40 *business days* prior to the proposed test.

(o) The *Inter-regional Planning Committee* must:

(1) meet within 15 *business days* of the members receiving a draft *test program* under clauses 5.7.7(m) or (n); and

(2) within a period of not more than 10 *business days* make a recommendation to *NEMMCO* on the draft *test program* that identifies changes the *Inter-regional Planning Committee* proposes to the *test program*.

(p) *NEMMCO* must:

(1) *publish* a copy of the draft *test program* and any relevant changes recommended by the *Inter-regional Planning Committee* and invite interested *Registered Participants* to make written submissions;

(2) only accept as valid submissions received not later than the date specified in the notice *publishing* the copy of the draft *test program* (not to be less than 14 *days* after the date of *publication*); and

(3) provide the *Inter-regional Planning Committee* with copies of all valid submissions and seek its final recommendation.

(q) The *Inter-regional Planning Committee* must consider and take into account all valid submissions received and may amend its recommendation.

(r) *NEMMCO* must determine and *publish* in accordance with clause 3.13.13 the *test program* for an *inter-network test* after taking into account the draft *test program* submitted to the *Inter-regional Planning Committee*, the *Inter-regional Planning Committee's* recommendation and any valid submissions received from *Registered Participants*.

(s) In making a recommendation under clause 5.7.7(o) and in determining the *test program*, the *Inter-regional Planning Committee* and *NEMMCO* must so far as practicable have regard to the following principles:

(1) *power system security* must be maintained in accordance with Chapter 4;

(2) the variation from the *central dispatch* outcomes that would otherwise occur if there was no *inter-network test* should be minimised;

(3) the duration of the tests should be as short as possible consistent with test requirements and *power system security*; and

(4) subject to clauses 5.7.7(s)(1), (2) and (3), the test facilitation costs borne or payable under clause 5.7.7 (aa) by the *Proponent* should be minimised.

(t) An *inter-regional test* must not be conducted within 20 *business days* after *NEMMCO publishes* the *test program* for the *inter-network test* determined by *NEMMCO* under clause 5.7.7(r).

(u) The *Proponent* in respect of an *inter-network test* must seek to enter into agreements with other *Registered Participants* to provide the test facilitation services identified in the *test program* in order to ensure that the *power system* conditions required by the *test program* are achieved.

(v) If the *Proponent* approaches another *Registered Participant* seeking to enter into an agreement under clause 5.7.7(u) then the *Proponent* and the *Registered Participant* must negotiate in good faith concerning the provision of the relevant test facilitation service.

(w) If:

(1) a *Proponent* approaches another *Registered Participant* as described in clause 5.7.7(v); and

(2) the *Proponent* and the other *Registered Participant* have not agreed the terms and conditions to be included in the agreement under which the *Registered Participant* will provide the test facilitation service requested within 15 *business days* of the approach,

then those terms and conditions must be determined in accordance with clause 8.2 and a dispute of this type is deemed to fall within clause 8.2.5(c)(2).

(x) If the dispute concerns the price which the *Proponent* is to pay for a test facilitation service, then it must be resolved applying the following principles:

(1) the other *Registered Participant* is entitled to recover the costs it incurs, and a reasonable rate of return on the capital it employs, in providing the test facilitation service, determined taking into account the additional costs associated with:

(i) maintaining the equipment necessary to provide the test facilitation service;

(ii) any labour required to operate and maintain the equipment used to provide the test facilitation service; and

(iii) any materials consumed when the test facilitation service is utilised; and

(2) the other *Registered Participant* is entitled to be compensated for any commercial opportunities foregone by providing the test facilitation service.

(y) When the terms and conditions are determined in accordance with clause 8.2 under this clause 5.7.7, then the *Proponent* and the other *Registered Participant* must enter into an agreement setting out those terms and conditions.

(z) If *NEMMCO* is not the *Proponent* in respect of an *inter-network test*, the *Proponent* must:

(1) prior to the scheduled date of the *inter-network test*, confirm to *NEMMCO* that the test facilitation services identified in the *test program* will be available to be utilised, who will be providing them and the operational arrangements for utilising them;

(2) provide sufficient information to enable *NEMMCO* to utilise the test facilitation services in conducting the *inter-network test*; and

(3) respond promptly to any queries *NEMMCO* raises with the *Proponent* concerning the availability of the test facilitation services and *NEMMCO's* ability to utilise those services in conducting the *inter-network tests*.

(aa) The *Proponent* in respect of an *inter-network test* must bear all of the following costs associated with that *inter-network test*:

(1) any amounts payable under an agreement under which test facilitation services are provided;

(2) the *Proponent's* own costs associated with the *inter-network test* and in negotiating and administering the agreements referred to in clause 5.7.7(u); and

(3) if the *Proponent* is not *NEMMCO* and the amount of *settlements residue* on any *directional interconnector* for a *trading interval* during which there is an impact on *central dispatch* outcomes as a result of the *inter-network test* is negative, then the *Proponent* must enter into an agreement with *NEMMCO* to pay that amount to *NEMMCO*.

(ab) If the *Proponent* is *NEMMCO* and the amount of *settlements residue* on any *directional interconnector* for a *trading interval* during which there is an impact on *central dispatch* outcomes as a result of the *inter-network test* is negative, then *NEMMCO* must adjust that residue to be zero and must recover the amount as provided for in clause 2.11.3(b)(2A).

(ac) *NEMMCO* must establish operational conditions to achieve the particular *power transfer* levels for each stage of the *inter-network test* as contemplated by the *test program*:

(1) utilizing where practicable and economic to do so the test facilitation services identified in the *test program*; and

(2) otherwise, by applying to the minimum extent necessary to fulfil the test requirements, *inter-network testing constraints*.

(ad) An *inter-network test* must be coordinated by an officer nominated by the *Inter-regional Planning Committee* who has authority to stop the test or any part of it or vary the procedure within pre-approved guidelines determined by the *Inter-regional Planning Committee* if that officer considers any of these actions to be reasonably necessary.

(ae) Each *Registered Participant* must:

(1) cooperate with *NEMMCO* in planning, preparing for and conducting *inter-regional tests*;

(2) act in good faith in respect of, and not unreasonably delay, an *inter-network test*; and

(3) comply with any instructions given to it by *NEMMCO* under clause 5.7.7(af).

(af) *NEMMCO* may utilise test facilitation services under agreements entered into by the *Proponent* under this clause 5.7.7 during an *inter-network test* in order to achieve operational conditions on the *power system* which are reasonably required to achieve valid test results.

5.8 Commissioning

5.8.1 Requirement to inspect and test equipment

(a) A *Registered Participant* must ensure that any of its new or replacement equipment is inspected and tested to demonstrate that it complies with relevant *Australian Standards*, the *Rules* and any relevant *connection agreement* prior to or within an agreed time after being *connected* to a *transmission network* or *distribution network,* and the relevant *Network Service Provider* is entitled to witness such inspections and tests.

(b) The *Registered Participant* must produce test certificates on demand by the relevant *Network Service Provider* showing that the equipment has passed the tests and complies with the standards set out in clause 5.8.1(a) before *connection* to a *network*, or within an agreed time thereafter.

5.8.2 Co-ordination during commissioning

A *Registered Participant* seeking to *connect* to a *network* must co-operate with the relevant *Network Service Provider*(s) and *NEMMCO* to develop procedures to ensure that the commissioning of the *connection* and *connected facility* is carried out in a manner that:

(a) does not adversely affect other *Registered Participants* or affect *power system security* or quality of *supply* of the *power system*; and

(b) minimises the threat of damage to any other *Registered Participant's* equipment.

5.8.3 Control and protection settings for equipment

(a) Not less than 3 months prior to the proposed commencement of commissioning by a *Registered Participant* of any new or replacement equipment that could reasonably be expected to alter performance of the *power system* (other than replacement by identical equipment), the *Registered Participant* must submit to the relevant *Network Service Provider* sufficient design information including proposed parameter

settings to allow critical assessment including analytical modelling of the effect of the new or replacement equipment on the performance of the *power system*.

(b) The *Network Service Provider* must*:*

(1) consult with other *Registered Participants* and *NEMMCO* as appropriate; and

(2) within 20 *business days* of receipt of the design information under clause 5.8.3(a), notify the *Registered Participant* and *NEMMCO* of any comments on the proposed parameter settings for the new or replacement equipment.

(c) If the *Network Service Provider's* comments include alternative parameter settings for the new or replacement equipment, then the *Registered Participant* must notify the *Network Service Provider* that it either accepts or disagrees with the alternative parameter settings suggested by the *Network Service Provider*.

(d) The *Network Service Provider* and the *Registered Participant* must negotiate parameter settings that are acceptable to them both and if there is any unresolved disagreement between them, the matter must be referred to the *Inter-regional Planning Committee* whose majority decision must be given within 20 *business days* of referral of the dispute and, once a decision is given, it is to be final.

(e) The *Registered Participant* and the *Network Service Provider* must co-operate with each other to ensure that adequate grading of protection is achieved so that faults within the *Registered Participant's facility* are cleared without adverse effects on the *power system*.

5.8.4 Commissioning program

(a) Prior to the proposed commencement of commissioning by a *Registered Participant* of any new or replacement equipment that could reasonably be expected to alter performance of the *power system*, the *Registered Participant* must advise the relevant *Network Service Provider* and *NEMMCO* in writing of the commissioning program including test procedures and proposed test equipment to be used in the commissioning.

(b) Notice under clause 5.8.4(a) must be given not less than 3 months prior to commencement of commissioning for a *connection* to a *transmission network* and not less than 1 month prior to commencement of commissioning for a *connection* to a *distribution network*.

(c) The relevant *Network Service Provider* and *NEMMCO* must, within 15 *business days* of receipt of such advice under clause 5.8.4(a), notify the *Registered Participant* either that they:

(1) agree with the proposed commissioning program; or

(2) require changes to it in the interest of maintaining *power system security*, safety or quality of *supply*.

(d) If the relevant *Network Service Provider* or *NEMMCO* require changes to the proposed commissioning program, then the parties must co-operate to reach agreement and finalise the commissioning program within a reasonable period.

(e) A *Registered Participant* must not commence the commissioning until the commissioning program has been finalised and the relevant *Network Service Provider* and *NEMMCO* must not unreasonably delay finalising a commissioning program.

5.8.5 Commissioning tests

(a) The relevant *Network Service Provider* and/or *NEMMCO* has the right to witness commissioning tests relating to new or replacement equipment that could reasonably be expected to alter performance of the *power system* or the accurate *metering* of *energy*.

(b) The relevant *Network Service Provider* must, within a reasonable period of receiving advice of commissioning tests, notify the *Registered Participant* whose new or replacement equipment is to be tested under this clause 5.8.5 whether or not it:

(1) wishes to witness the commissioning tests; and

(2) agrees with the proposed commissioning times.

(c) A *Registered Participant* whose new or replacement equipment is tested under this clause 5.8.5 must submit to the relevant *Network Service Provider* the commissioning test results demonstrating that a new or replacement item of equipment complies with the *Rules* or the relevant *connection agreement* or both to the satisfaction of the relevant *Network Service Provider*.

(d) If the commissioning tests conducted in relation to a new or replacement item of equipment demonstrates non-compliance with one or more requirements of the *Rules* or the relevant *connection agreement* then the *Registered Participant* whose new or replacement equipment was tested under this clause 5.8.5 must promptly meet with the *Network Service*

Provider to agree on a process aimed at achievement of compliance of the relevant item with the *Rules*.

(e) On request by a *Network Service Provider*, *NEMMCO* may direct that the commissioning and subsequent *connection* of the *Registered Participant's* equipment must not proceed if the relevant equipment does not comply with the requirements described in clause 5.8.1(a).

5.9 Disconnection and Reconnection

5.9.1 Voluntary disconnection

(a) Unless agreed otherwise and specified in a *connection agreement*, a *Registered Participant* must give to the relevant *Network Service Provider* notice in writing of its intention to permanently *disconnect* a *facility* from a *connection point*.

(b) A *Registered Participant* is entitled, subject to the terms of the relevant *connection agreement*, to require voluntary permanent *disconnection* of its equipment from a *network* in which case appropriate operating procedures necessary to ensure that the *disconnection* will not threaten *power system security* must be implemented in accordance with clause 5.9.2.

(c) The *Registered Participant* must pay all costs directly attributable to the voluntary *disconnection* and *decommissioning*.

5.9.2 Decommissioning procedures

(a) In the event that a *Registered Participant's facility* is to be permanently *disconnected* from a *network*, whether in accordance with clause 5.9.1 or otherwise, the *Network Service Provider* and the *Registered Participant* must, prior to such *disconnection* occurring, follow agreed procedures for *disconnection*.

(b) The *Network Service Provider* must notify *NEMMCO* and any *Registered Participants* with whom it has a *connection agreement* if it believes, in its reasonable opinion, the terms and conditions of such a *connection agreement* will be affected by procedures for *disconnection* or proposed procedures agreed with any other *Registered Participant.* The parties must negotiate any amendments to the procedures for *disconnection* or the *connection agreement* that may be required.

(c) Any *disconnection* procedures agreed to or determined under clause 5.9.2(a) must be followed by all relevant *Network Service Providers* and *Registered Participants*.

5.9.3 Involuntary disconnection

(a) *NEMMCO* may direct a *Network Service Provider* to, or a *Network Service Provider* may (either on its own initiative or in accordance with a direction from *NEMMCO*), *disconnect* a *Registered Participant's facilities* from a *network*, or a *Registered Participant's market loads*, in the following circumstances:

(1) pursuant to a direction for a *disconnection* made by a court under section 62 or 63 of the *National Electricity Law* or pursuant to regulations made under section 44AAG of the Trade Practices Act 1974 (Cth);

(2) during an emergency in accordance with clause 5.9.5;

(3) in accordance with the *National Electricity Law*; or

(4) in accordance with the provisions of the *Registered Participant's connection agreement.*

(b) In all cases of *disconnection* by a *Network Service Provider* at *NEMMCO's* direction during an emergency in accordance with clause 5.9.5, *NEMMCO* must undertake a review under clause 4.8.15 and *NEMMCO* must then provide a report to the *Registered Participant*, the *AEMC* and the AER advising of the circumstances requiring such action.

(c) A *Network Service Provider* that has received a direction from *NEMMCO* under this clause 5.9.3 must comply with that direction promptly.

5.9.4 Direction to disconnect

(a) Where a *disconnection* is made pursuant to clause 5.9.3(a)(1), neither *NEMMCO* nor the relevant *Network Service Provider* is liable in any way for any loss or damage suffered or incurred by the *Registered Participant* by reason of the *disconnection* and neither *NEMMCO* nor the relevant *Network Service Provider* is obliged for the duration of the *disconnection* to fulfil any agreement to convey electricity to or from the *Registered Participant's facility.*

(b) A *Registered Participant* must not bring proceedings against *NEMMCO* or a *Network Service Provider* to seek to recover any amount for any loss or damage described in clause 5.9.4(a).

(c) *Transmission service* charges and *distribution service* charges must be paid by a *Registered Participant* whose *facilities* have been *disconnected* under this clause 5.9.4 as if any *disconnection* had not occurred.

(d) A *Network Service Provider* that has received a direction from *NEMMCO* to *disconnect* a *Registered Participant's facilities* in the circumstances described in clause 5.9.3(a)(1) must comply with that direction promptly.

5.9.4A Notification of disconnection

If the *AER* applies to a court for a direction, under section 62 or 63 of the *National Electricity Law* or pursuant to regulations made under section 44AAG of the Trade Practices Act 1974 (Cth), that a *Registered Participant's market loads* be *disconnected*, the *AER* must promptly notify *NEMMCO* and the *participating jurisdictions* which the *AER* considers may be affected.

5.9.5 Disconnection during an emergency

(a) Where *NEMMCO* may direct a *Network Service Provider* to *disconnect* a *Registered Participant's facilities* during an emergency under the *Rules* or otherwise, then *NEMMCO* may:

(1) require the relevant *Registered Participant* to reduce the *power transfer* at the proposed point of *disconnection* to zero in an orderly manner and then direct a *Network Service Provider* to *disconnect* the *Registered Participant's facility* by automatic or manual means; or

(2) direct a *Network Service Provider* to immediately *disconnect* the *Registered Participant's facilities* by automatic or manual means where, in *NEMMCO's* reasonable opinion, it is not appropriate to follow the procedure set out in clause 5.9.5(a)(1) because action is urgently required as a result of a threat to safety of persons, hazard to equipment or a threat to *power system security*.

(b) A *Network Service Provider* that has received a direction from *NEMMCO* under this clause 5.9.5 must comply with that direction promptly.

5.9.6 Obligation to reconnect

(a) Either *NEMMCO* (by directing the *Network Service Provider*) or the relevant *Network Service Provider* (either on its own initiative or in accordance with a direction from *NEMMCO*) must reconnect a *Registered Participant's facilities* to a *transmission network* or *distribution network* at a reasonable cost to the *Registered Participant* as soon as practicable if:

(1) *NEMMCO* is reasonably satisfied that there no longer exists an emergency due to which the *Registered Participant's facilities* were *disconnected* under clause 5.9.5;

(2) *NEMMCO* is reasonably satisfied that there no longer exists a reason for the *disconnection* under the *National Electricity Law* or the *Registered Participant's connection agreement*;

(3) one of the following occurs:

(i) a breach of the *Rules* giving rise to the *disconnection* has been remedied;

(ii) where the breach is not capable of remedy, compensation has been agreed and paid by the *Registered Participant* to the affected parties or, failing agreement, the amount of compensation payable has been determined in accordance with the dispute resolution procedure in clause 8.2 and that amount has been paid;

(iii) where the breach is not capable of remedy and the amount of compensation has not been agreed or determined, assurances for the payment of reasonable compensation have been given to the satisfaction of *NEMMCO*, the *Network Service Provider* and the parties affected; or

(iv) the *Registered Participant* has taken all necessary steps to prevent the re-occurrence of the breach and has delivered binding undertakings to *NEMMCO* or the *Network Service Provider* that the breach will not re-occur.

(b) In carrying out its obligations under clause 5.9.6(a), *NEMMCO* must, to the extent practicable, arrange for the implementation of an equitable sharing of the reconnection of *facilities* across *interconnected regions* up to the *power transfer capability* of the *network* and, in performing these obligations within a *region*, both *NEMMCO* and the relevant *Network Service Provider* must, to the extent practicable, give priority to reconnection of a *region's sensitive loads.*

(c) A *Network Service Provider* that has received a direction from *NEMMCO* under this clause 5.9.6 must comply with that direction promptly.

Schedule 5.1a - System standards

S5.1a.1 Purpose

The purpose of this schedule is to establish *system standards* that:

(a) are necessary or desirable for the safe and reliable operation of the *facilities* of *Registered Participants*;

(b) are necessary or desirable for the safe and reliable operation of equipment;

(c) could be reasonably considered *good electricity industry practice*; and

(d) seek to avoid the imposition of undue costs on the industry or *Registered Participants*.

A *Registered Participant* should not, by virtue of this schedule, rely on *system standards* being fully complied with at a *connection point* under all circumstances. However, a *Registered Participant* should expect to be reasonably informed of circumstances where the standard of *supply* at its *connection points* will not conform to the *system standards*.

Except for standards of *frequency* and system stability, a *Registered Participant* should have the opportunity to negotiate or renegotiate relevant terms of a *connection agreement* (including relevant charges), to improve the standard of *supply* to the level of the *system standard*.

The *system standards* are set out below.

S5.1a.2 Frequency

The *frequency operating standards* are *system standards* and are as determined by the *Reliability Panel* and *published* by the *AEMC*.

S5.1a.3 System stability

The *power system* should remain in synchronism and be stable:

(a) **Transient stability:** following any *credible contingency event*; and

(b) **Oscillatory stability:** in the absence of any *contingency event*, for any level of *inter-regional* or *intra-regional* power transfer up to the applicable operational limit; and

(c) **Voltage stability:** stable *voltage* control must be maintained following the most severe *credible contingency event*.

For the purposes of clause S5.1a.3 a *credible contingency event* includes the application of a fault (other than a three-phase fault) to any part of the *power system* and de-energisation of the faulted element within the allowable clearance time applicable to that element according to clause S5.1a.8.

The halving time of any *inter-regional* or *intra-regional* oscillation, being the time for the amplitude of an oscillation to reduce by half, should be less than 10 seconds. To allow for planning and operational uncertainties, the *power system* should be planned and operated to achieve a halving time of 5 seconds.

S5.1a.4 Power frequency voltage

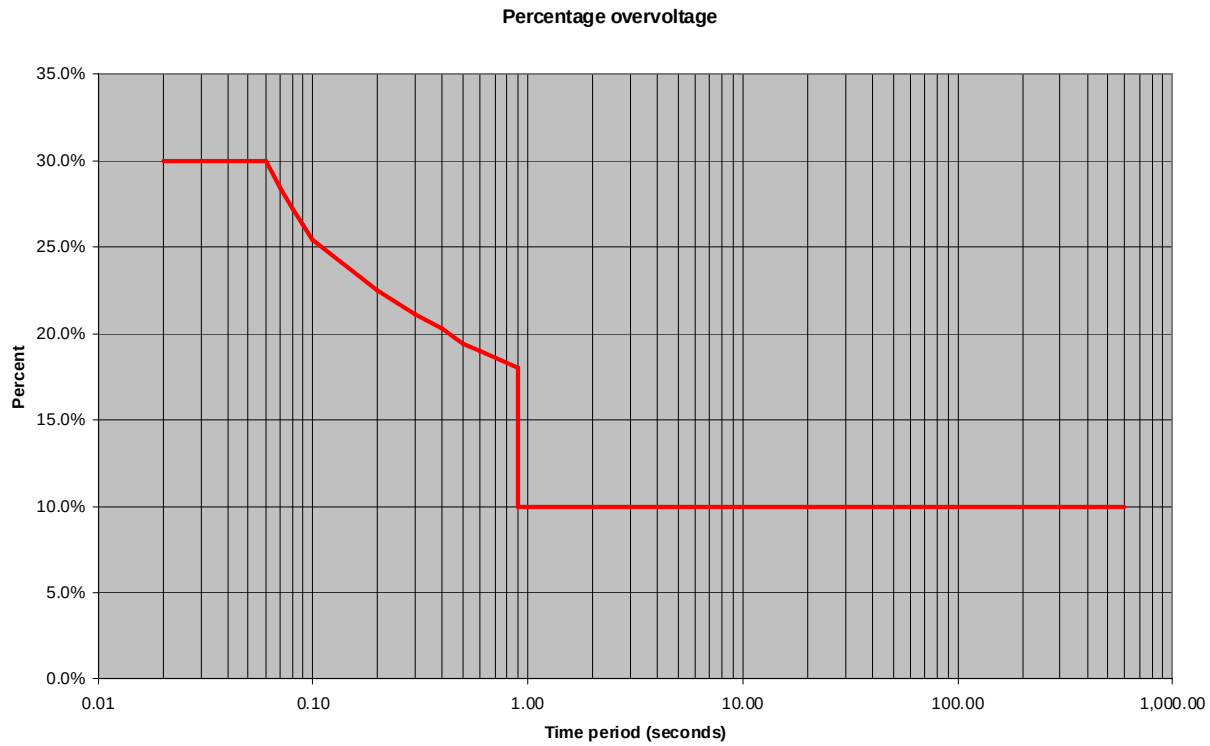
Except as a consequence of a *contingency event*, the *voltage* of *supply* at a *connection point* should not vary by more than 10 percent above or below its normal voltage, provided that the *reactive power* flow and the *power factor* at the *connection point* is within the corresponding limits set out in the *connection agreement*.

As a consequence of a *credible contingency event*, the *voltage* of *supply* at a *connection point* should not rise above its normal voltage by more than a given percentage of normal voltage for longer than the corresponding period shown in Figure S5.1a.1 for that percentage.

As a consequence of a *contingency event*, the *voltage* of *supply* at a *connection point* could fall to zero for any period.

For the purposes of this *system standard*, "normal voltage" means, in relation to a *connection point*, its nominal *voltage* or such other *voltage* up to 10 percent higher or lower than the nominal *voltage*, as approved by *NEMMCO*, for that *connection point* at the request of the *Network Service Provider* who provides *connection* to the *power system*.

Figure S5.1a.1:



The nominal *voltages* selected for new *facilities* and the intended operating *voltage* ranges for new and existing *facilities* should, wherever practicable, be *voltages* that are recognized by *Australian Standards* and for which potential *Connection Applicants* can reasonably obtain compatible *facilities*.

For the purpose of this clause, the *voltage* of *supply* is measured as the *RMS phase voltage*.

S5.1a.5 Voltage fluctuations

The *voltage* fluctuation level of *supply* should be less than the "compatibility levels" set out in 1 of *Australian Standard* AS/NZS 61000.3.7:2001. To facilitate the application of this standard *Network Service Providers* must establish “planning levels” for their *networks* as provided for in the *Australian Standard.*

The following principles apply to the use of the shared network:

(a) the sharing between *Network Users* of the capability of *connection assets* to withstand *voltage* fluctuations is to be managed by *Network Service Providers* in accordance with the provisions of clause S5.1.5 of schedule 5.1; and

(b) to the extent practicable, the costs of managing or abating the impact of *voltage* fluctuations in excess of the costs which would result from the

application of an *automatic access standard* are to be borne by those *Network Users* whose *facilities* cause the *voltage* fluctuations.

S5.1a.6 Voltage waveform distortion

Harmonic *voltage* distortion level of *supply* should be less than the "compatibility levels" defined in Table 1 of *Australian Standard* AS/NZS 61000.3.6:2001. To facilitate the application of this standard *Network Service Providers* must establish "planning levels" for their *networks* as provided for in the *Australian Standard.*

The following principles apply to the use of the shared network:

(a) the sharing between *Network Users* of the capability of *connection assets* to absorb or mitigate harmonic *voltage* distortion is to be managed by *Network Service Providers* in accordance with the provisions of clause S5.1.6 of schedule 5.1; and

(b) to the extent practicable, the costs of managing or abating the impact of harmonic distortion in excess of the costs which would result from the application of an *automatic access standard* are to be borne by those *Network Users* whose *facilities* cause the harmonic *voltage* distortion.

S5.1a.7 Voltage unbalance

Except as a consequence of a *contingency event*, the average *voltage* unbalance, measured at a *connection point*, should not vary by more than the amount set out in column 2 of Table S5.1a.1, when determined over a 30-minute averaging period.

As a consequence of a *credible contingency event*, the average *voltage* unbalance, measured at a *connection point*, should not vary by more than the amount set out in column 3 of Table S5.1a.1, when determined over a 30-minute averaging period.

The average *voltage* unbalance, measured at a *connection point*, should not vary by more than the amount set out in column 4 of Table S5.1a.1 for the relevant nominal *supply voltage*, when determined over a 10-minute averaging period.

The average *voltage* unbalance, measured at a *connection point*, should not vary more often than once per hour by more than the amount set out in column 5 of Table S5.1a.1 for the relevant nominal *supply voltage*, when determined over a 1-minute averaging period.

For the purpose of this clause, *voltage* unbalance is measured as negative sequence voltage.

Table S5.1a.1

Nominal supply voltage (kV)	**Maximum negative sequence voltage (% of nominal voltage)**			
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
	no contingency event	**credible contingency event**	**general**	**once per hour**
	30 minute average	**30 minute average**	**10 minute average**	**1 minute average**
more than 100	0.5	0.7	1.0	2.0
more than 10 but not more than 100	1.3	1.3	2.0	2.5
10 or less	2.0	2.0	2.5	3.0

S5.1a.8 Fault clearance times

(a) Faults anywhere within the *power system* should be cleared sufficiently rapidly that:

(1) the *power system* does not become unstable as a result of faults that are *credible contingency events*;

(2) *inter-regional* or *intra-regional power transfers* are not unduly *constrained*; and

(3) consequential equipment damage is minimised.

(b) The *fault clearance time* of a primary *protection system* for a *short circuit fault* of any *fault type* anywhere:

(1) within a *substation*;

(2) within *connected plant*; or

(3) on at least the half of a power line nearer to the *protection system*,

should not exceed the relevant time in column 2 of Table S5.1a.2 for the nominal *voltage* that applies at the fault location.

(c) The *fault clearance time* of a primary *protection system* for a *short circuit fault* of any *fault type* anywhere on the remote portion of a power line for which the near portion is protected by a primary *protection system* under clause S5.1a8(b) should not exceed the relevant time in column 3 of Table S5.1a.2 for the nominal *voltage* that applies at the fault location.

(d) The *fault clearance time* of a *breaker fail protection system* or similar back-up *protection system* for a *short circuit fault* of any *fault type* should not exceed the relevant time in column 4 of Table S5.1a.2 for the nominal *voltage* that applies at the fault location.

(e) The owner of the faulted element may require shorter *fault clearance times* to minimise *plant* damage.

(f) The allowable *fault clearance times* specified in Table S5.1a.2 apply in accordance with the provisions of clause S5.1.9 to *facilities* constructed or modified on or after the *performance standards commencement date.*

(g) For *facilities* other than those referred to in clause S5.1a.8(f), the applicable allowable *fault clearance times* must be derived by the relevant *Network Service Provider* from the existing capability of each *facility* on the *performance standards commencement date*.

Table S5.1a.2

Nominal voltage at fault location(kV)	**Time(milliseconds)**		
Column 1	**Column 2**	**Column 3**	**Column 4**
400kV and above	80	100	175
at least 250kV but less than 400kV	100	120	250
more than 100kV but less than 250kV	120	220	430
less than or equal 100 kV	As necessary to prevent *plant* damage and meet stability requirements		

Schedule 5.1 - Network Performance Requirements to be Provided or Co-ordinated by Network Service Providers

S5.1.1 Introduction

This schedule describes the planning, design and operating criteria that must be applied by *Network Service Providers* to the *transmission networks* and *distribution networks* which they own, operate or control. It also describes the requirements on *Network Service Providers* to institute consistent processes to determine the appropriate technical requirements to apply for each *connection* enquiry or *application to connect* processed by the *Network Service Provider* with the objective that all *connections* satisfy the requirements of this schedule.

The criteria and the obligations of *Registered Participants* to implement them, fall into two categories, namely:

(a) those required to achieve adequate levels of *network power transfer capability* or quality of *supply* for the common good of all, or a significant number of, *Registered Participants*; and

(b) those required to achieve a specific level of *network service* at an individual *connection point.*

A *Network Service Provider* must:

(1) fully describe the quantity and quality of *network services* which it agrees to provide to a person under a *connection agreement* in terms that apply to the *connection point* as well as to the *transmission or distribution system* as a whole;

(2) ensure that the quantity and quality of those *network services* are not less than could be provided to the relevant person if the *national grid* were planned, designed and operated in accordance with the criteria set out in this clause S5.1.1 and recognising that levels of service will vary depending on location of the *connection point* in the *network*; and

(3) observe and apply the relevant provisions of the *system standards* in accordance with this schedule 5.1.

To the extent that this schedule 5.1 does not contain criteria which are relevant to the description of a particular *network service*, the *Network Service Provider* must describe the *network service* in terms which are fair and reasonable.

This schedule includes provisions for *Network Service Providers* and *Registered Participants* to negotiate the criteria to apply to a *connection* within defined ranges between a lower bound (*minimum access standard*) and an upper bound (*automatic access standard*). All criteria which are intended to apply to a *connection* must be recorded in a *connection agreement*. Where it is intended to apply a *negotiated access standard* in accordance with clause 5.3.4A of the *Rules*, the *Network Service Provider* must first be satisfied that the application of the *negotiated access standard* will not adversely affect other *Registered Participants*.

S5.1.2 Network reliability

S5.1.2.1 Credible contingency events

Network Service Providers must plan, design, maintain and operate their *transmission networks* and *distribution networks* to allow the transfer of power from *generating units* to *Customers* with all *facilities* or equipment associated with the *power system* in service and may be required by a *Registered Participant* under a *connection agreement* to continue to allow the transfer of power with certain facilities or *plant* associated with the *power system* out of service, whether or not accompanied by the occurrence of certain faults (called "*credible contingency events*").

The following *credible contingency events* and practices must be used by *Network Service Providers* for planning and operation of *transmission networks* and *distribution networks* unless otherwise agreed by each *Registered Participant* who would be affected by the selection of *credible contingency events*:

(a) The *credible contingency events* must include the *disconnection* of any single *generating unit* or *transmission line*, with or without the application of a single circuit two-phase-to-ground solid fault on lines operating at or above 220 kV, and a single circuit three-phase solid fault on lines operating below 220 kV. The *Network Service Provider* must assume that the fault will be cleared in primary protection time by the faster of the duplicate protections with installed intertrips available. For existing *transmission lines* operating below 220 kV but above 66 kV a two-phase to earth fault criterion may be used if the modes of operation are such as to minimise the probability of three-phase faults occurring and operational experience shows this to be adequate, and provided that the *Network Service Provider* upgrades performance when the opportunity arises.

(b) For lines at any *voltage* above 66 kV which are not protected by an overhead earth wire and/or lines with tower footing resistances in excess of 10 ohms, the *Network Service Provider* may extend the criterion to include a single circuit three-phase solid fault to cover the increased risk of such a fault occurring. Such lines must be examined individually on their merits by the relevant *Network Service Provider*.

(c) For lines at any *voltage* above 66 kV a *Network Service Provider* must adopt operational practices to minimise the risk of slow fault clearance in case of inadvertent closing on to earths applied to equipment for maintenance purposes. These practices must include but not be limited to:

(1) Not leaving lines equipped with intertrips alive from one end during maintenance; and

(2) *Off-loading* a three terminal (tee connected) line prior to restoration, to ensure switch on to fault *facilities* are operative.

(d) The *Network Service Provider* must ensure that all *protection systems* for lines at a *voltage* above 66 kV, including associated intertripping, are well maintained so as to be available at all times other than for short periods (not greater than eight hours) while the maintenance of a *protection system* is being carried out.

S5.1.2.2 Network service within a region

The following paragraphs of this section set out minimum standards for certain *network services* to be provided to *Registered Participants* by *Network Service Providers* within a *region*. The amount of *network* redundancy provided must be determined by the process set out in clause 5.6.2 of the *Rules* and is expected to reflect the grouping of *generating units*, their expected capacity factors and availability and the size and importance of *Customer* groups.

The standard of service to be provided at each *connection point* must be included in the relevant *connection agreement*, and must include a *power transfer capability* such as that which follows:

(a) In the *satisfactory operating state*, the *power system* must be capable of providing the highest reasonably expected requirement for *power transfer* (with appropriate recognition of diversity between individual peak requirements and the necessity to withstand *credible contingency events*) at any time.

(b) During the most critical single element *outage* the *power transfer* available through the *power system* may be:

(1) zero (single element *supply*);

(2) the defined capacity of a backup *supply*, which, in some cases, may be provided by another *Network Service Provider*;

(3) a nominated proportion of the normal *power transfer capability* (eg 70 percent); or

(4) the normal *power transfer capability* of the *power system* (when required by a *Registered Participant*).

In the case of clauses S5.1.2.2(b)(2) and (3) the available capacity would be exceeded sufficiently infrequently to allow maintenance to be carried out on each *network* element by the *Network Service Provider*. A *connection agreement* may state the expected proportion of time that the normal capability will not be available, and the capability at those times, taking account of specific design, locational and seasonal influences which may affect performance, and the random nature of element *outages*.

A *connection agreement* may also state a conditional *power transfer capability* that allows for both circuits of a double circuit line or two closely parallel circuits to be out of service.

S5.1.2.3 Network service between regions

The *power transfer capability* between *regions* must be determined by the process set out in clauses 5.6.5 and 5.6.6 of the *Rules*.

The following paragraphs of this section set out a framework within which *Network Service Providers* must describe to *NEMMCO* the levels of *network service* that apply for *power transfer* between *regions*. In cases where *power transfer capability* is determined by stability considerations on the *power system* (refer to clause S5.1.8 of this schedule) it is expected that line *outages* within *transmission networks* within a region will weaken the *network* so as to result in reduced *power transfer capability* even in the absence of *outages* of the lines between *regions*.

(a) In the *satisfactory operating state* the *power transfer capability* between *regions* is defined by a multi-term equation for each *connection* between *regions* which takes account of all *power system* operating conditions which can significantly impact on performance. The majority of these operating conditions are the result of *market* operation and are outside the control of the *Network Service Provider*. In the *satisfactory operating state* the *network* must be planned by the *Network Service Provider* and operated by *NEMMCO* to withstand the impact of any *single contingency* with severity less than the *credible contingency events* stated in clause S5.1.2.1.

(b) During critical single element *outages* reduced *power transfer capabilities* will apply. In those cases where *outage* of the remaining element will result in breaking of the *connection* between the *regions NEMMCO* must provide for the effect on *power system frequency* in the separate *transmission systems* following this event when determining the maximum *power transfer*.

S5.1.3 Frequency variations

A *Network Service Provider* must ensure that within the *extreme frequency excursion tolerance limits* all of its *power system* equipment will remain in service unless that equipment is required to be switched to give effect to *load shedding* in accordance with clause S5.1.10, or is required by *NEMMCO* to be switched for operational purposes.

Sustained operation outside the *extreme frequency excursion tolerance limits* need not be taken into account by *Network Service Providers* in the design of *plant* which may be *disconnected* if this is necessary for the protection of that *plant*.

S5.1.4 Magnitude of power frequency voltage

A *Transmission Network Service Provider* must plan and design its *transmission system* and equipment for control of *voltage* such that the minimum steady state *voltage* magnitude, the maximum steady state *voltage* magnitude and variations in *voltage* magnitude are consistent with the levels stipulated in clause S5.1a.4 of the *system standards*.

(a) The *Network Service Provider* must determine the *automatic access standard* for the *voltage* of *supply* at the *connection point* such that the *voltage* may vary in accordance with clause S5.1a.4 of the *system standards*.

(b) The *Network Service Provider* must determine the *minimum access standard* for the *voltage of supply* at the *connection point* such that the *voltage* may vary:

(1) as a consequence of a *credible contingency event* in accordance with clause S5.1a.4; and

(2) otherwise, between 95 percent and 105 percent of the target *voltage*.

(c) For the purposes of clause S5.1.4(b) the target *voltage* must be determined as follows:

(1) if the *connection point* is connected to a *transmission line* (but not through a *transformer*), the *Network Service Provider* must determine the target *voltage* in consultation with *NEMMCO* taking into account the capability of existing *facilities* that are subject to that *supply voltage*; and

(2) otherwise, *Network Users* that share the same *supply voltage* must jointly determine the target *voltage* which may be specified to vary with aggregate *loading level*;

provided that at all times the *supply voltage* remains between 90 percent and 110 percent of the normal voltage determined in accordance with clause S5.1a.4 except as a consequence of a *contingency event.*

(d) For the purposes of this clause, the *voltage* of *supply* is measured as the *RMS phase voltage.*

Where the independent control of *voltage* at the *connection point* is possible without adverse impact on *voltage* control at another *connection point*, the *Network Service Provider* must make reasonable endeavors to meet the request. The target *voltage* and any agreement to a target range of *voltage* magnitude must be specified in the relevant *connection agreement*. The agreement may include a different target range in the *satisfactory operating state* and after a *credible contingency event* (and how these target ranges may be required to vary with *loading*).

A *Network Service Provider* must ensure that each *facility* that is part of its *transmission network* or *distribution network* is capable of continuous uninterrupted operation in the event that variations in *voltage* magnitude occur due to faults external to the *facility*. The design of a *facility* should anticipate the likely time duration and magnitude of variations in the power-*frequency* phase *voltages* which may arise dependent on the nature and location of the fault.

S5.1.5 Voltage fluctuations

A *Network Service Provider* must use reasonable endeavours to design and operate its *transmission system* or *distribution system* and include conditions in *connection agreements* in relation to the permissible variation with time of the power *generated* or *load* taken by a *Network User* to ensure that other *Network Users* are supplied with a power-*frequency voltage* which fluctuates to an extent that is less than the levels stipulated in accordance with the provisions of clause S5.1a.5 of the *system standards* and this clause S5.1.5.

In accordance with AS/NZS 61000.3.7:2001 and guidelines published by *Standards Australia* and applying the assumption that *Customers* will comply with their obligations under schedule 5.3, a *Network Service Provider* must determine "Planning Levels" for *connection points* on their *network* in order to maintain *voltage* fluctuation levels for all supply points to customers supplied from their *network* below the "Compatibility Levels" defined in Table 1 of AS/NZS 61000.3.7:2001.

The *Network Service Provider* must allocate emission limits in response to a *connection* enquiry or an *application to connect* and evaluate the acceptability for *connection* of fluctuating sources as follows:

(a) *Automatic access standard:* the *Network Service Provider* must allocate emission limits no more onerous than the lesser of the acceptance levels determined in accordance with either of the stage 1 or the stage 2 evaluation procedures defined in AS/NZS 61000.3.7:2001.

(b) *Minimum access standard:* subject to clause S5.1.5(c), the determination by the *Network Service Provider* of acceptable emission limits must be

undertaken in consultation with the party seeking *connection* using the stage 3 evaluation procedure defined in AS/NZS61000.3.7:2001.

(c) In respect of each new *connection* at a level of performance below the *automatic access standard* the *Network Service Provider* must include provisions in the relevant *connection agreement* requiring the *Network User* if necessary to meet the *system standards* or allow connection of other *Network Users* to either upgrade to the *automatic access standard* or fund the reasonable cost of the works necessary to mitigate their effect of connecting at a standard below the *automatic access standard*.

(d) If for existing customer *connections* the level of *voltage* fluctuation is, or may be, exceeded as a result of a proposed new *connection*, the *Network Service Provider* must, if the cause of that excessive level cannot be remedied by enforcing the provisions of existing *connection agreements*, undertake all reasonable works necessary to meet the technical standards in this schedule or to permit the proposed new *connection* within the requirements stated in this clause.

For other than a new *connection* in accordance with the preceding paragraph, the responsibility of a *Network Service Provider* for excursions in *voltage* fluctuations above the levels defined above is limited to *voltage* fluctuations caused by *network plant* and the pursuit of all reasonable measures available under the *Rules* and its *connection agreements*.

S5.1.6 Voltage harmonic or voltage notching distortion

A *Network Service Provider* must use reasonable endeavours to design and operate its *network* and include conditions in *connection agreements* to ensure that the effective harmonic *voltage* distortion at any point in the *network* will be limited to less than the levels stipulated in accordance with the provisions of clause S5.1a.6 of the *system standards* and this clause S5.1.6.

In accordance with AS/NZS 61000.3.6:2001 and guidelines published by *Standards Australia* and applying the assumption that *Customers* will comply with their obligations under schedule 5.3 *Network Service Providers* must determine "Planning Levels" for *connection points* on their *network* in order to maintain harmonic *voltage* distortion for all supply points to customers supplied from their *network* below the "Compatibility Levels" defined in Table 1 of AS/NZS 61000.3.6:2001.

The *Network Service Provider* must allocate emission limits to a connection enquiry or an *application to connect* and must evaluate the acceptability for *connection* of distorting sources as follows:

(a) *Automatic access standard*: the *Network Service Provider* must allocate emission limits no more onerous than the lesser of the acceptance levels

determined in accordance with either of the stage 1 or the stage 2 evaluation procedures defined in AS/NZS 61000.3.6:2001.

(b) *Minimum access standard*: subject to clause S5.1.6(c), the determination by the *Network Service Provider* of acceptable emission limits must be undertaken in consultation with the party seeking *connection* using the Stage 3 evaluation procedure defined in AS/NZS61000.3.6:2001.

(c) In respect of each new *connection* at a level of performance below the *automatic access standard* the *Network Service Provider* must include provisions in the relevant *connection agreement* requiring the *Network User* if necessary to meet the *system standards* or allow connection of other *Network Users* to either upgrade to the *automatic access standard* or fund the reasonable cost of the works necessary to mitigate their effect of connecting at a standard below the *automatic access standard*.

(d) If for existing customer *connections* the level of harmonic *voltage* distortion is, or may be, exceeded as a result of a proposed new *connection*, the *Network Service Provider* must, if the cause of that excessive level cannot be remedied by enforcing the provisions of existing *connection agreements*, undertake all works necessary to meet the technical standards in this schedule or to permit a proposed new *connection* within the *automatic access standard* defined in clause S5.3.8 and the requirements stated in this clause.

For other than a new *connection* in accordance with the preceding paragraph, the responsibility of a *Network Service Provider* for harmonic *voltage* distortion outside the range defined above is limited to harmonic *voltage* distortion caused by *network plant* and the pursuit of all measures available under the *Rules* and its *connection agreements*.

S5.1.7 Voltage unbalance

(a) A *Transmission Network Service Provider* must balance the effective impedance of the phases of its *network*, and a *Distribution Network Service Provider* must balance the current drawn in each phase at each of its *connection points*, so as to achieve average levels of negative sequence *voltage* at all *connection point*s that are equal to or less than the values set out in Table S5.1a.1 as determined in accordance with the accompanying provisions of clause S5.1a.7 of the *system standards.*

(b) A *Network Service Provider* must include conditions in *connection agreements* to ensure that a *Connection Applicant* will balance the current drawn in each phase at each of its *connection points* so as to achieve:

(1) for those *Network Users* listed in clause S5.3(a): the levels permitted in accordance with clause S5.3.6 of schedule 5.3;

(2) for *Market Network Service Providers*: the levels permitted in accordance with clause S5.3a.9 of schedule 5.3a;

(3) otherwise: the average levels of negative sequence *voltage* at each of its *connection points* that are equal to or less than the values set out in Table S5.1a.1 and the accompanying provisions of clause S5.1a.7 of the *system standards.*

The responsibility of the *Network Service Provider* for *voltage* unbalance outside the ranges defined above is limited to *voltage* unbalance caused by the *network* and the pursuit of all measures available under the *Rules* and its *connection agreements.*

S5.1.8 Stability

In conforming with the requirements of the *system standards*, the following criteria must be used by *Network Service Providers* for both planning and operation:

For stable operation of the *national grid*, both in a *satisfactory operating state* and following any *credible contingency events* described in clause S5.1.2.1:

(a) the *power system* will remain in synchronism;

(b) damping of *power system* oscillations will be adequate; and

(c) *voltage* stability criteria will be satisfied.

Damping of *power system* oscillations must be assessed for planning purposes according to the design criteria which states that *power system damping* is considered adequate if after the most critical *credible contingency event*, simulations calibrated against past performance indicate that the halving time of the least damped electromechanical mode of oscillation is not more than five seconds.

To assess the damping of *power system* oscillations during operation, or when analysing results of tests such as those carried out under clause 5.7.7 of the *Rules*, the *Network Service Provider* must take into account statistical effects. Therefore, the *power system damping* operational performance criterion is that at a given operating point, real-time monitoring or available test results show that there is less than a 10 percent probability that the halving time of the least damped mode of oscillation will exceed ten seconds, and that the average halving time of the least damped mode of oscillation is not more than five seconds.

The *voltage* control criterion is that stable *voltage* control must be maintained following the most severe *credible contingency event*. This requires that an adequate *reactive power* margin must be maintained at every *connection point* in a *network* with respect to the *voltage* stability limit as determined from the

voltage/reactive *load* characteristic at that *connection point*. Selection of the appropriate margin at each *connection point* is at the discretion of the relevant *Network Service Provider*, subject only to the requirement that the margin (expressed as a capacitive *reactive power* (in MVAr)) must not be less than one percent of the maximum fault level (in MVA) at the *connection point*.

In planning a *network* a *Network Service Provider* must consider *non-credible contingency events* such as *busbar* faults which result in tripping of several circuits, uncleared faults, double circuit faults and multiple contingencies which could potentially endanger the stability of the *power system*. In those cases where the consequences to any *network* or to any *Registered Participant* of such events are likely to be severe disruption a *Network Service Provider* and/or a *Registered Participant* must install emergency controls within the *Network Service Provider's* or *Registered Participant's* system or in both, as necessary, to minimise disruption to any *transmission* or *distribution network* and to significantly reduce the probability of cascading failure.

A *Registered Participant* must co-operate with a *Network Service Provider* to achieve stable operation of the *national grid* and must use all reasonable endeavours to negotiate with the *Network Service Provider* regarding the installation of emergency controls as described in the previous paragraph. The cost of installation, maintenance and operation of the emergency controls must be borne by the *Network Service Provider* who is entitled to include this cost when calculating the *Transmission Customer use of system* price.

S5.1.9 Protection systems and fault clearance times

Network Users

(a) A *Network Service Provider* must determine the *automatic access standard* and *minimum access standard* that applies to the protection zone of each *protection system* in relation to the *connection point* and the *plant* to be *connected*, as follows:

(1) The *automatic access standard* for *fault clearance time* for any *fault type* is the lesser of the *system standard* set out in clause S5.1a.8 that applies to the highest nominal *voltage* within the *protection system's* protection zone and the corresponding *minimum access standard* determined under clause S5.1.9(a)(2) or clause S5.1.9(a)(3) as applicable.

(2) The *minimum access standard* for *fault clearance time* of a primary *protection system* is:

(i) for a *fault type* that constitutes a *credible contingency event* in the relevant protection zone, the longest time such that a *short circuit fault* of that *fault type* that is cleared in that time would not cause the *power system* to become unstable when operating

at any level of *inter-regional* or *intra-regional power transfer* that would be permissible (taking into account all other limiting criteria) if the *fault clearance time* for such a *fault* at the *connection point* were the *system standard* set out in clause S5.1a.8 that applies to the nominal *voltage* at the *connection point*; and

(ii) for a *fault type* that does not constitute a *credible contingency event* in the relevant protection zone:

(A) if a two phase to ground fault in that protection zone constitutes a *credible contingency event*, the corresponding *fault clearance time* for a two phase to ground *short circuit fault* in that protection zone as determined under clause S5.1.9(a)(2)(i); and

(B) otherwise, the shortest of the *fault clearance times* for a two phase to ground *short circuit fault* in each adjoining protection zone (excluding *transformer* protection zones and dead zones) as determined under clause S5.1.9(a)(2)(i) or clause S5.1.9(e).

(3) The *minimum access standard* for *fault clearance time* of a *breaker fail protection system* or similar back-up *protection system* is the longest time such that a *short circuit fault* of any *fault type* that is cleared in that time would not damage any part of the *power system* (other than the faulted element) while the fault current is flowing or being interrupted.

(b) The negotiation of access standards in relation to this clause S5.1.9(a) must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

Transmission systems and distribution systems

(c) Subject to clauses S5.1.9(k) and S5.1.9(l), a *Network Service Provider* must provide sufficient primary *protection systems* and back-up *protection systems* (including *breaker fail protection systems*) to ensure that a fault of any *fault type* anywhere on its *transmission system* or *distribution system* is automatically *disconnected* in accordance with clause S5.1.9(e) or clause S5.1.9(f).

(d) If the *fault clearance time* determined under clause S5.1.9(e) of a primary *protection system* for a two phase to ground *short circuit fault* is less than 10 seconds, the primary *protection system* must have sufficient redundancy to ensure that it can clear *short circuit faults* of any *fault type* within the relevant *fault clearance time* with any single protection element (including any communications facility upon which the *protection system* depends) out of service.

(e) The *fault clearance time* of a primary *protection system* of a *Network Service Provider* must not exceed:

(1) for any *fault type* that constitutes a *credible contingency event* in the relevant protection zone, the longest time such that a *short circuit fault* of that *fault type* that is cleared in that time would not cause the *power system* to become unstable when operating at any level of *inter-regional* or *intra-regional power transfer* that would be permissible (taking into account all other limiting criteria) if the *fault clearance time* for such a fault in that protection zone were the relevant *system standard* set out in clause S5.1a.8; and

(2) for any *fault type* that does not constitute a *credible contingency event* in the relevant protection zone:

(i) if a two phase to ground fault in that protection zone is a *credible contingency event*, the corresponding *fault clearance time* for a two phase to ground fault in that protection zone as determined under clause S5.1.9(e)(1); and

(ii) otherwise, the shortest of the *fault clearance times* for a two phase to ground fault in each adjoining protection zone (excluding *transformer* protection zones and dead zones) as determined under clauses S5.1.9(a)(2)(i), S5.1.9(e)(1)or S5.1.9(e)(2)(i).

(f) The *fault clearance time* of each *breaker fail protection system* or similar back-up *protection system* of a *Network Service Provider* must be such that a *short circuit fault* of any *fault type* that is cleared in that time would not damage any part of the *power system* (other than the faulted element) while the fault current is flowing or being interrupted.

(g) A *Network Service Provider* must demonstrate to *NEMMCO* that each *fault clearance time* for a primary *protection system* that is longer than the relevant *system standard* set out in clause S5.1a.8 and is less than 10 seconds would not cause or require an *inter-regional* or *intra-regional power transfer capability* to be reduced.

(h) A *Network Service Provider* must include in each *connection agreement* entered into after the *performance standards commencement date*:

(1) the *fault clearance times* for each *fault type* of each of its *protection systems* that could reasonably be expected to interrupt *supply* to or from the relevant *connection point*; and

(2) an agreement to not increase those *fault clearance times* without the prior written agreement of the other party.

(i) *Network Service Providers* must coordinate and cooperate with *Network Users* to implement *breaker fail* protection for circuit breakers provided to isolate the *Network User's facility* from the *Network Service Provider's facilities*.

(j) Where practicable and economic to achieve, new network investment should meet the *system standard* for *fault clearance times* as specified in clause S5.1a.8 for two phase to ground *short circuit faults*.

(k) A primary *protection system* may clear faults other than *short circuit faults* slower than the relevant *fault clearance time*, provided that such faults would be cleared sufficiently promptly to not adversely impact on *power system security* compared with its operation for the corresponding *short circuit fault.* In the case of a fault within equipment at a station, the corresponding *short circuit fault* is to be taken as a two phase to ground *short circuit fault* at the external connections of the equipment.

(l) *Protection systems* may rely on *breaker fail protection systems* or other back-up *protection systems* to completely clear faults of any *fault type* that:

(1) occur within a *substation* between a protection zone and a circuit breaker adjacent to that protection zone that is required to open to clear the fault (a "dead zone"); and

(2) remain connected through a power line or *transformer* after operation of a primary *protection system*,

provided that the relevant *Network Service Provider* assesses that the likelihood of a fault occurring within the dead zone is not greater than the likelihood of a fault occurring on *busbars*.

(m) For the purposes of this clause S5.1.9, a *credible contingency event* includes any event that clause S5.1.2.1 requires a *Network Service Provider* to consider as a *credible contingency event*.

(n) The provisions of clause S5.1.9(d) apply to *facilities* constructed or modified on or after the *performance standards commencement date*.

(o) For *facilities* other than those referred to in clause S5.1.9(n), the requirement for primary *protection system* redundancy must be derived by the *Network Service Provider* from the existing capability of each *facility* on the *performance standards commencement date*.

S5.1.10 Load and network control facilities

S5.1.10.1 General

Each *Network Service Provider* in consultation with *NEMMCO* must ensure that:

(a) sufficient *load* is under the control of underfrequency relays where required to ensure that in the event of the sudden, unplanned simultaneous occurrence of multiple *contingency events*, the *power system frequency* does not move outside the *extreme frequency excursion tolerance limits*;

(b) where determined to be necessary, sufficient *load* is under the control of undervoltage relays to minimize or reduce the risk of voltage collapse on the occurrence of multiple *contingency events*; and

(c) there is sufficient *load* under manual or automatic control either locally or from remotely located *control centres* to allow the *load shedding procedures* to be implemented on instruction from *NEMMCO* to enable *NEMMCO* to maintain *power system security*.

A *Network Service Provider* may require *load shedding* arrangements to be installed to cater for abnormal operating conditions.

Arrangements for *load shedding* must be agreed between *Transmission Network Service Providers* and *connected Distribution Network Service Providers* and may include the opening of circuits in either a *transmission* or *distribution network*.

The *Transmission Network Service Provider* must specify, in the *connection agreement*, control and monitoring requirements to be provided by a *Distribution Network Service Provider* for *load shedding facilities*.

S5.1.10.2 Distribution Network Service Providers

A *Distribution Network Service Provider* must:

(a) provide, install, operate and maintain *facilities* for *load shedding* in respect of any *connection point* at which the maximum *load* exceeds 10MW in accordance with clause 4.3.5 of the *Rules*;

(b) in accordance with the provisions of the relevant *connection agreement*, co-operate with the *Transmission Network Service Provider*s in conducting periodic functional testing of the *facilities*, which must not require *load* to be *disconnected*;

(c) apply underfrequency settings to relays as determined by *NEMMCO* in consultation with the *Network Service Provider*; and

(d) apply undervoltage settings to relays as notified by the *Transmission Network Service Provider* in accordance with clause S5.1.10.3(b).

S5.1.10.3 Transmission Network Service Providers

Transmission Network Service Providers must:

(a) conduct periodic functional tests of the *load shedding facilities*; and

(b) notify *Distribution Network Service Providers* regarding the settings of undervoltage *load* shed relays as determined by *NEMMCO* in consultation with the *Transmission Network Service Provider*.

S5.1.11 Automatic reclosure of transmission or distribution lines

Where *automatic reclose equipment* is provided on *transmission lines* or *distribution lines*, check or blocking *facilities* must be applied to the *automatic reclose equipment* in those circumstances where there is any possibility of the two ends of the *transmission line* or *distribution line* being *energised* from sources that are not in synchronism.

S5.1.12 Rating of transmission lines and equipment

For operational purposes each *Network Service Provider* must, on reasonable request, advise *NEMMCO* of the maximum current that may be permitted to flow (under conditions nominated by *NEMMCO*) through each *transmission line, distribution line* or other item of equipment that forms part of its *transmission system* or *distribution system*.

This maximum current is called a "*current rating*" of the *transmission line*, *distribution line* or item of equipment notwithstanding that it may be determined by equipment associated with its *connection* to the *power system* (including switchgear, droppers, current *transformers* and *protection systems*).

NEMMCO may request for a *transmission line*, *distribution line* or other item of equipment:

(a) a continuous *current rating*, being the level of current that is permitted to flow in that item of equipment for an indefinite period; and

(b) one or more short term *current ratings* for a period of time nominated by *NEMMCO* after consultation with the *Network Service Provider*, being the level of current that is permitted to flow in that item of equipment for that period of time if the current had been less than the corresponding continuous *current rating* for a reasonable prior period taking into account the thermal properties of the item of equipment.

The *Network Service Provider* may be required by *NEMMCO* to advise different *current ratings* to be applied under nominated conditions including, without limitation:

(a) ambient weather conditions;

(b) seasons and/or times of *day*;

(c) ratios of the current during an emergency to the current prior to the emergency (taking into account pre-contingent loading history where applicable); and

(d) period of loading at the nominated level.

A *Transmission Network Service Provider* is entitled to advise *NEMMCO* of short term *current ratings* which may apply for nominated periods of time to the relevant *transmission line* or item of equipment provided that these ratings do not materially affect the safety of the *transmission line* or item of equipment, or the safety of persons. Short-term ratings for *transmission lines* or items of equipment may be implemented by a methodology or algorithm in a format agreed with *NEMMCO*.

S5.1.13 Information to be provided

A *Network Service Provider* must, in response to a *connection* enquiry or an *application to connect* made in accordance with clause 5.3.2 of the *Rules*, provide the *connection applicant* electrical design information relevant to the nominal point of *connection* in accordance with a relevant requirement of schedules 5.2, 5.3 or 5.3a.

S5.1.14 [Deleted]

Schedule 5.2 - Conditions for Connection of Generators

S5.2.1 Outline of requirements

(a1) The equipment associated with each *generating unit* must be designed to withstand without damage the range of operating conditions which may arise consistent with the *system standards.*

(a2) *Generators* must comply with the *performance standards* and any attached terms or conditions of agreement agreed with the *Network Service Provider* or *NEMMCO* in accordance with a relevant provision of schedules 5.1 or 5.1a.

(a) This schedule sets out details of additional requirements and conditions which (subject to clause 5.2 of the *Rules*) *Generators* must satisfy as a condition of *connection* of a *generating unit* to the *power system.* It does not apply to *generating units* in so far as the person who owns, controls or operates them is exempt from registration as a *Generator* in respect of those *generating units* in accordance with clause 2.2.1(c) of the *Rules* and which are *connected* or intended for use in a manner which the *Network Service Provider* considers is unlikely to cause a material degradation in the quality of supply to other *Network Users.*

(b) This schedule also sets out the requirements and conditions, which (subject to clause 5.2.5 of the *Rules*) are obligations of *Generators* to:

(1) co-operate with the relevant *Network Service Provider* on technical matters when making a new *connection*; and

(2) provide information to the *Network Service Provider* or *NEMMCO.*

(c) This schedule does not set out arrangements by which a *Generator* may enter into an agreement or contract with *NEMMCO* to:

(1) provide additional services that are necessary to maintain *power system security*; or

(2) provide additional services to facilitate management of the *market*.

(d) This schedule provides for *automatic access standards* and the determination of *negotiated access standards* derived from *minimum access standards* which, once determined, must be recorded together with the *automatic access standards* in a *connection agreement* and registered with *NEMMCO* as *performance standards.*

S5.2.2 Application of Settings

A *Generator* must only apply settings to a *control system* or a *protection system* that are necessary to comply with performance requirements of this schedule 5.2 if the settings have been approved in writing by the relevant *Network Service Provider* and, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, also by *NEMMCO*. A *Generator* must not allow its *generating unit* to *supply* electricity to the *power system* without such prior approval.

If a *Generator* seeks approval from the *Network Service Provider* to apply or change a setting, approval must not be withheld unless the *Network Service Provider* or, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, *NEMMCO*, reasonably determines that the changed setting would cause the *generating unit* to not comply with the relevant *performance standard* or cause an *inter-regional* or *intra-regional power transfer capability* to be reduced.

If the *Network Service Provider* or, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, *NEMMCO*, reasonably determines that a setting of a *generating unit's control system* or *protection system* needs to change to comply with the relevant *performance standard* or to maintain or restore an *inter-regional* or *intra-regional power transfer capability*, the *Network Service Provider* or *NEMMCO* (as applicable) must consult with the relevant *Generator*, and the *Network Service Provider* may request in writing that a setting be applied in accordance with the determination.

The *Network Service Provider* may also request a test to verify the performance of the relevant *plant* with the new setting. The *Network Service Provider* must provide *NEMMCO* with a copy of its request to a *Generator* to apply a setting or to conduct a test.

A *Generator* who receives such a request must arrange for the notified setting to be applied as requested and for a test to be conducted as requested. After the test, the *Generator* must, on request, provide both *NEMMCO* and the *Network Service Provider* with a report of a requested test, including evidence of its success or failure. Such a report of a test is *confidential information*.

A *Generator* must not change a setting requested by the *Network Service Provider* without its prior written agreement. If the *Network Service Provider* requires a *Generator* to change a setting within 18 months of a previous request, the *Network Service Provider* must pay the *Generator* its reasonable costs of changing the setting and conducting the tests as requested.

S5.2.3 Technical matters to be co-ordinated

A *Generator* and the relevant *Network Service Provider* must use all reasonable endeavours to agree upon relevant technical matters in respect of each new or altered *connection* of a *generating unit* to a *network* including:

(a) design at the *connection point*;

(b) physical layout adjacent to the *connection point*;

(c) primary protection and backup protection (clause S5.2.5);

(d) control characteristics (clause S5.2.5);

(e) communications and alarms (clause S5.2.6);

(f) insulation co-ordination and lightning protection;

(g) fault levels and *fault clearance times*;

(h) switching and *isolation facilities*;

(i) interlocking arrangements; and

(j) *metering installations* as described in Chapter 7 of the *Rules*.

S5.2.4 Provision of information

(a) The *Generator* must promptly on request provide all data of the kinds specified in schedule 5.5 reasonably required by *NEMMCO* or the *Network Service Provider*.

(b) Three months before first *synchronisation* a *Generator* must, in respect of each proposed *scheduled generating unit*, provide *NEMMCO* and the relevant *Network Service Provider* and any relevant *Distribution Network Service Provider* with the following information about the *generating unit's control systems* for *frequency* control and *voltage* control:

(1) a set of functional block diagrams, including all functions between feedback signals and *generating unit* output;

(2) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits; and

(3) the characteristics of non-linear elements,

sufficient for *NEMMCO* and the relevant *Network Service Provider* to perform short and long-term simulation studies.

The information provided must be updated within 3 months after commissioning tests or other tests undertaken in accordance with clause 5.7.3 of the *Rules* are completed. The *connection agreement* must record the process for subsequently changing this information. Conformance with the requirements described in this clause is the responsibility of the *Generator* and is subject to the provisions of clause 5.7.3(f) of the *Rules* for each *generating unit.*

(c) For the purposes of clause 5.3.2(d) of the *Rules*, the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of the proposed *connection* for a *generating unit* includes:

(1) the highest expected single phase and three phase fault levels at the *connection point* with the *generating unit* not *synchronised*;

(2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;

(3) the expected limits of *voltage* fluctuation, harmonic *voltage* distortion and *voltage* unbalance at the *connection point* with the *generating unit* not *synchronised*;

(4) technical information relevant to the *connection point* with the *generating unit* not *synchronised* including equivalent source impedance information, sufficient to estimate fault levels, *voltage* fluctuations, harmonic *voltage* distortion and *voltage* unbalance; and

(5) any other information or data not being *confidential information* relating to the performance of the *Network Service Provider's facilities* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*;

except where the *Connection Applicant* agrees the *Network Service Provider* may provide alternative or less detailed technical information in satisfaction of this clause S5.2.4(c).

S5.2.5 Technical requirements

[Deleted]

S5.2.5.1 Reactive power capability

For the purpose of this clause S5.2.5.1:

'rated active power output' means the 'Rated MW (Generated)' (as defined in schedule 5.5.1) for the relevant *synchronous generating unit*; and

'nominal voltage' means the 'Nominal *voltage* at *connection* to *Network*' (as defined in schedule 5.5.1) at the *connection point* for the relevant *synchronous generating unit*.

(a) *Automatic access standard*: Each *synchronous generating unit*, while operating at any level of *active power* output, must be capable of:

(1) supplying at its *connection point* an amount of *reactive power* of at least the amount equal to the product of the *rated active power output* of the *generating unit* at *nominal voltage* and 0.395; and

(2) absorbing at its *connection point* an amount of *reactive power* of at least the amount that would be absorbed equal to the product of the *rated active power output* of the *generating unit* at *nominal voltage* and 0.395.

(b) *Minimum access standard*: No requirement to supply or absorb *reactive power* at the *connection point*.

(c) The *Generator* and the *Network Service Provider* may, in accordance with clause 5.3.4A of the *Rules*, negotiate a *reactive power capability* sufficient to ensure all relevant *system standards* are met under system normal and contingency operating conditions.

(d) The *Generator* may reach a commercial arrangement with the *Network Service Provider* or a *Registered Participant* for the provision of *reactive power capability* sufficient to ensure the *Generator's* obligation under this clause is met.

(e) The access standards for consumption by a *Generator* are to be determined in accordance with clause S5.3.5 of schedule 5.3 as if the *Generator* were a *Market Customer*.

S5.2.5.2 Quality of electricity generated

(a) *Automatic access standard*:

(1) The *plant standard* in accordance with clause S5.2.5.2(c); or

(2) Each *generating unit* must *generate* a constant *voltage* level, and when not *generating* draw electricity, with:

(i) *voltage* fluctuation equal to or less than the limits determined by the *Network Service Provider* in accordance with clause S5.1.5(a); and

(ii) harmonic *voltage* distortion equal to or less than the emission limits determined by the *Network Service Provider* in accordance with clause S5.1.6(a); and

(iii) *voltage* unbalance equal to or less than the limits allocated by the *Network Service Provider* in accordance with clause S5.1.7.

(b) *Minimum access standard*: Each *generating unit* must *generate* a constant *voltage* level with balanced phase *voltage*s and harmonic *voltage* distortion equal to or less than the emission limits determined by the relevant *Network Service Provider* in accordance with clauses S5.1.5(b) and S5.1.6(b) and clause S5.1a.7 of the *system standards*.

(c) *Plant standard*: When operating *unsynchronised*, each *synchronous generating unit* must *generate* a constant *voltage* level with balanced phase *voltage*s and harmonic *voltage* distortion equal to or less than permitted in accordance with *Australian Standard AS* 1359 "General Requirements for Rotating Electrical Machines".

S5.2.5.3 Generating unit response to disturbances in the power system

(a) Each *generating unit* must be capable of continuous uninterrupted operation during the occurrence of:

(1) *Power system frequency* within the *frequency operating standards* limits and bands for periods not longer than the corresponding times specified in the *frequency operating standards* for the relevant limit or band.

(2) The range of *voltage* variation conditions permitted by clause S5.1a.4 of the *system standards*.

(3) The *voltage* variation conditions corresponding to either:

(i) the *automatic access standard* determined in accordance with clause S5.2.5.3(b); or

(ii) the *negotiated access standard* derived from the *minimum access standard* in accordance with clause S5.2.5.3(c) and agreed between the *Generator* and the *Network Service Provider*.

(b) *Automatic access standard*: The *voltage* dip caused by a *transmission system* fault which causes *voltage* at the *connection point* to drop to zero for up to 0.175 seconds in any one phase or combination of phases, followed by a period of ten seconds where *voltage* may vary in the range 80-110 percent of the nominal *voltage*, and a subsequent period of three minutes in which

the *voltage* may vary within the range 90-110 percent of the nominal *voltage*.

(c) *Minimum access standard*: The *voltage* dip caused by a *transmission system* fault which causes *voltage* at the *connection point* to drop to the *voltage* magnitude calculated by the *Network Service Provider* and advised to the *Generator* for a period of time derived from column 2 of Table S5.1a.2 corresponding to the nominal *voltage* of *transmission* at a location nearest the *connection point* in any one phase or combination of phases.

(d) The negotiation of access standards in relation to this clause S5.2.5.3 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

S5.2.5.4 Partial load rejection

(a) *Automatic access standard*: Each *generating unit* must be capable of continuous uninterrupted operation during and following a *loading level* reduction directly imposed from the *power system* in less than 10 seconds from a fully or partially loaded condition provided that the *loading level* reduction is less than 30 percent of the *generating unit's nameplate rating* and the *loading level* remains above *minimum load*.

(b) *Minimum access standard*: Each *generating unit* must be capable of continuous uninterrupted operation during and following a *loading level* reduction directly imposed from the *power system* in less than 10 seconds from a fully or partially loaded condition provided that the *load* reduction is less than 5 percent of the *generating unit's nameplate rating* and the *loading level* remains above *minimum load.*

(c) If, in accordance with clause 5.3.4A of the *Rules*, the *Generator* and the *Network Service Provider* determine a *negotiated access standard* is to apply, the *Network Service Provider* must consult *NEMMCO* to ensure that the *negotiated access standard* does not materially adversely affect *system security*.

(d) The actual partial load rejection performance must be recorded in the *connection agreement.*

(e) For the purposes of this clause *minimum load* means the *generating unit* output level corresponding to the value described as PMIN in schedule 5.5.1.

S5.2.5.5 [Deleted]

S5.2.5.6 [Deleted]

S5.2.5.7 [Deleted]

S5.2.5.8 Protection of generating units from power system disturbances

(a) The *minimum access standard* is:

(1) Subject to clause S5.2.5.8(a)(2), if a *Connection Applicant* requires that its *generating unit* be automatically *disconnected* from the *power system* in response to abnormal conditions arising from the *power system*, the relevant *protection system* or *control system* must not *disconnect* the *generating unit* for conditions under which it must continuously operate or must withstand under a provision of the *Rules*.

(2) Each *scheduled generating unit connected* to a *transmission system* must have *facilities* to automatically and rapidly reduce its *generation* by at least half if the *frequency* at the *connection point* exceeds a level nominated by *NEMMCO* that is not less that the upper limit of the *operational frequency tolerance band*.

(b) There is no *automatic access standard* for this technical requirement.

(c) For the purposes of this clause, abnormal conditions include:

(1) *frequency* outside the *extreme frequency excursion tolerance limits*;

(2) sustained and uncontrollable stator current beyond the *generating unit's* "Rated Stator Current" (as described in schedule 5.5.1);

(3) stator *voltage* above the *generating unit's* stator *voltage* maximum rating or sustained below the lower limit for stable operation;

(4) *voltage* to *frequency* ratio beyond the *generating unit's* magnetic flux based *voltage* to *frequency* rating;

(5) sustained *voltage* fluctuations at the *connection point* beyond the level determined under clause S5.1.5(a);

(6) sustained harmonic *voltage* distortion at the *connection point* beyond the level determined under clause S5.1.6(a);

(7) sustained negative phase sequence *voltage* at the *connection point* beyond the level determined under clause S5.1.7(a); and

(8) any similar condition agreed between the *Generator* and the relevant *Network Service Provider* after consultation with *NEMMCO*.

(d) The negotiation of access standards in relation to this clause S5.2.5.8 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

The *Network Service Provider* is not liable for any loss or damage incurred by the *Generator* or any other person as a consequence of a fault on either the *power system*, or within the *Generator*'s *facility*.

S5.2.5.9 Protection systems that impact on power system security

The requirements of this clause apply only to protection measures which may be necessary to maintain *power system security*. Protection solely for *Generator* risks is at the *Generator's* discretion.

(a) The *automatic access standard* is:

(1) Primary *protection systems* must be provided to *disconnect* from the *power system* any faulted element within the protection zones that include the *connection point*, the *generating unit* stator winding or any *plant connected* between them, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l).

(2) Each primary *protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.

(3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).

(b) The *minimum access standard* is:

(1) *Protection systems* must be provided to *disconnect* from the *power system* any faulted element within the protection zones that include the *connection point*, the *generating unit* stator winding and any *plant* between them, within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l).

(2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

(c) The *Network Service Provider* and the *Generator* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:

(1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;

(2) tripping of one party's circuit breakers by a *protection system* of the other party; and

(3) co-ordination of *protection system* settings to ensure inter-operation.

S5.2.5.10 Asynchronous operation of synchronous generating units

(a) The *automatic access standard* is: Each *synchronous generating unit* must have a *protection system* to promptly *disconnect* it in order to prevent pole slipping.

(b) The *minimum access standard* is: Each *generating unit* must not cause a *voltage* disturbance due to pole slipping of more than the maximum level specified in Table 7 of *Australian Standard* AS/NZS 61000.3.7:2001.

(c) The actual settings of protection installed on a *generating unit* to satisfy the requirements of clause S5.2.5.10(a) must be approved by the *Network Service Provider*.

S5.2.5.11 Frequency control

General:

(a) For the purpose of this clause:

"*maximum operating level*" means, in relation to a *generating unit*, the greater of its *nameplate rating* and its value for "PMAX" as described in schedule 5.5.1;

"*minimum operating level*" means, in relation to a *generating unit*, the greater of zero and its value for "PMIN" as described in schedule 5.5.1;

"*system frequency*" means the electrical frequency of the *transmission system* or *distribution system* to which the *generating unit* is *connected*;

"*pre-disturbance level*" means, in relation to a *generating unit* and a *frequency* disturbance, the *generating unit's* level of output just before the *system frequency* first exceeds the upper or lower limit of the *normal operating frequency band* during the *frequency* disturbance.

Automatic access standard:

(b) A *Generator* must ensure that in respect of each of its *scheduled generating units*:

(1) its *active power* transfer to the *power system* does not increase in response to a rise in *system frequency*;

(2) its *active power* transfer to the *power system* does not decrease in response to a fall in *system frequency*; and

(3) any oscillatory behaviour in respect of its *active power* transfer to the *power system* (other than authorised power system stabiliser action) is damped with a damping ratio of more than 0.4.

(c) A *Generator* must ensure that each of its *scheduled generating units* is capable of automatically reducing its output:

(1) whenever the *system frequency* exceeds the upper limit of the *normal operating frequency band*;

(2) by an amount that is at least the smallest of:

(i) twenty percent of its *maximum operating level* times the percentage *frequency* difference between *system frequency* and the upper limit of the *normal operating frequency band*;

(ii) ten percent of its *maximum operating level*; and

(iii) subject to the *frequency* recovering gradually, the difference between the *generating unit's pre-disturbance level* and *minimum operating level*, but zero if the difference is negative.

(d) A *Generator* must ensure that each of its *scheduled generating units* is capable of automatically increasing its output:

(1) whenever the *system frequency* falls below the lower limit of the *normal operating frequency band*;

(2) by the amount that is at least the smallest of:

(i) twenty percent of its *maximum operating level* times the percentage *frequency* difference between the lower limit of the *normal operating frequency band* and *system frequency*;

(ii) five percent of its *maximum operating level*; and

(iii) subject to the *frequency* recovering gradually, one third of the difference between the *generating unit's maximum operating level* and *pre-disturbance level*, but zero if the difference is negative.

Minimum access standard:

(e) A *Generator* must ensure that at each of its *connection points* in relation to its *scheduled generating units*:

(1) the *active power* transfer to the *power system* does not increase in response to a rise in *system frequency*;

(2) the *active power* transfer to the *power system* does not decrease more than 2 percent per Hz in response to a fall in *system frequency*; and

(3) any oscillatory behaviour of *active power* transfer to the *power system* (other than authorised power system stabiliser action) is damped with a damping ratio of more than 0.4.

Negotiated access standards:

(f) If, in accordance with clause 5.3.4A of the *Rules*, the *Generator* and the *Network Service Provider* determine a *negotiated access standard* is to apply, the *Network Service Provider* must ensure that the *negotiated access standard* is equal to the value determined by *NEMMCO* as unlikely to materially adversely affect *system security*.

(g) The negotiation of access standards in relation to this clause S5.2.5.11 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

S5.2.5.12 Stability

(a) *Automatic access standard*: A *generating unit* must have plant capabilities and *control systems*, including, but not limited to inertia, short-circuit ratio and power system stabilisers, sufficient to:

(1) not cause any *inter-regional* or *intra-regional power transfer capability* based on:

(i) transient stability;

(ii) oscillatory stability; or

(iii) *voltage* stability,

to be reduced below the level that would apply if the *generating unit* were *disconnected*;

(2) not cause instability that would adversely impact on other *Registered Participants*.

(b) *Minimum access standard*: The *generating unit* must have plant capabilities and *control systems*, including, but not limited to inertia, short-circuit ratio and power system stabilisers, sufficient to not reduce any *inter-regional* or *intra-regional power transfer capability* to import into the *generating unit's region* by more than its *loading level* whenever it is *synchronised*.

(c) The relevant requirements for short-circuit ratio in IEC 60034-3 are a *plant standard* in relation to clause S5.2.5.12(a)(1)(i).

(d) The negotiation of access standards in relation to this clause S5.2.5.12 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

S5.2.5.13 Excitation control system

A *Generator* must ensure that each *synchronous generating unit is* fitted with an *excitation control system*. Each *excitation control system* must provide continuous *voltage* regulation to within 0.5 percent of the selected setpoint value at all operating points within generator capability.

A *Generator* must ensure that the *excitation control system* of a *synchronous generating unit* is also capable of:

(a) controlling *generating unit* excitation to maintain the short-time average *generating unit* stator *voltage* at highest rated power output level which must be at least 5 percent above the nominal stator *voltage*;

(b) maintaining adequate *generating unit* stability under all operating conditions including providing *power system* stabilising action if fitted with a *power system* stabiliser;

(c) providing a ceiling excitation *voltage* at least 1.6 times the excitation *voltage* required to achieve maximum continuous rating at nominal *voltage*; and

(d) unless otherwise agreed by the *Network Service Provider* providing reactive current compensation settable for boost or droop.

Where fitted in accordance with clause S5.2.5.12(a), a *power system* stabiliser circuit must modulate *generating unit* field *voltage* in response to changes in power output and/or shaft speed and/or any other equivalent input signal approved by the *Network Service Provider*. The stabilising circuit must be responsive and adjustable over a *frequency* range which must include *frequencies* within a bandwidth from 0.1 Hz to 2.5 Hz.

The *Network Service Provider* must ensure that the structure and setting or modification of a parameter setting of any component of a *synchronous generating unit excitation control system* is undertaken in accordance with clause S5.2.2.

Excitation limiters must be provided by the *Generator* on each *synchronous generating unit* for under excitation and over excitation and may be provided for *voltage* to *frequency* ratio. Each *generating unit* must be capable of stable operation for indefinite periods while under the control of any excitation limiter. The *Generator* must ensure that excitation limiters do not detract from the performance of any stabilising circuits and that they have settings applied which are co-ordinated with all *protection systems*.

Automatic access standard: A *generating unit* must be adequately damped and is not permitted to remain in oscillation with respect to the remainder of the *power system* with a frequency of oscillation more than 2.5 Hz or less than 0.1 Hz.

Minimum access standard: A *generating unit* must be adequately damped and is not permitted to remain in oscillation with respect to the remainder of the *power system* with a frequency of oscillation more than 5 Hz or less than 0.1 Hz.

Negotiated access standard: If, in accordance with clause 5.3.4A of the *Rules*, the *Generator* and the *Network Service Provider* determine a *negotiated access standard* is to apply, the *Network Service Provider* must ensure that the *negotiated access standard* is equal to the value determined by *NEMMCO* as unlikely to materially adversely affect *system security*.

The negotiation of access standards in relation to this clause S5.2.5.13 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

Table S5.2.1 sets out a minimum performance requirement that must be achieved by the *Generator* for *synchronous generating unit*:

Performance Item	**Units**	**Minimum requirement**	**Notes**
Sensitivity: A sustained 0.5 percent error between the *voltage* reference and the sensed *voltage* will produce an excitation change of not less than 1.0 per unit.	gain	200 minimum	1
Field voltage rise time: Time for field *voltage* to rise from rated *voltage* to minimum excitation ceiling *voltage* required by clause S5.2.5.13(c) following the application of a short duration impulse to the *voltage* reference	s	.5 maximum	2
Settling time with the *generating unit* unsynchronised following a disturbance equivalent to a 5 percent step change in the sensed *generating unit* terminal *voltage*.	s	2.5 maximum	

Performance Item	Units	Minimum requirement	Notes
Settling time with the *generating unit synchronised* following a disturbance equivalent to a 5 percent step change in the sensed *generating unit* terminal *voltage*. Must be met at all operating points within the *generating unit* capability.	s	5 maximum	
Settling time following any disturbance which causes an excitation limiter to operate	s	7.5 maximum	

Table S5.2.1: Excitation System Performance Requirements

Notes:

1. One per unit is that field *voltage* required to produce nominal *voltage* on the airgap line of the *generating unit* open circuit characteristic (Refer IEEE Standard 115-1983 - Test Procedures for Synchronous Machines).

2. Rated field *voltage* is that *voltage* required to give nominal *generating unit* terminal *voltage* when the *generating unit* is operating at its maximum continuous rating. Rise time is defined as the time taken for the field *voltage* to rise from 10 percent to 90 percent of the increment value.

S5.2.6 Monitoring and control requirements

S5.2.6.1 Remote monitoring

(a) *Automatic access standard*:

(1) Each *scheduled generating unit* must have *remote monitoring equipment* to transmit to *NEMMCO's control centres* in real time, the quantities that *NEMMCO* reasonably requires to discharge its *market* and *power system security* functions as set out in Chapters 3 and 4 of the *Rules* respectively.

(2) The quantities may include such data as current, *voltage*, *active power* and *reactive power* in respect of *generating unit* stators, auxiliary supply and power conversion systems.

(b) *Minimum access standard*:

(1) Each *scheduled generating unit* connected to a *transmission system* must have *remote monitoring equipment* to transmit to *NEMMCO's control centres* in real time:

(A) *generating unit active power* output; and

(B) *generating unit reactive power* output.

(2) Each *scheduled generating unit* connected to a *distribution system* must have *remote monitoring equipment* to transmit to *NEMMCO's control centres* in real time either *generating unit active power* output or *active power* delivered to the *distribution system*.

(c) The negotiation of access standards in relation to this clause S5.2.6.1 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

S5.2.6.2 [Deleted]

S5.2.6.3 Communications equipment

A *Generator* must provide electricity *supplies* for *remote monitoring equipment* and *remote control equipment* installed in relation to its *generating unit*s capable of keeping such equipment available for at least three hours following total loss of *supply* at the *connection point* for the relevant *generating unit*.

A *Generator* must provide communications paths (with appropriate redundancy) from the *remote monitoring equipment* or *remote control equipment* installed at any of its *generating unit*s to a communications interface in a location reasonably acceptable to the *Network Service Provider* at the relevant *power station*. Communications systems between this communications interface and the *control centre* are the responsibility of the *Network Service Provider* unless otherwise agreed by the *Generator* and the *Network Service Provider*.

Telecommunications between *Network Service Providers* and *Generators* for *operational communications* must be established in accordance with the requirements set down below.

(a) Primary Speech Facility

The relevant *Network Service Provider* must provide and maintain equipment by means of which routine and emergency control telephone calls may be made between the *Generator's* responsible Engineer/Operator and *NEMMCO*.

The *facilities* to be provided, including the interface requirement between the *Network Service Provider's* equipment and the *Generator's* equipment, must be specified by the *Network Service Provider*.

The costs of the equipment must be recovered by the *Network Service Provider* only through the charge for *connection*.

(b) Back-up Speech Facility

Where the *Network Service Provider* or *NEMMCO* reasonably determines that a back-up speech *facility* to the primary *facility* is required, the *Network Service Provider* must provide and maintain a separate telephone link or radio installation on a cost-recovery basis only through the charge for *connection*.

The *Network Service Provider* is responsible for radio system planning and for obtaining all necessary radio licenses.

S5.2.6.4 [Deleted]

S5.2.6.5 [Deleted]

S5.2.7 [Deleted]

S5.2.8 Power station auxiliary transformers

In cases where a *Generator's power station* takes its auxiliary supplies through a *transformer* via a separate *connection point*, the *Generator* must comply with the conditions for *Customers* (schedule 5.3) in respect of that *connection point*.

S5.2.9 Fault Level

(a) *Automatic access standard*: A *Generator* must ensure that each *generating unit* can limit its contribution to the fault current on the *transmission network* or *distribution network* to the level specified for that *generating unit* by the *Network Service Provider*.

(b) *Minimum access standard*: There is no minimum requirement.

(c) Negotiated access standard: If, in accordance with clause 5.3.4A of the *Rules*, the *Generator* and the *Network Service Provider* determine a *negotiated access standard* is to apply on terms and conditions to be agreed between the parties, the *Network Service Provider* must consider alternative *network* configurations in the determination of the applicable fault current level and must prefer those options which maintain an equivalent level of service to other *Network Users* and which, in the opinion of the *Generator*, impose the least obligation on the *Generator*.

Schedule 5.3 - Conditions for Connection of Customers

(a) This schedule applies to the following classes of *Network User*:

(1) a *First-Tier Customer* in respect of its *first-tier load*;

(2) a *Second-Tier Customer* in respect of its *second-tier load*;

(3) a *Market Customer* in respect of its *market load*;

(4) a *Non-Registered Customer* in respect of *supply* it takes from a *network*; and

(5) a *Distribution Network Service Provider* in respect of its *distribution network.*

(b) For the purposes of this schedule 5.3 the term "*Network Service Provider"* must be interpreted to mean the *Network Service Provider* with whom the *Connection Applicant* has sought, or is seeking, a *connection* in accordance with clause 5.3.2 of the *Rules*.

(c) All *Network Users* must comply with the requirements for the establishment of performance standards in accordance with provisions contained in schedule 5.1a for *system standards* or schedule 5.1 for *Network Service Providers* and this schedule 5.3 for *Customers*.

(d) If the *Connection Applicant* is a *Registered Participant* in relation to the proposed *connection*, the *Network Service Provider* may include as terms and conditions of the *connection agreement* any provision of this schedule that is expressed as an obligation on a *Network User*. If the *Connection Applicant* is not a *Registered Participant* in relation to the proposed *connection*, the *Network Service Provider* must include as terms and conditions of the *connection agreement*:

(1) each provision of this schedule that is expressed as an obligation on a *Network User*; and

(2) each agreed *performance standard* and an obligation to comply with it.

(e) The purpose of this schedule is to:

(1) describe the information that must be exchanged for the *connection* enquiry and *application to connect* processes described in clause 5.3 of the *Rules*;

(2) establish the *automatic access standards* and *minimum access standards* that will apply to the process of negotiating access standards under clause 5.3.4A of the *Rules*; and

(3) establish obligations to apply prudent design standards for the *plant* to be *connected.*

S5.3.1 Information

(a) Before a *Network User connects* any new or additional equipment to a *network*, the *Network User* must submit the following kinds of information to the *Network Service Provider*:

(1) a single line diagram with the protection details;

(2) *metering system* design details for any metering equipment being provided by the *Network User*;

(3) a general arrangement locating all the equipment on the site;

(4) a general arrangement for each new or altered *substation* showing all exits and the position of all electrical equipment;

(5) type test certificates for all new switchgear and *transformers*, including measurement *transformers* to be used for *metering* purposes in accordance with Chapter 7 of the *Rules*;

(6) earthing details;

(7) the proposed methods of earthing cables and other equipment to comply with the regulations of the relevant *participating jurisdiction*;

(8) *plant* and earth grid test certificates from approved test authorities;

(9) a secondary injection and trip test certificate on all circuit breakers;

(10) certification that all new equipment has been inspected before being *connected* to the *supply*; and

(11) operational arrangements.

(b) For the purposes of clause 5.3.2(d) of the *Rules*, the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of the proposed *connection* includes:

(1) the highest expected single phase and three phase fault levels at the *connection point* without the proposed *connection*;

(2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;

(3) the expected limits of *voltage* fluctuation, harmonic *voltage* distortion and *voltage* unbalance at the *connection point* without the proposed *connection*;

(4) technical information relevant to the *connection point* without the proposed *connection* including equivalent source impedance information, sufficient to estimate fault levels, *voltage* fluctuations, harmonic *voltage* distortion and *voltage* unbalance; and

(5) any other information or data not being *confidential information* relating to the performance of the *Network Service Provider's facilities* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*;

except where the *Connection Applicant* agrees the *Network Service Provider* may provide alternative or less detailed technical information in satisfaction of this clause S5.3.1.(b).

S5.3.2 Design standards

A *Network User* must ensure that:

(a) the electrical *plant* in its *facility* complies with the relevant *Australian Standards* as applicable at the time of first installation of that electrical *plant* in the *facility*;

(b) circuit breakers provided to isolate the *Network User's facilities* from the *Network Service Provider's facilities* are capable of breaking, without damage or restrike, fault currents nominated by the *Network Service Provider* in the relevant *connection agreement*; and

(c) new equipment including circuit breakers provided to isolate the *Network User's facilities* from the *Network Service Provider's facilities* is capable of withstanding, without damage, power *frequency voltage*s and impulse levels nominated by the *Network Service Provider* to apply at the *connection point* in accordance with the relevant provisions of the *system standards* and recorded in the relevant *connection agreement*.

S5.3.3 Protection systems and settings

A *Network User* must ensure that all *connections* to the *network* are protected by protection devices which effectively and safely *disconnect* any faulty circuit automatically within a time period specified by the *Network Service Provider* in accordance with the following provisions:

(a) The *automatic access standard* is:

(1) Primary *protection systems* must be provided to *disconnect* any faulted element from the *power system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l).

(2) Each primary *protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.

(3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).

(b) The *minimum access standard* is:

(1) Primary *protection systems* must be provided to *disconnect* from the *power system* any faulted element within their respective protection zones within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l).

(2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

(c) The *Network Service Provider* and the *Network User* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:

(1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;

(2) tripping of one party's circuit breakers by a *protection system* of the other party; and

(3) co-ordination of *protection system* settings to ensure inter-operation.

Before the *Network User's* installation is *connected* to the *Network Service Provider's transmission or distribution system* the *Network User's protection system* must be tested and the *Network User* must submit the appropriate test certificate to the *Network Service Provider*.

The application of settings of the protection scheme must be undertaken in accordance with clause S5.3.4.

S5.3.4 Settings of protection and control systems

A *Network User* must only apply settings to a *control system* or a *protection system* that are necessary to comply with performance requirements of this schedule 5.3 if the settings have been approved in writing by the *Network Service Provider* and, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, also by *NEMMCO*. A *Network User* must not allow its *plant* to take *supply* of electricity from the *power system* without such prior approval.

If a *Network User* seeks approval from the *Network Service Provider* to apply or change a setting, approval must not be withheld unless the *Network Service Provider* or, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, *NEMMCO*, reasonably determines that the changed setting would cause the *plant* to not comply with the relevant *performance standard* or cause an *inter-regional* or *intra-regional power transfer capability* to be reduced.

If the *Network Service Provider* or, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, *NEMMCO*, reasonably determines that a setting of a *control system* or *protection system* of the *plant* needs to change to comply with the relevant *performance standard* or to maintain or restore an *inter-regional* or *intra-regional power transfer capability*, the *Network Service Provider* or *NEMMCO* (as applicable) must consult with the *Network User*, and the *Network Service Provider* may request in writing that a setting be applied in accordance with the determination.

The *Network Service Provider* may also request a test to verify the performance of the relevant *plant* with the new setting.

A *Network User* who receives such a request must arrange for the notified setting to be applied as requested and for a test to be conducted as requested. After the test, the *Network User* must, on request, provide both *NEMMCO* and the *Network Service Provider* with a report of a requested test, including evidence of its success or failure. Such a report of a test is *confidential information*.

A *Network User* must not change a setting requested by the *Network Service Provider* without its prior written agreement. If the *Network Service Provider* requires a *Network User* to change a setting within 18 months of a previous request, the *Network Service Provider* must pay the *Network User* its reasonable costs of changing the setting and conducting the tests as requested.

S5.3.5 Power factor requirements

Automatic access standard: For *loads* equal to or greater than 30 percent of the *maximum demand* at the *connection point* the *power factor*s for *Network Users* and for *distribution networks connected* to another *transmission network* or *distribution network* are shown in Table S5.3.1:

Table S5.3.1

Permissible Range	
Supply Voltage (nominal)	**Power Factor Range**
> 400 kV	0.98 lagging to unity
250 kV - 400 kV	0.96 lagging to unity
50 kV - 250 kV	0.95 lagging to unity
1 kV < 50 kV	0.90 lagging to 0.90 leading

For *load* less than 30 percent of the *maximum demand* at the *connection point* a *Network Service Provider* may accept a *power factor* outside the range stipulated in Table S5.3.1 provided this does not cause the *system standards* to be violated.

Minimum access standard: A *Network Service Provider* may permit a lower lagging or leading *power factor* where the *Network Service Provider* is advised by *NEMMCO* that this will not detrimentally affect *power system security* or reduce *intra-regional* or *inter-regional power transfer capability.*

General:

If the *power factor* falls outside the relevant *performance standard* over any critical *loading* period nominated by the *Network Service Provider*, the *Network User* must, where required by the *Network Service Provider* in order to maintain satisfactory *voltage* levels at the *connection point* or to restore *intra-regional* or *inter-regional power transfer capability*, take action to ensure that the *power factor* falls within range as soon as reasonably practicable. This may be achieved by installing additional *reactive plant* or reaching a commercial agreement with the *Network Service Provider* to install, operate and maintain equivalent *reactive plant* as part of the *connection assets* or by alternative commercial arrangements with another party.

A *Registered Participant* who installs *shunt capacitors* to comply with *power factor* requirements must comply with the *Network Service Provider's* reasonable requirements to ensure that the design does not severely attenuate audio *frequency* signals used for *load* control or operations, or adversely impact on harmonic *voltage* levels at the *connection point.*

S5.3.6 Balancing of load currents

A *Network Service Provider* may require a *connected Registered Participant's load* to be balanced across all phases in order to maintain the negative sequence *voltage* at each *connection point* at less than or equal to the limits set out in Table S5.1a.1 of the *system standards* for the applicable nominal *supply voltage* level.

Automatic access standard: A *Network User* must ensure that:

(a) for *connections* at 30 kV or higher *voltage*, the current in any phase is not greater than 102 percent or less than 98 percent of the average of the currents in the three phases; and

(b) for *connections* at *voltages* less than 30 kV, that the current in any phase is not greater than 105 percent or less than 95 percent of the average of the currents in the three phases.

Minimum access standard: Where agreed with the relevant *Network Service Provider* and subject to any specific conditions imposed, a *Network User* may cause current unbalance greater than that specified in the *automatic access standard* provided the *Network User* does not cause the limits specified in clause S5.1a.7 to be exceeded at any point in the *network*.

General:

The limit to *load* current unbalance must be included in the *connection agreement* and is subject to verification of compliance by the *Network Service Provider*.

Where these requirements cannot be met the *Registered Participant* may enter into a commercial arrangement with the *Network Service Provider* for the installation of equipment to correct the phase unbalance. Such equipment must be considered as part of the *connection assets* for the *Registered Participant*.

The limit to *load* current unbalance must be included in the *connection agreement* and is subject to verification of compliance by the *Network Service Provider*.

S5.3.7 Voltage fluctuations

(a) *Automatic access standard*: The *voltage* fluctuations caused by variations in *loading level* at the *connection point*, including those arising from *energisation*, de-energisation or other operation of *plant*, must not exceed the limits determined under clause S5.1.5(a).

(b) *Minimum access standard*: The *voltage* fluctuations caused by variations in *loading level* at the *connection point*, including those arising from *energisation*, de-energisation or other operation of *plant*, must not exceed the limits determined under clause S5.1.5(b).

The *voltage* fluctuation emission limits and any specified conditions must be included in the *connection agreement*, and are subject to verification of compliance by the *Network Service Provider*.

S5.3.8 Harmonics and voltage notching

(a) *Automatic access standard*: The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(a).

(b) *Minimum access standard*: The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(b).

The harmonic *voltage* distortion emission limits and any special conditions must be included in the *connection agreement*, and is subject to verification of compliance by the *Network Service Provider*.

S5.3.9 Design requirements for Network Users' substations

A *Network User* must comply with the following requirements applicable to the design, station layout and choice of equipment for a *substation*:

(a) safety provisions must comply with requirements applicable to the *participating jurisdiction* notified by the *Network Service Provider*;

(b) where required by the *Network Service Provider*, appropriate interfaces and accommodation must be incorporated for communication *facilities*, remote monitoring and control and protection of *plant* which is to be installed in the *substation*;

(c) a *substation* must be capable of continuous uninterrupted operation with the levels of *voltage*, harmonics, unbalance and *voltage* fluctuation specified in the *system standards* as modified in accordance with the relevant provisions of schedule 5.1;

(d) earthing of primary *plant* in the *substation* must be in accordance with the Electricity Supply Association of Australia Safe Earthing Guide and must reduce step and touch potentials to safe levels;

(e) *synchronisation facilities* or reclose blocking must be provided if a *generating unit* is *connected* through the *substation*;

(f) secure electricity supplies of adequate capacity must be provided for *plant* performing communication, monitoring, control and protection functions;

(g) *plant* must be tested to ensure that the *substation* complies with the approved design and specifications as included in a *connection agreement*;

(h) the protection equipment required would normally include protection schemes for individual items of *plant*, back-up arrangements, auxiliary DC supplies and instrumentation *transformers*; and

(i) insulation levels of *plant* in the *substation* must co-ordinate with the insulation levels of the *network* to which the *substation* is *connected* as nominated in the *connection agreement*.

S5.3.10 Load shedding facilities

Network Users who are *Market Customers* and who have expected peak demands in excess of 10MW must provide automatic *interruptible load* in accordance with clause 4.3.5 of the *Rules*.

Load shedding procedures may be applied by *NEMMCO* in accordance with the provisions of clause 4.3.2 of the *Rules* for the shedding of all *loads* including *sensitive loads*.

Schedule 5.3a - Conditions for connection of Market Network Services

This schedule sets out obligations of *Market Network Service Providers* who *connect* to either a *transmission network* or a *distribution network*. It represents the requirements to be met for access to a *network*. Particular provisions may be varied by the *Network Service Provider* under the provisions of the *Rules* for the application of *minimum access standards* and *automatic access standards.*

This schedule includes specific provisions for the determination of *automatic access standards* and *negotiated access standards* derived from *minimum access standards* which, once determined, must be recorded together with the *automatic access standards* in a *connection agreement* and registered with *NEMMCO* as *performance standards.*

In this schedule, the term "*Network Service Provider*" applies only to the *Network Service Provider* with whom the *Market Network Service Provider* has lodged, or is considering lodging, an *application to connect*.

(a) The schedule includes, in respect of each *market network service*, provisions regarding the capability to:

(1) automatically control the transfer of real power at the *connection point* for any given set of *system* conditions within the limits permitted under the *Rules*;

(2) respond to control requirements under expected normal and abnormal conditions;

(3) comply with general requirements to meet quality of *supply* obligations in accordance with clauses S5.3a.9, S5.3a.10 and S5.3a.11 and to maintain security of *supply* to other *Registered Participants*; and

(4) automatically *disconnect* itself when necessary to prevent any damage to the *market network service facilities* or threat to *power system security*.

(b) This schedule also sets out the requirements and conditions, which (subject to clause 5.2.3 of the *Rules*) are obligations of *Market Network Service Providers* to:

(1) co-operate with the relevant *Network Service Provider* on technical matters when making a new *connection*;

(2) provide information to the *Network Service Provider* or *NEMMCO;* and

(3) observe and apply the relevant provisions of the *system standards* contained in schedule 5.1a in relation to the planning, design and operation of its *market network service facilities*.

(c) This schedule does not set out arrangements by which a *Market Network Service Provider* may enter into an agreement or contract with *NEMMCO* to:

(1) provide additional services that are necessary to maintain *power system security*; or

(2) provide additional service to facilitate management of the *market*.

S5.3a.1 Provision of Information

(a) Before a *Market Network Service Provider connects* any new or additional equipment to a *network*, the *Market Network Service Provider* must submit the following kinds of information to the *Network Service Provider*:

(1) a single line diagram with the protection details;

(2) *metering system* design details for any metering equipment being provided by the *Market Network Service Provider*;

(3) a general arrangement locating all relevant equipment on the site;

(4) a general arrangement for each new or altered *substation* showing all exits and the position of all electrical equipment;

(5) type test certificates for all new switchgear and *transformers*, including measurement *transformers* to be used for *metering* purposes in accordance with Chapter 7 of the *Rules*;

(6) earthing details;

(7) the proposed methods of earthing cables and other equipment to comply with the regulations of the relevant *participating jurisdiction*;

(8) *plant* and earth grid test certificates from approved test authorities;

(9) a secondary injection and trip test certificate on all circuit breakers;

(10) certification that all new equipment has been inspected before being *connected* to the *supply*; and

(11) operational arrangements.

(b) For the purposes of clause 5.3.2(d) of the *Rules*, the technical information that a *Network Service Provider* must, if requested, provide to a *Connection*

Applicant in respect of the proposed *connection* of a *market network service facility* includes:

(1) the highest expected single phase and three phase fault levels at the *connection point* without the proposed *connection*;

(2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;

(3) the expected limits of *voltage* fluctuation, harmonic *voltage* distortion and *voltage* unbalance at the *connection point* without the proposed *connection*;

(4) technical information relevant to the *connection point* without the proposed *connection* including equivalent source impedance information, sufficient to estimate fault levels, *voltage* fluctuations, harmonic *voltage* distortion and *voltage* unbalance; and

(5) any other information or data not being *confidential information* relating to the performance of the *Network Service Provider's facilities* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*;

except where the *Connection Applicant* agrees the *Network Service Provider* may provide alternative or less detailed technical information in satisfaction of this clause S5.3a.1(b).

S5.3a.2 Application of settings

A *Market Network Service Provider* must only apply settings to a *control system* or a *protection system* that are necessary to comply with performance requirements of this schedule 5.3a if the settings have been approved in writing by the *Network Service Provider* and, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, also by *NEMMCO*. A *Market Network Service Provider* must not allow its *market network service facilities* to take electricity from the *power system* without such prior approval.

If a *Market Network Service Provider* seeks approval from the *Network Service Provider* to apply or change a setting, approval must not be withheld unless the *Network Service Provider* or, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, *NEMMCO*, reasonably determines that the changed setting would cause the *market network service facilities* to not comply with the relevant *performance standard* or cause an *inter-regional* or *intra-regional power transfer capability* to be reduced.

If the *Network Service Provider* or, if the requirement is one that would involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*, *NEMMCO*, reasonably

determines that a setting of a *market network service facility's control system* or *protection system* needs to change to comply with the relevant *performance standard* or to maintain or restore an *inter-regional* or *intra-regional power transfer capability*, the *Network Service Provider* or *NEMMCO* (as applicable) must consult with the *Market Network Service Provider*, and may request in writing that a setting be applied in accordance with the determination.

The *Network Service Provider* may also request a test to verify the performance of the relevant *plant* with the new setting. The *Network Service Provider* must provide *NEMMCO* with a copy of its request to a *Market Network Service Provider* to apply a setting or to conduct a test.

A *Market Network Service Provider* who receives such a request must arrange for the notified setting to be applied as requested and for a test to be conducted as requested. After the test, the *Market Network Service Provider* must, on request, provide both *NEMMCO* and the *Network Service Provider* with a report of a requested test, including evidence of its success or failure. Such a report of a test is *confidential information*.

A *Market Network Service Provider* must not change a setting requested by the *Network Service Provider* without its prior written agreement. If the *Network Service Provider* requires a *Market Network Service Provider* to change a setting within 18 months of a previous request, the *Network Service Provider* must pay the *Market Network Service Provider* its reasonable costs of changing the setting and conducting the tests as requested.

S5.3a.3 Technical matters to be co-ordinated

A *Market Network Service Provider* and the relevant *Network Service Provider* must use all reasonable endeavours to agree upon the following matters in respect of each new or altered *connection* of a *market network service facility* to a *network*:

(a) design at the *connection point*;

(b) physical layout adjacent to the *connection point*;

(c) primary protection and backup protection (clause S5.3a.6);

(d) control characteristics (clause 5.3a.4);

(e) communications and alarms (clause 5.3a.4);

(f) insulation co-ordination and lightning protection;

(g) fault levels and *fault clearance times*;

(h) switching and *isolation facilities*;

(i) interlocking arrangements; and

(j) *metering installations* as described in Chapter 7 of the *Rules*.

S5.3a.4 Monitoring and control requirements

S5.3a.4.1 Remote Monitoring

(a) *Automatic access standard*:

(1) Each *market network service facility* must have *remote monitoring equipment* to transmit to *NEMMCO's control centres* in real time, the quantities that *NEMMCO* reasonably requires to discharge its *market* and *power system security* functions as set out in Chapters 3 and 4 of the *Rules* respectively.

(2) The quantities may include such data as current, *voltage*, *active power*, *reactive power*, operational limits and critical temperatures in respect of *connection points* and power conversion systems.

(b) *Minimum access standard*:

(1) Each *market network service facility* must have *remote monitoring equipment* to transmit to *NEMMCO's control centres* in real time:

(A) *connection point active power* flow, *reactive power* flow and *voltage*;

(B) *active power*, *reactive power* and *voltage* for AC power lines, *transformers* and *busbars*, and power and *voltage* (or alternatively current) for DC power lines; and

(C) the status of circuit breakers.

(c) The negotiation of access standards in relation to this clause S5.3a.4.1 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

S5.3a.4.2 [Deleted]

S5.3a.4.3 Communications equipment

A *Market Network Service Provider* must provide electricity *supplies* for *remote monitoring equipment* and *remote control equipment* installed in relation to its *market network service facilities* capable of keeping such equipment available for at least three hours following total loss of *supply* at the *connection point* for the relevant *market network service facility*.

A *Market Network Service Provider* must provide communications paths (with appropriate redundancy) from the *remote monitoring equipment* or *remote control equipment* installed at any of its *market network service facilities* to a communications interface in a location reasonably acceptable to the *Network Service Provider* at the relevant *connection point.* Communications systems between this communications interface and the *control centre* are the responsibility of the *Network Service Provider* unless otherwise agreed by the *Market Network Service Provider* and the *Network Service Provider*.

Telecommunications between *Network Service Providers* and *Market Network Service Providers* for *operational communications* must be established in accordance with the requirements set down below.

(a) Primary Speech Facility

The relevant *Network Service Provider* must provide and maintain equipment by means of which routine and emergency control telephone calls may be established between the *Market Network Service Provider's* responsible Engineer/Operator and *NEMMCO*.

The *facilities* to be provided, including the interface requirement between the *Network Service Provider's* equipment and the *Market Network Service Provider's* equipment, must be specified by the *Network Service Provider*.

The costs of the equipment must be recovered by the *Network Service Provider* only through the charge for *connection.*

(b) Back-up Speech Facility

Where the *Network Service Provider* or *NEMMCO* reasonably determines that a back-up speech *facility* to the primary *facility* is required, the *Network Service Provider* must provide and maintain a separate telephone link or radio installation on a cost-recovery basis only through the charge for *connection.*

The *Network Service Provider* is responsible for radio system planning and for obtaining all necessary radio licences.

S5.3a.5 Design standards

A *Market Network Service Provider* must ensure that:

(a) the electrical *plant* in its *facility* complies with the relevant *Australian Standards* as applicable at the time of first installation of that electrical *plant* in the *facility*;

(b) circuit breakers provided to isolate the *Market Network Service Provider's facilities* from the *Network Service Provider's facilities* are capable of breaking, without damage or restrike, fault currents nominated by the *Network Service Provider* in the relevant *connection agreement*; and

(c) all new equipment including circuit breakers provided to isolate the *Market Network Service Provider's facilities* from the *Network Service Provider's facilities* is capable of withstanding, without damage, power *frequency voltages* and impulse levels nominated by the *Network Service Provider* in accordance with the relevant provisions of the *system standards* and recorded in the relevant *connection agreement*.

S5.3a.6 Protection systems and settings

A *Market Network Service Provider* must ensure that all *connections* to the *network* are protected by protection devices which effectively and safely *disconnect* any faulty circuit automatically within a time period specified by the *Network Service Provider* in accordance with the following provisions:

(a) The *automatic access standard* is:

(1) Primary *protection systems* must be provided to *disconnect* any faulted element from the *power system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l).

(2) Each primary *protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.

(3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).

(b) The *minimum access standard* is:

(1) Primary *protection systems* must be provided to *disconnect* from the *power system* any faulted element within their respective protection zones within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l).

(2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers

controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

(c) The *Network Service Provider* and the *Market Network Service Provider* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:

(1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;

(2) tripping of one party's circuit breakers by a *protection system* of the other party; and

(3) co-ordination of *protection system* settings to ensure inter-operation.

The *Market Network Service Provider* must ensure that the protection settings of its protective equipment grade with the *Network Service Provider's transmission system* or *distribution system* protection settings. Similarly the grading requirements of fuses must be co-ordinated with the *Network Service Provider*. The *Market Network Service Provider* must provide details of the protection scheme implemented by the *Market Network Service Provider* to the *Network Service Provider* and must liaise with the *Network Service Provider* when determining gradings and settings.

The application of settings of the protection scheme must be undertaken in accordance with clause S5.3a.2.

Before the *Market Network Service Provider's* installation is *connected* to the *Network Service Provider's transmission or distribution system* the *Market Network Service Provider's protection system* must be tested and the *Market Network Service Provider* must submit the appropriate test certificate to the *Network Service Provider*.

S5.3a.7 [Deleted]

S5.3a.8 Reactive power capability

Subject to the access standards stated in this clause S5.3a.8, if additional *reactive support* is required as a result of the *connection* or operation of the *network elements* which provide a *market network service* then the requisite *reactive support* must be supplied or paid for by the *Market Network Service Provider*.

Additional reactive support is required if, at rated power output as measured at the *connection point* of the *market network service* the *market network service* has a lagging power factor of less than 0.9 or a leading power factor of less than 0.95.

Automatic access standard: For power export, at rated power output and target *network voltage* as determined in accordance with clause S5.1a.4 of the *system standards* when measured at the *connection point* of the *market network service*, the *market network service* must be capable of operation in the range from a lagging power factor of 0.9 to a leading power factor of 0.95. For power import, the power factor must satisfy the requirements of clause S5.3.5 of schedule 5.3.

Minimum access standard: With the agreement of *NEMMCO* and the *Network Service Provider*, a power factor capability less than that defined by the *automatic access standard* may be provided if the requirements of the *system standards* are satisfied under all operating conditions of the *market network service*.

S5.3a.9 Balancing of load currents

A *Network Service Provider* may require a *Market Network Service Provider's power transfer* to be balanced at a *connection point* in order to maintain the negative sequence *voltage* at each connection point at less than or equal to the limits set out in Table S5.1a.1 of the *system standards* for the applicable nominal *supply voltage* level.

Automatic access standard: A *Market Network Service Provider* must ensure that for *connections* at 11kV or higher *voltage*, the current in any phase drawn by its equipment from the *Network Service Provider's network* is not greater than 102 percent or less than 98 percent of the average of the currents in the three phases.

Minimum access standard: Where agreed with the relevant *Network Service Provider* and subject to any specific conditions imposed, a *Market Network Service Provider* may cause current unbalance greater than that specified in the *automatic access standard* provided the *Market Network Service Provider* does not cause the limits specified in clause S5.1a.7 of the *system standards* to be exceeded at any point in the *network*.

Where these requirements cannot be met the *Market Network Service Provider* may enter into a commercial arrangement with the *Network Service Provider* for the installation of equipment to correct the phase unbalance. Such equipment must be considered as part of the *connection assets* for the *Market Network Service Provider*.

The limit to *power transfer* current unbalance must be included in the *connection agreement* and is subject to verification of compliance by the *Network Service Provider*.

S5.3a.10 Voltage fluctuations

(a) *Automatic access standard*: The *voltage* fluctuations caused by variations in *loading level* at the *connection point*, including those arising from

energisation, de-energisation or other operation of *plant*, must not exceed the limits determined under clause S5.1.5(a).

(b) *Minimum access standard*: The *voltage* fluctuations caused by variations in *loading level* at the *connection point*, including those arising from *energisation*, de-energisation or other operation of *plant*, must not exceed the limits determined under clause S5.1.5(b).

The *voltage* fluctuation emission limits and any specified conditions must be included in the *connection agreement*, and are subject to verification of compliance by the *Network Service Provider*.

S5.3a.11 Harmonics and voltage notching

(a) *Automatic access standard*: The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(a).

(b) *Minimum access standard*: The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(b).

A *Market Network Service Provider* must ensure that all of its *plant connected* to a *transmission network* or *distribution network* is capable of withstanding the effects of harmonic levels produced by that *plant* plus those imposed from the *network*.

The harmonic *voltage* distortion emission limits and any special conditions must be included in the *connection agreement*, and are subject to verification of compliance by the *Network Service Provider*.

S5.3a.12 Design requirements for Market Network Service Providers' substations

A *Market Network Service Provider* must comply with the following requirements applicable to the design, station layout and choice of equipment for a *substation*:

(a) safety provisions must comply with requirements applicable to the *participating jurisdiction* notified by the *Network Service Provider*;

(b) where required by the *Network Service Provider*, appropriate interfaces and accommodation must be incorporated for communication *facilities*, remote monitoring and control and protection of *plant* which is to be installed in the *substation*;

(c) a *substation* must be capable of continuous uninterrupted operation with the levels of *voltage*, harmonics, unbalance and *voltage* fluctuation specified in the *system standards* as modified in accordance with the relevant provisions of schedule 5.1;

(d) earthing of primary *plant* in the *substation* must be in accordance with the Electricity Supply Association of Australia Safe Earthing Guide and must reduce step and touch potentials to safe levels;

(e) *synchronisation facilities* or reclose blocking must be provided if necessary;

(f) secure electricity supplies of adequate capacity must be provided for *plant* performing communication, monitoring, control and protection functions;

(g) *plant* must be tested to ensure that the *substation* complies with the approved design and specifications as included in a *connection agreement*;

(h) the protection equipment required would normally include protection schemes for individual items of *plant*, back-up arrangements, auxiliary DC supplies and instrumentation *transformers*; and

(i) insulation levels of *plant* in the *substation* must co-ordinate with the insulation levels of the *network* to which the *substation* is *connected* as nominated in the *connection agreement*.

S5.3a.13 Market network service response to disturbances in the power system

(a) Each *market network service* must be capable of continuous uninterrupted operation during the occurrence of:

(1) *power system frequency* within the *frequency operating standards*; or

(2) the range of *voltage* variation conditions permitted by the *system standards*.

(b) The equipment associated with each *market network service* must be designed to withstand without damage or reduction in life expectancy the harmonic distortion and *voltage* unbalance conditions determined to apply in accordance with the provisions of schedule 5.1, clauses S5.1.6 and S5.1.7, respectively, at the *connection point*.

S5.3a.14 Protection of market network services from power system disturbances

(a) *Minimum access standard*: If a *Connection Applicant* requires that its *market network service facility* be automatically *disconnected* from the *power system* in response to abnormal conditions arising from the *power*

system, the relevant *protection system* or *control system* must not *disconnect* the *facility* for conditions under which it must continuously operate or must withstand under a provision of the *Rules*.

(b) There is no *automatic access standard* for this technical requirement.

(c) For the purposes of this clause S5.3a.14, the abnormal conditions include:

(1) *frequency* outside the *extreme frequency excursion tolerance limits*;

(2) sustained and uncontrollable DC current beyond a short term current rating for the period assigned to that rating;

(3) DC *voltage* above the *voltage* maximum rating or sustained below any lower limit for stable operation;

(4) *voltage* to *frequency* ratio beyond *a transformer* magnetic flux based *voltage* to *frequency* rating;

(5) sustained *voltage* fluctuations at the *connection point* beyond the level determined under clause S5.1.5(a);

(6) sustained harmonic *voltage* distortion at the *connection point* beyond the level determined under clause S5.1.6(a);

(7) sustained negative phase sequence *voltage* at the *connection point* beyond the level determined under clause S5.1.7(a); and

(8) any similar condition agreed between the *Market Network Service Provider* and *NEMMCO* after consultation with each relevant *Network Service Provider*.

(d) The negotiation of access standards in relation to this clause S5.3a.14 must involve *NEMMCO* under clause 5.3.4A(b) of the *Rules*.

(e) The *Network Service Provider* is not liable for any loss or damage incurred by the *Market Network Service Provider* or any other person as a consequence of a fault on either the *power system*, or within the *Market Network Service Provider's facility*.

Schedule 5.4 - Information to be Provided with Preliminary Enquiry

The following items of information are required to be submitted with a preliminary enquiry for *connection* or modification of an existing *connection*:

(a) Type of *plant* - (eg. gas turbine *generating unit*; rolling mill, etc.).

(b) Preferred site location - (listing any alternatives in order of preference as well).

(c) Maximum power *generation* or demand of whole *plant* - (maximum MW and/or MVA, or average over 15 minutes or similar).

(d) Expected *energy* production or consumption (MWh per month).

(e) *Plant* type and configuration - (eg. number and type of *generating units* or number of separate production lines).

(f) Nature of any disturbing *load* (size of disturbing component MW/MVAr, duty cycle, nature of power electronic *plant* which may produce harmonic distortion).

(g) Technology of proposed *generating unit* (e.g. *synchronous generating unit*, induction generator, photovoltaic array, etc).

(h) When *plant* is to be in service - (eg. estimated date for each *generating unit*).

(i) Name and address of enquirer, and, if relevant, of the party for whom the enquirer is acting.

(j) Other information may be requested by the *Network Service Provider*, such as amount and timing of power required during construction or any auxiliary power requirements.

Schedule 5.5 - Technical Details to Support Application for Connection and Connection Agreement

S5.5.1 Various sections of the *Rules* require that *Registered Participants* submit technical data to the *Network Service Provider*. This schedule lists the range of data which may be required. The actual data required will be advised by the *Network Service Provider*, and will form part of the technical specification in the *connection agreement*. These data will also be made available to *NEMMCO* and to other *Network Service Provider*s by the *Network Service Provider* at the appropriate time.

S5.5.2 Data is coded in categories, according to the stage at which it is available in the build-up of data during the process of forming a *connection* or obtaining access to a *network*, with data acquired at each stage being carried forward, or enhanced in subsequent stages, eg. by testing.

Preliminary system planning data

This data is required for submission with the *application to connect*, to allow the *Network Service Provider* to prepare an offer of terms for a *connection agreement* and to assess the requirement for, and effect of, *network augmentation* or *extension* options. Such data is normally limited to the items denoted as Standard Planning Data (S) in the technical data schedules 5.5.1 to 5.5.5.

The *Network Service Provider* may, in cases where there is reasonable doubt as to the viability of a proposal, require the submission of other data before making an offer to *connect* or to amend a *connection agreement*.

Registered system planning data

This is the class of data which will be included in the *connection agreement* signed by both parties. It consists of the preliminary system planning data plus those items denoted in the attached schedules as Detailed Planning Data (D). The latter must be submitted by the *Registered Participant* in time for inclusion in the *connection agreement*.

Registered data

Registered Data consists of data validated and agreed between the *Network Service Provider* and the *Registered Participant*, such data being:

(a) prior to actual *connection* and provision of access, data derived from manufacturers' data, detailed design calculations, works or site tests etc. (R1); and

(b) after connection, data derived from on-system testing (R2).

All of the data will, from this stage, be categorised and referred to as Registered Data; but for convenience the schedules omit placing a higher ranked code next to items which are expected to already be valid at an earlier stage.

S5.5.3 Data will be subject to review at reasonable intervals to ensure its continued accuracy and relevance. The *Network Service Provider* must initiate this review. A *Registered Participant* may *change* any data item at a time other than when that item would normally be reviewed or updated by submission to the *Network Service Provider* of the revised data, together with authentication documents, eg. test reports.

The *Network Service Provider* must supply data relating to its system to other *Network Service Provider*s for planning purposes and to other *Registered Participants* and *NEMMCO* as specified in the various sections of the *Rules*, including through the *statement of opportunities*.

S5.5.4 Schedules 5.5.1 to 5.5.5 cover the following data areas:

(a) schedule 5.5.1 - *Generating Unit* Design Data. This comprises *generating unit* fixed design parameters.

(b) schedule 5.5.2 - *Generating Unit* Setting Data. This comprises settings which can be varied by agreement or by direction of the *Network Service Provider* or *NEMMCO*.

(c) schedule 5.5.3 - Network Plant Technical Data. This comprises fixed electrical parameters.

(d) schedule 5.5.4 - Plant and Apparatus Setting Data. This comprises settings which can be varied by agreement or by direction of the *Network Service Provider* or *NEMMCO*.

(e) schedule 5.5.5 - *Load* Characteristics. This comprises the estimated parameters of *load* groups in respect of, for example, harmonic content and response to *frequency* and *voltage* variations.

The schedules applicable to each class of *Registered Participant* are as follows:

(1) *Generators* schedules 5.5.1 and 5.5.2

(2) *Customers and Network Service Providers* schedules 5.5.3 and 5.5.4

(3) *Customers* Schedule 5.5.5

S5.5.5 A *Generator* that *connects* a *generating unit*, that is not a *synchronous generating unit*, must be given exemption from complying with those parts of schedules 5.5.1 and 5.5.2 that are determined by the *Network Service Provider* to be not relevant to such *generating units*, but must comply with

those parts of schedules 5.5.3, 5.5.4, and 5.5.5 that are relevant to such *generating units*, as determined by the *Network Service Provider*.

S5.5.6 A *Generator* that *connects* a *synchronous generating unit* equal to or smaller than 30MW or a number of *synchronous generating units* totalling less than 30MW to a *connection point* to a *distribution network* will usually be required to submit less registered system planning data and less registered data than is indicated in schedule 5.5.1. In general these data will be limited to confirmation of the preliminary system planning data, marked (S), but other data must be supplied if required by the *Network Service Provider* or *NEMMCO*.

Codes:

S = Standard Planning Data

D = Detailed Planning Data

R = Registered Data (R1 pre-*connection*, R2 post-*connection*)

Schedule 5.5.1 Generating unit design data

Power Station Technical Data:

Symbol	Data Description	Units	Data Category
	Connection Point to *Network*	Text, diagram	S, D
	Nominal *voltage* at *connection* to *Network*	kV	S
	Total Station Net Maximum Capacity (NMC)	MW (*sent out*)	S, D, R2

At Connection Point:

Symbol	Data Description	Units	Data Category
	Maximum 3 phase short circuit infeed calculated by method of AS 3851 (1991)		
	· Symmetrical	kA	S, D
	· Asymmetrical	kA	D
	Minimum zero sequence impedance	% on 100 MVA base	D
	Minimum negative sequence impedance	% on 100 MVA base	D

Individual Generating Unit Data:

Symbol	Data Description	Units	Data Category
MBASE	Rated MVA	MVA	S, D, R1
PSO	Rated MW (*Sent Out*)	MW (*sent out*)	S, D, R1
PMAX	Rated MW (*Generated*)	MW (Gen)	D
VT	Nominal Terminal *Voltage*	kV	D, R1
PAUX	Auxiliary *load* at PMAX	MW	S, D, R2
Qmax	Rated Reactive Output at PMAX	MVAr (*sent out*)	S, D, R1
PMIN	*Minimum Load* (ML)	MW (*sent out*)	S, D, R2
H	Turbo *Generator* Inertia Constant	MWs/rated MVA	D, R1
GSCR	Short Circuit Ratio		D, R1
ISTATOR	Rated Stator Current	A	D, R1
IROTOR	Rated Rotor Current at rated MVA and *Power Factor*, rated terminal volts and rated speed	A	D,R1
VROTOR	Rotor *Voltage* at which IROTOR is achieved	V	D, R1
VCEIL	Rotor *Voltage* capable of being *supplied* for five seconds at rated terminal volts and rated speed	V	D, R1

Generating Unit Resistance:

Symbol	Data Description	Units	Data Category
RA	Stator Resistance	% on MBASE	S, D, R1, R2

Generating Unit Reactance (unsaturated):

Symbol	Data Description	Units	Data Category
XD	Direct Axis Synchronous Reactance	% on MBASE	S, D, R1, R2
XDD	Direct Axis Transient Reactance	% on MBASE	S, D, R1, R2
XDDD	Direct Axis Sub-Transient Reactance	% on MBASE	S, D, R1, R2
XQ	Quadrature Axis Synch Reactance	% on MBASE	D, R1, R2
XQQ	Quadrature Axis Transient Reactance	% on MBASE	D, R1, R2

Symbol	Data Description	Units	Data Category
XQQQ	Quadrature Axis Sub-Transient Reactance	% on MBASE	D,R1, R2
XL	Stator Leakage Reactance	% on MBASE	D, R1, R2
XO	Zero Sequence Reactance	% on MBASE	D, R1
XZ	Negative Sequence Reactance	% on MBASE	D, R1
XP	Potier Reactance	% on MBASE	D, R1

Generating Unit Time Constants (unsaturated):

Symbol	Data Description	Units	Data Category
TDO	Direct Axis Open Circuit Transient	Seconds	S, D, R1, R2
TDDO	Direct Axis Open Circuit Sub-Transient	Seconds	S, D, R1, R2
TKD	Direct Axis Damper Leakage	Seconds	D, R1, R2
TQO	Quad Axis Open Circuit Transient	Seconds	D, R1, R2
TQQO	Quad Axis Open Circuit Sub-Transient	Seconds	D, R1, R2

Charts:

Symbol	Data Description	Units	Data Category
GCD	Capability Chart	Graphical data	D, R1, R2
GOCC	Open Circuit Characteristic	Graphical data	R1
GSCC	Short Circuit Characteristic	Graphical data	R1
GZPC	Zero *power factor* curve	Graphical data	R1

Generating Unit Transformer:

Symbol	Data Description	Units	Data Category
GTW	Number of windings	Text	S, D
GTRn	Rated MVA of each winding	MVA	S, D, R1
GTTRn	Principal tap rated *voltage*s	kV/kV	S, D, R1
GTZ1n	Positive Sequence Impedance (each wdg)	(a + jb) % on 100 MVA base	S, D, R1
GTZ2n	Negative Sequence Impedance (each wdg)	(a + jb) % on 100 MVA base	S, D, R1
GTZOn	Zero Sequence Impedance (each wdg)	(a + jb) % on 100 MVA base	S, D, R1

Symbol	Data Description	Units	Data Category
	Tapped Winding	Text, diagram	S, D, R1
GTAPR	Tap Change Range	kV - kV	S, D
GTAPS	Tap Change Step Size	%	D
	Tap Changer Type, On/Off load	On/Off	D
	Tap Change Cycle Time	Seconds	D
GTVG	Vector Group	Diagram	S, D
	Earthing Arrangement	Text, diagram	S, D
	Saturation curve	Diagram	R1

Generating Unit Reactive Capability (At machine terminals):

Symbol	Data Description	Units	Data Category
	Lagging *Reactive Power* at PMAX	MVAr export	S, D, R2
	Lagging *Reactive Power* at ML	MVAr export	S, D, R2
	Lagging Reactive Short Time capability at rated MW, terminal *voltage* and speed	MVAr (for time)	D, R1, R2
	Leading *Reactive Power* at rated MW	MVAr import	S,D, R2

Generating Unit Excitation System:

Symbol	Data Description	Units	Data Category
	DC Gain of Excitation Control Loop	V/V	D, R1
	Rated Field *Voltage* at rated MVA and *Power Factor* and rated terminal volts and speed	V	S, D, R1
	Maximum Field *Voltage*	V	S, D, R1
	Minimum Field *Voltage*	V	D, R1
	Maximum rate of change of Field *Voltage*:	Rising V/s	D, R1
	Maximum rate of change of Field *Voltage*:	Falling V/s	D, R1

Generating Unit and exciter Saturation:

Symbol	Data Description	Units	Data Category
	Characteristics 50 - 120% V	Diagram	D, R1
	Dynamic Characteristics of Over	Text/	
	Excitation Limiter	Block diagram	D, R2
	Dynamic Characteristics of Under	Text/	
	Excitation Limiter	Block diagram	D, R2

Generating Unit Load Controller:

Symbol	Data Description	Units	Data Category
	Maximum Droop	%	S, D, R1
	Normal Droop	%	D, R1
	Minimum Droop	%	D, R1
	Maximum *Frequency* Dead band	Hz	D, R1
	Normal *Frequency* Deadband	Hz	D, R1
	Minimum *Frequency* Deadband	Hz	D, R1
	MW Deadband	MW	D, R1

Generating Unit Response Capability:

Symbol	Data Description	Units	Data Category
	Sustained response to *frequency* change	MW/Hz	D, R2
	Non-sustained response to *frequency* change	MW/Hz	D, R2
	Load Rejection Capability	MW	S, D, R2

Governor:

Symbol	Data Description	Units	Data Category
	Details of the *governor system* described in block diagram form showing transfer functions of individual elements and measurement units.	Diagram	D,R2

Mechanical Shaft Model: - (Multiple-Stage Steam Turbine Generators only)

Symbol	Data Description	Units	Data Category
	Dynamic model of turbine/ generator shaft system in lumped element form showing component inertia, damping and shaft stiffness.	Diagram	D
	Natural damping of shaft torsional oscillation modes.(for each mode)		
	- Modal *frequency*	Hz	D
	- Logarithmic decrement	Nepers/Sec	D

(Multiple-Stage Steam Turbines only)

Symbol	Data Description		Units	Data Category
	Fraction of power produced by each stage:			
	Symbols	KHP KIP KLP1 KLP2	Per unit of Pmax	D
	Stage and reheat time constants:			
	Symbols	THP TRH TIP TLP1 TLP2	Seconds	D

Schedule 5.5.2 Generating unit setting data

Data Description	Units	Data
Protection Data:		
Settings of the following protections:		
Loss of field	Text	D
Under excitation	Text, diagram	D
Over excitation	Text, diagram	D
Differential	Text	D

Data Description	Units	Data
Control Data:		
Details of excitation loop described in block diagram form showing transfer functions of individual elements and measurement units.	Diagram	D, R2
Settings of the following controls:		
Over excitation limiter	Text, diagram	D
Under excitation limiter	Text, diagram	D
Stator current limiter (if fitted)	Text, diagram	D
Manual restrictive limiter (if fitted)	Text	D
Load drop compensation/VAr sharing (if fitted)	Text, function	D
V/f limiter (if fitted)	Text, diagram	D

Schedule 5.5.3 Network and plant technical data of equipment at or near connection point

Data Description	Units	Data Category
Voltage Rating		
Nominal v*oltage*	kV	S, D
Highest *voltage*	kV	D
Insulation Co-ordination		
Rated lightning impulse withstand *voltage*	kVp	D
Rated short duration power *frequency* withstand *voltage*	kV	D
Rated Currents		
Circuit maximum current	kA	S, D
Rated Short Time Withstand Current	kA for seconds	D
Ambient conditions under which above current applies	Text	S,D

Data Description	Units	Data Category
Earthing		
System Earthing Method	Text	S, D
Earth grid rated current	kA for seconds	D
Insulation Pollution Performance		
Minimum total creepage	mm	D
Pollution level	Level of *IEC* 815	D
Controls		
Remote control and data transmission arrangements	Text	D
Metering Provided by Customer		
Measurement *transformer* ratios:		D
Current transformers	A/A	D
Voltage transformers	V/kV	D
Measurement *Transformer* Test Certification details	Text	R1
Network Configuration		
Operation Diagrams showing the electrical circuits of the existing and proposed main *facilities* within the *Registered Participant's* ownership including *busbar* arrangements, phasing arrangements, earthing arrangements, switching *facilities* and operating *voltage*s.	Single line Diagrams	S, D, R1
Network Impedance		
For each item of *plant*: details of the positive, negative and zero sequence series and shunt impedance, including mutual coupling between physically adjacent elements.	% on 100 MVA base	S, D, R1

Data Description	Units	Data Category
Short Circuit Infeed to the Network		
Maximum generator 3-phase short circuit infeed including infeeds from *generating units connected* to the *Registered Participant's system*, calculated by method of AS 3851 (1991).	kA symmetrical	S, D, R1
The total infeed at the instant of fault (including contribution of induction motors).	kA	D, R1
Minimum zero sequence impedance of *Registered Participant's network* at *connection point*.	% on 100 MVA base	D, R1
Minimum negative sequence impedance of *Registered Participant's network* at *connection point*.	% on 100 MVA base	D, R1
Load Transfer Capability:		
Where a *load*, or group of *loads*, may be fed from alternative *connection points*:		
Load normally taken from *connection point* X	MW	D, R1
Load normally taken from *connection point* Y	MW	D, R1
Arrangements for transfer under planned or fault *outage* conditions	Text	D
Circuits Connecting Embedded Generating Units to the Network:		
For all g*enerating units*, all connecting lines/cables, *transformers* etc.		
Series Resistance	% on 100 MVA base	D, R
Series Reactance	% on 100 MVA base	D, R
Shunt Susceptance	% on 100 MVA base	D, R
Normal and short-time emergency ratings	MVA	D,R
Technical Details of g*enerating units* as per schedules 5.5.1, 5.5.2		

Data Description	Units	Data Category
Transformers* at *connection points:		
Saturation curve	Diagram	R
Equipment associated with DC Links		
Number of poles	MVA	D,R
Converters per station	Quantity	D,R
Reactive Power consumption of converters	MCAr	D,R
Location and Rating of A.C. Filters	MVAr	D,R
Location and Rating of Shunt Capacitors	MVAr	D,R
Location and Rating of Smoothing *Reactor*	MVAr	D,R
Location and Rating of DC Filter	MVAr	D,R

Schedule 5.5.4 Network Plant and Apparatus Setting Data

Data Description	Units	Data Category
Protection Data for Protection relevant to Connection Point:		
Reach of all protections on *transmission lines*, or cables	ohms or % on 100 MVA base	S, D
Number of protections on each item	Text	S, D
Total fault clearing times for near and remote faults	ms	S, D, R1
Line reclosure sequence details	Text	S, D, R1
Tap Change Control Data:		
Time delay settings of all *transformer* tap changers.	Seconds	D, R1
Reactive Compensation:		
Location and Rating of individual *shunt reactors*	MVAr	D, R1
Location and Rating of individual *shunt capacitor* banks	MVAr	D, R1
Capacitor bank capacitance	microfarads	D

Data Description	Units	Data Category
Inductance of switching *reactor* (if fitted)	millihenries	D
Resistance of capacitor plus *reactor*	Ohms	D
Details of special controls (e.g. Point-on-wave switching)	Text	D
For each shunt reactor or capacitor bank:		
Method of switching	Text	S
Details of automatic control logic such that operating characteristics can be determined	Text	D, R1
FACTS Installation:		
Data sufficient to enable static and dynamic performance of the installation to be modelled	Text, diagrams control settings	S, D, R1
Transmission line flow control device	Text,	D
Details of the operation of the control device under normal operation conditions (including startup and shutdown of the line) and during a fault (close up and remote)	diagrams	
Models for the control device and transmission line appropriate for load flow, small signal stability and transient stability analysis	Text, diagrams	D
Capability of the line flow control device	KA, MVA, MW	D
Details of the rate of change of flow capability of the control device	Text	D
Details of the capability of the control device to provide frequency and voltage control	Text	D
Description of possible failure modes of control device	Text	D
Details of performance of the control device under disturbance conditions including changes in AC frequency, variations in AC system voltages and Ac system waveform distortion.	Text	D
For DC control devices, contribution to the AC system short circuit level	KA, MVA	D

Schedule 5.5.5 Load Characteristics at Connection Point

Data Description	Units	Data Category
For all Types of Load		
Type of *Load* eg controlled rectifiers or large motor drives	Text	S
For Fluctuating Loads		
Cyclic variation of *active power* over period	Graph MW/time	S
Cyclic variation of *reactive power* over period	Graph MVAr/time	S
Maximum rate of change of *active power*	MW/s	S
Maximum rate of change of *reactive power*	MVAr/s	S
Shortest Repetitive time interval between fluctuations in active and *reactive power* reviewed annually	s	S
Largest Step Change:		
In *active power*	MW	S
In *reactive power*	MVAr	S

Schedule 5.6 - Terms and Conditions of Connection agreements

The *connection agreements* must contain the specific conditions that have been agreed to for *connection* and access to the *transmission* or *distribution network*, including but not limited to:

(a) details of the *connection point* including the *distribution network coupling points* where appropriate;

(b) *metering* arrangements and adjustments for losses where the point of *metering* is significantly different to the *connection point*;

(c) authorised demand which may be taken or supplied at the *connection point* (under specified conditions);

(c1) details of each *performance standard* agreed between the *Network Service Provider* and the *Registered Participant* and all related conditions of agreement resulting from the application of any of the provisions for access contained in schedule 5.1 for *Network Service Providers* or schedule 5.2 for *Generators* or schedule 5.3 for *Customers* or schedule 5.3a for *Market Network Service Providers*;

(d) *connection service* charges;

(e) payment conditions;

(f) duration and termination conditions of the *connection agreement*;

(g) terms, conditions and *constraints* that have been agreed to for *connection* to the *network* to protect the legitimate interest of the *Network Service Provider*s including rights to *disconnect* the *Registered Participant* for breach of commercial undertakings;

(h) details of any agreed standards of *reliability* of *transmission service* or *distribution service* at the *connection point*s or within the *network*;

(i) testing intervals for *protection systems* associated with the *connection point*;

(j) agreed protocols for maintenance co-ordination;

(k) where an expected *load*, to be connected to a *network*, has a *peak load* requirement in excess 10 MW, the provision, installation, operation and maintenance of automatic *load* shedding facilities for 60 percent of the *load* at anytime; and

(l) terms and conditions of access to the *metering installation* for the *Metering Provider*.

The *connection agreements* may include other technical, commercial and legal conditions governing works required for the *connection* or *extension* to the *network* which the parties have negotiated and agreed to. The circumstances under which the terms of the *connection agreement* would require renegotiation may also be included.

Schedule 5.7 - Annual Forecast Information for Planning Purposes

This schedule sets out the information in respect of each *connection point* that must be provided to the relevant *Network Service Provider* by each *Registered Participant* that has a *connection point* to a *transmission network* of that *Network Service Provider*.

Data Description	Units	Time Scale	Data Category
At each *connection point* to a *transmission network*, a forecast of:			
Annual Maximum *Active power* - Winter	MW	years 1-10	Annual
Coincident *Reactive Power* - Winter	MVAr	years 1-10	Annual
Annual Maximum *Active power* - Summer	MW	years 1-10	Annual
Coincident *Reactive Power* - Summer	MVAr	years 1-10	Annual
Forecast *load* diversity between each *connection point* to the *network* (winter and summer)	%	years 1-5	Annual
Load Profiles:			
The following forecast daily *profile*s of *connection point* half-hourly average active and reactive *loads* are required, net of all *generating plant*:			
Day of the peak summer and winter MW *peak load* at *connection point*	MW and MVAr	years 1-5	Annual
Day of *network* peak summer and winter MW *load* (as specified)	MW and MVAr	years 1-5	Annual

Data Description	Units	Time Scale	Data Category
Each July, October, January, April under average conditions representing:			
(a) weekdays	MW and MVAr	years 1-5	Annual
(b) Saturdays	MW and MVAr	years 1-5	Annual
(c) Sundays/holidays	MW and MVAr	years 1-5	Annual
Day of the *network* minimum demand (as specified)	MW and MVAr	years 1-5	Annual
Undispatched *generation*:			
For each *connection point* to the *network* the following information is required:			
No. of g*enerating unit*s	No.	years 1-5	Annual
Capacity of each *generating unit*	MW (*sent out*)	years 1-5	Annual
Daily/Seasonal Operating characteristics	Text	years 1-5	Annual
Expected output at time of peak *network* Winter *load* (as specified)	MW	years 1-5	Annual
Expected output at time of peak *network* Summer *load* (as specified)	MW	years 1-5	Annual