

Statement in support of application for merger authorisation
Annexure 'TH-1'

**PROPOSED ACQUISITION BY BROOKFIELD LP AND MIDOCEAN ENERGY OF ORIGIN
ENERGY LIMITED**

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Clause consequent upon making National Electricity Amendment (Cost Allocation Arrangements for Transmission Services) Rule No 2009 No 3 - Transition to new Chapter 6A: existing prescribed connection services

Definitions

(a) In this clause 11.6.11:

existing asset means an asset that as at 9 February 2006:

- (1) was used in connection with a *transmission system* where the value, or a portion of the value, of that asset was included in the regulatory asset base; or
- (2) was committed to be constructed for use in connection with a *transmission system* where the forecast value, or a portion of the forecast value, of that asset was included in the forecast capital expenditure,

for that *transmission system* under a *revenue determination* in force as at 9 February 2006.

For the purpose of this definition, an asset is, and is only, to be taken to be committed to be constructed if it satisfied the criteria which a project needed to satisfy to be a "*committed project*" for the purpose of the *regulatory test* in force as at 9 February 2006.

replacement asset means:

- (1) an asset which replaces an *existing asset* after 9 February 2006; or
- (2) an asset which replaces an asset referred to in this clause 11.6.11(a) after 9 February 2006.

For the purpose of this definition, an asset will be treated as replacing another asset even if it provides an increased or different functionality to the asset it replaces, provided that the increased or different functionality was not requested by the relevant *Transmission Network User*.

eligible asset means, subject to [clause 11.6.11\(d\)\(3\)](#):

- (1) an *existing asset* which was, immediately before the *commencement date*, or was or is, when first commissioned after the *commencement date*, wholly and exclusively used by a *Transmission Network Service Provider* to provide *connection services* to a *Transmission Network*

User or a group of *Transmission Network Users* at a *transmission network connection point*; and

- (2) a **replacement asset** which is wholly and exclusively used after the **commencement date** by a *Transmission Network Service Provider* to continue providing *connection services* to a *Transmission Network User* or a group of *Transmission Network Users* at a *transmission network connection point*,

and excludes:

- (3) an **existing asset** or a **replacement asset** to the extent that it ceases to be used after the **commencement date** to provide *connection services* to a *Transmission Network User* or a group of *Transmission Network Users* at a *transmission network connection point*; and
- (4) an **existing asset** or **replacement asset** that, as at the **2009 commencement date**, was wholly and exclusively used by a *Transmission Network Service Provider* to provide connection services to a *Transmission Network User* or a group of *Transmission Network Users* at a *transmission network connection point* but had all of its costs treated as directly attributable to, or incurred in providing, *TUOS services* at that date.

prescribed connection service means a *connection service* provided by a *Transmission Network Service Provider* to a *Transmission Network User* at a *transmission network connection point* on or after the **2009 commencement date** in respect of which the following criteria are satisfied:

- (1) the relevant service is provided by using assets that include eligible assets;
- (2) the whole of the relevant service is being provided under a *connection agreement* which was first entered into before the **commencement date** (as extended, amended or novated from time to time);
- (3) the *connection agreement* has not at any time after the **2009 commencement date** been amended at the request of the *Transmission Network User* for the purposes of altering the relevant service; and
- (4) the relevant service would not otherwise be a *prescribed transmission service* for the purposes of **new Chapter 6A** but for this clause 11.6.11.

If, at the date a *Transmission Network Service Provider* submits a *Revenue Proposal* after the *2009 commencement date* to the *AER* under new *Chapter 6A*, a *connection service* does not satisfy each of the above criteria, then the *connection service* remains a *prescribed connection service* until the start of the next *regulatory control period* to which the *Revenue Proposal* relates, from which time it ceases to be a *prescribed connection service*.

2009 commencement date means the date on which the National Electricity Amendment (Cost Allocation Arrangements for Transmission Services) Rule 2009 commences operation.

Prescribed transmission services

- (b) References to *prescribed transmission services* in new *Chapter 6A* include prescribed connection services and, where a service is a *prescribed transmission service* by virtue of the operation of this clause 11.6.11, that service is taken not to be a *negotiated transmission service*.

Interaction with new Chapter 6A

- (c) For the purposes of new *Chapter 6A*:
- (1) the costs of the *transmission system* assets that from time to time may be treated as:
- (i) directly attributable to the provision of a *prescribed connection service*; or
 - (ii) incurred in providing a *prescribed connection service*,
to a *Transmission Network User* or a group of *Transmission Network Users* at a *transmission network connection point* are limited to the costs of the eligible assets which, from time to time, provide that *prescribed connection service*;
- (2) any costs of an *existing asset* or a *replacement asset* (or of any portion of an *existing asset* or a *replacement asset*) that:
- (i) is not an *eligible asset* (other than as a result of *clause 11.6.11(d)*);
and
 - (ii) is used by a *Transmission Network Service Provider* to provide *connection services* to a *Transmission Network User* or a group of *Transmission Network Users* at a *transmission network connection point*,

must be treated as costs that are directly attributable to the provision of, or are incurred in providing, *prescribed TUOS services* and, to avoid doubt, the services provided by those assets which would otherwise be *connection services* are taken to be *prescribed TUOS services*; and

- (3) the *stand-alone amount* for *prescribed TUOS services* is taken to include any portion of the costs referred to in [clause 11.6.11\(c\)\(2\)](#) that has not been allocated under [clause 6A.23.2\(d\)\(1\)](#).

Cessation of prescribed connection services

(d) If a *connection service* ceases to be a *prescribed connection service* at the start of a *regulatory control period* for the relevant *Transmission Network Service Provider*:

- (1) the *connection service* is taken to be a *negotiated transmission service*;
- (2) despite [clause 6A.19.2\(7\)](#), the costs which were allocated to the *prescribed connection service* may be reallocated to *negotiated transmission services*;
- (3) the eligible assets that previously provided the *prescribed connection service* cease to be eligible assets; and
- (4) despite [clause S6A.2.3](#), the value of the eligible assets which previously provided the *prescribed connection service* may be removed from the regulatory asset base of the *Transmission Network Service Provider*.

negotiated transmission service

Any of the following services:

- (a) a *shared transmission service* that:
 - (1) exceeds the *network* performance requirements (whether as to quality or quantity) (if any) as that *shared transmission service* is required to meet under any *jurisdictional electricity legislation*; or
 - (2) except to the extent that the *network* performance requirements which that *shared transmission service* is required to meet are prescribed under any *jurisdictional electricity legislation*, exceeds or does not meet the *network* performance requirements (whether as to quality or quantity) as are set out in schedule 5.1a or 5.1;
- (b) *connection services* that are provided to serve a *Transmission Network User*, or group of *Transmission Network Users*, at a *single transmission network connection point*, other than *connection services* that are provided by one *Network Service Provider* to another *Network Service Provider* to connect their *networks* where neither of the *Network Service Providers* is a *Market Network Service Provider*;
- (c) services specified to be *negotiated transmission services* under clause 5.2A.4; or
- (d) undertaking *system strength connection works*,

but does not include an *above-standard system shared transmission service*, a *market network service* or a *system strength transmission service*.

negotiated use of system charges

The charges described in rule 5.3AA(f)(3).

negotiating framework

For a *Distribution Network Service Provider*, a negotiating framework as approved or substituted by the *AER* in its final decision under clause 6.12.1(15).

negotiating principles

Those negotiating principles set out in schedule 5.11.

NEL (National Electricity Law)

The National Electricity Law set out in the schedule to the *National Electricity (South Australia) Act 1996* (SA) and applied in each of the *participating jurisdictions*.

NEM (National Electricity Market)

Has the meaning given in the *NEL*.

NEMMCO

Has the meaning given in the *NEL*.

NERL (National Energy Retail Law)

The National Energy Retail Law set out in the Schedule to the *National Energy Retail Law (South Australia) Act 2011* (SA).

RULE
8.11

Augmentations

CLAUSE
8.11.1

Application

This Part applies only to, and in relation to, the *declared transmission system* of an *adoptive jurisdiction* in which *AEMO* is authorised to exercise its *declared network functions*.

CLAUSE
8.11.2

Object

The objects of this rule are:

- (1) to establish the distinction between *contestable augmentations* and *augmentations* that are not contestable; and
- (2) to regulate the process for calling, receiving and evaluating tenders for the construction and operation of a *contestable augmentation*; and
- (3) to facilitate the construction and operation of *augmentations*; and
- (4) to provide guidance on risk allocation and other commercial principles to be reflected in *network agreements* and *augmentation connection agreements*; and
- (5) to make provision for certain matters with respect to *AEMO's* planning of the *declared shared network*.

CLAUSE
8.11.3

Definitions

In this Part:

augmentation connection agreement has the meaning given in the *NEL*.

augmentation direction means a direction given by *AEMO* to an incumbent *declared transmission system operator* to construct an *augmentation* of a *declared shared network* that is not a *contestable augmentation*.

contestable augmentation means an *augmentation* classified as a *contestable augmentation* under [clause 8.11.6](#).

contestable provider means a person responsible for the construction or operation of a *contestable augmentation*.

incumbent *declared transmission system operator* means the *declared transmission system operator* that owns or operates the part of the *transmission system* to which the *augmentation* will connect.

potential contestable provider means a person who responds positively to a call for expressions of interest in constructing and operating a *contestable augmentation* under [clause 8.11.7\(b\)](#).

relevant limit means \$10 million.

separable augmentation means an *augmentation* that satisfies both the following criteria:

- (a) the *augmentation* will result in a distinct and definable service to be provided by the *contestable* provider to *AEMO*;
- (b) the *augmentation* will not have a material adverse effect on the incumbent *declared transmission system operator's* ability to provide services to *AEMO* under any relevant *network agreement*.

CLAUSE
8.11.4

Planning criteria

- (a) *AEMO* must *publish* the planning criteria that it proposes to use in performing its *declared network functions*.
- (b) The planning criteria:
 - (1) must outline the principles on which *AEMO* will carry out a cost benefit analysis of a proposed *augmentation* under section 50F of the *NEL*; and
 - (2) must describe how *AEMO* proposes to apply a probabilistic approach in determining the benefit of a proposed *augmentation*; and
 - (3) must describe the kind of circumstances in which a probabilistic approach will be regarded as inappropriate; and
 - (4) may deal with any other aspect of planning inherent in, or related to, *AEMO's declared network functions*.

CLAUSE
8.11.5

Construction of augmentation that is not a contestable augmentation

- (a) An incumbent *declared transmission system operator* must, at *AEMO's* written request, provide *AEMO* with information and assistance that *AEMO* reasonably requires to decide:
- (1) whether to give an *augmentation* direction; and
 - (2) if so, the terms of the direction.
- (b) If *AEMO* gives an *augmentation* direction, *AEMO* and the incumbent *declared transmission system operator* must negotiate in good faith with a view to reaching agreement on the terms of an appropriate amendment to the operator's *network agreement* covering:
- (1) the operation of the *augmentation*; and
 - (2) the use of the *augmentation* to provide *shared network capability services*; and
 - (3) the basis on which *AEMO* will pay for *shared network capability services* provided by means of the *augmentation*.

Note:

If there is a dispute about the proposed amendment, the *AER* may resolve the dispute and determine the terms of the amendment under section 50H and 50J of the *NEL*.

- (c) An incumbent *declared transmission system operator* that is required by, or agrees with, a *Connection Applicant* to construct an *augmentation* that is not a *contestable augmentation*, must negotiate with the *Connection Applicant* in good faith with a view to reaching agreement on the terms of an appropriate amendment to their *connection agreement*.
- (d) However, if the incumbent *declared transmission system operator* applies for revocation and substitution of its *revenue determination* on the basis of an *augmentation* direction, or a requirement by or agreement with a *Connection Applicant* to construct an *augmentation* that is not a *contestable augmentation*, negotiations are not required on a matter to which the application relates.

CLAUSE
8.11.6

Contestable augmentations

- (a) Subject to paragraph (b), an *augmentation* of a *declared shared network* is a *contestable augmentation* if:

- (1) the capital cost of the *augmentation* is reasonably expected to exceed the *relevant limit*; and
 - (2) the *augmentation* is a separable *augmentation*.
- (b) An *augmentation* of a *declared shared network* is not a *contestable augmentation* if:
- (1) *AEMO* classifies the *augmentation* as non-contestable because the delay in implementation that would necessarily result from treating the *augmentation* as a *contestable augmentation* would unduly prejudice *power system security*; or
 - (2) *AEMO* classifies the *augmentation* as non-contestable because it does not consider it economical or practicable to treat the *augmentation* as a *contestable augmentation*.

CLAUSE
8.11.7

Construction and operation of contestable augmentation

- (a) For the purpose of procuring the construction and operation of a *contestable augmentation*, *AEMO* must:
- (1) publish a generally applicable tender and evaluation process that accords with best practice as currently understood and may include, but need not be limited to:
 - (i) typical timetables for the tender and evaluation process; and
 - (ii) details of typical evaluation criteria; and
 - (iii) indications of the way in which different matters are to be or might be weighted for evaluation purposes; and
 - (iv) provision for declaration and management of conflicts of interest; and
 - (v) provision for the debriefing of unsuccessful tenderers; and
 - (2) *publish* a register of persons who have from time to time expressed interest in being *contestable* providers and keep the register up to date to reflect the developing market.
- (b) For each *contestable augmentation*, *AEMO* must:
- (1) call for expressions of interest from persons who may be interested in constructing and operating the proposed *contestable*

augmentation; and

- (2) prepare, in consultation with the incumbent *declared transmission system operator*, a timetable allowing *AEMO* and the incumbent *declared transmission system operator* a reasonable time to comply with their respective obligations and allowing a reasonable construction period having regard to the nature and extent of the *augmentation*; and
 - (3) prepare, in consultation with the incumbent *declared transmission system operator*, a detailed tender specification setting out the scope of the work involved in the *augmentation*, including details of the technical interface required for the *augmentation*; and
 - (4) prepare and issue an invitation to tender setting out details of the *contestable augmentation* and the tender and evaluation process - details that must (without limitation):
 - (i) provide as much certainty as is reasonably practicable to tenderers regarding the terms and conditions subject to which they are invited to tender for the work involved in the *contestable augmentation*; and
 - (ii) identify the relevant land (if any) that is available for or in connection with the *contestable augmentation*, including (to the extent reasonably practicable) details of current usage and, if available, a geotechnical and environmental report on the land; and
 - (iii) specify (to the extent reasonably practicable) the services to be provided under the *network agreement*;
 - (5) make available to potential *contestable* providers a copy of any proposed *augmentation connection agreement* or *network agreement*.
- (c) The incumbent *declared transmission system operator* must:
- (1) provide, within a reasonable period specified by *AEMO*, information and assistance reasonably required by *AEMO* for the preparation of the tender documents such as information about the technical interface and information required for the preparation of the tender specification; and

- (2) negotiate in good faith with a potential *contestable* provider about changes to the proposed *augmentation connection agreement* that are sought or suggested by that potential *contestable* provider.
- (d) The incumbent *declared transmission system operator* may tender for work involved in a *contestable augmentation*.
- (e) *AEMO* must evaluate, assess and negotiate responses to the invitation to tender in accordance with the published tender and evaluation process.
- (f) After completing the tender and evaluation process, *AEMO* must notify all persons who submitted tenders of the successful tender.
- (g) *AEMO* may only proceed with a *contestable augmentation* on the basis of a tender accepted after evaluation and assessment in accordance with the published tender and evaluation process.
- (h) The successful tenderer:
 - (1) must enter into an agreement with *AEMO*, based on the successful tender, for the construction of the *augmentation*; and
 - (2) must (unless the incumbent *declared transmission system operator* is itself the successful tenderer) enter into an *augmentation connection agreement* with the incumbent *declared transmission system operator*.
- (i) This clause does not apply to a *funded augmentation* unless *AEMO* and the *Connection Applicant* agree to the conduct of a tender process.

CLAUSE
8.11.8

Funded augmentations that are not subject to the tender process

- (a) This clause applies to a *contestable augmentation* that is a *funded augmentation* except in the case where *AEMO* and the *Connection Applicant* agree to the conduct of a tender process in accordance with [clause 8.11.7](#).
- (b) For each *contestable augmentation* to which this clause applies, *AEMO* must:

- (1) prepare, in consultation with the incumbent *declared transmission system operator* and the *Connection Applicant*, a timetable allowing *AEMO* and the incumbent *declared transmission system operator* a reasonable time to comply with their respective obligations and allowing a reasonable construction period having regard to the nature and extent of the *augmentation*; and
 - (2) prepare, in consultation with the incumbent *declared transmission system operator* and the *Connection Applicant*, a detailed specification setting out the scope of the work involved in the *augmentation*, including details of the technical interface required for the *augmentation*; and
 - (3) make available to the incumbent *declared transmission system operator* and the *Connection Applicant* a copy of any proposed *augmentation connection agreement*.
- (c) The incumbent *declared transmission system operator* must:
- (1) provide, within a reasonable period specified by *AEMO*, information and assistance reasonably required by *AEMO* for the preparation of an agreement for the construction of proposed *contestable augmentation*; and
 - (2) negotiate in good faith with the *Connection Applicant* about any changes to the proposed *augmentation connection agreement* that are sought or suggested by the *Connection Applicant*; and
 - (3) enter into an *augmentation connection agreement* with the *Connection Applicant*.
- (d) The *Connection Applicant* must enter into an agreement with *AEMO* for the construction of the *augmentation*.

CLAUSE
8.11.9

Contractual requirements and principles

- (a) A *network agreement* or an *augmentation connection agreement* related to a *contestable augmentation* should be consistent with the requirements and principles set out in [Schedule 8.11](#) to this Chapter.
- (b) If a person submits a tender for a *contestable augmentation* proposing a *network agreement* or an *augmentation connection agreement* that is not consistent with the requirements and principles

set out in [Schedule 8.11](#) to this Chapter, the person must, in responding to the invitation to tender, include a statement drawing *AEMO's* attention to the inconsistency and explaining the reasons for it.

- (c) Despite the provisions of this clause and [Schedule 8.11](#):
 - (1) *AEMO* and the other party or parties to a *network agreement* may agree terms and conditions of an amendment that differ from the requirements and principles set out in [Schedule 8.11](#); and
 - (2) the parties to an *augmentation connection agreement* may, with *AEMO's consent*, agree terms and conditions that differ from the requirements and principles set out in [Schedule 8.11](#).

CLAUSE

8.11.10

Annual planning review

AEMO must in its annual planning review indicate:

- (a) which *augmentations* commenced in the previous year are *contestable augmentations*; and
- (b) which *augmentations* planned to commence in the present or future years are likely to be *contestable augmentations*.

Establishing or Modifying Connection

Process and procedures

- (a) For the purposes of this rule 5.3:
- (1) **establish a connection** includes:
 - (i) modify an existing *connection* or alter *plant* but does not include alterations to *plant* in the circumstances set out in [clause 5.3.9](#) or [clause 5.3.12](#); or
 - (ii) incorporating a *designated network asset* into a *transmission network*.
 - (2) **connect** includes the incorporation of a *designated network asset* into a *transmission network*.
- (b) Subject to paragraph (b1), a *Registered Participant* or person intending, or required by the *Rules*, to become a *Registered Participant* who wishes to *establish a connection* to a *network* must follow the procedures in this rule 5.3.
- (b1) If a *Registered Participant*, or person intending to become a *Registered Participant*, wishes to establish a *connection* to a part of a *network* that is a *designated network asset* either through a *dedicated connection asset* or by way of a new *designated network asset*, then:
- (1) for *connection*, the process in [rule 5.3](#) applies; and
 - (2) for access to *DNA services* from the existing *designated network asset*, the access is governed by the relevant *access policy* that applies.
- (c) A *Generator* wishing to alter *connected generating plant* must comply with [clause 5.3.9](#) and a *Network User* or *Market Network Service Provider* to whom [clause 5.3.12](#) applies must comply with [clause 5.3.12](#).
- (d) *AEMO* must comply with [clause 5.3.11](#) in relation to requests to change *normal voltage*.

- (e) For *connection* to a *transmission network*, there may be more than one *Connection Applicant* in relation to a *connection* where there are different persons developing and owning *contestable IUSA components, dedicated connection assets, designated network assets* and *Transmission Network User facilities* in relation to that *connection*.

CLAUSE
5.3.1A

Application of rule to connection of embedded generating units

(a)

[Deleted]

(b) If a *Connection Applicant* wishes to *connect* an *embedded generating unit*, then:

- (1) unless otherwise provided, [rule 5.3A](#) applies to the proposed connection and clauses [5.3.2](#), [5.3.3](#), [5.3.4](#) and [5.3.5](#) do not apply to the proposed *connection*; and
- (2) for the avoidance of doubt, the application of the balance of [Chapter 5](#), Part B to the *Connection Applicant* is otherwise unaffected by this clause 5.3.1A.

(c) A reference to a *Connection Applicant* in paragraph (b) is to a:

- (1) person who intends to be an *Embedded Generator*;
- (2) person who has applied or intends to apply to *AEMO* for an exemption from the requirement to register as a *Generator* in respect of an *embedded generating unit* (and is not eligible for an automatic exemption under the *registration information resource and guidelines*);
- (3) *non-registered embedded generator* who has made an election under [clause 5A.A.2\(c\)](#); or
- (4) a person (including a *non-registered embedded generator*) who is seeking *connection* for a *large inverter based resource*,

and who makes a *connection* enquiry under [clause 5.3A.5](#) or an *application to connect* under [clause 5.3A.9](#) in relation to any *generating systems*, or any *network elements* used in the provision of a *network service*, as the case may be.

Connection enquiry

- (a) A person referred to in [clause 5.3.1\(b\)](#), who wishes to make an *application to connect* must first make a *connection* enquiry by advising the *Local Network Service Provider* of the type, magnitude and timing of the proposed *connection* to that *provider's network*.
- (b) If the information submitted with a *connection* enquiry is inadequate to enable the *Local Network Service Provider* to process the enquiry the *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.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (c) 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 paragraph (b) if the enquiry would be more appropriately directed to another *Network Service Provider*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (d) The *Connection Applicant*, notwithstanding the advice received under paragraph (c), may if it is reasonable in all the circumstances, request the *Local Network Service Provider* to process the *connection* enquiry and the *provider* must meet this request.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (e) Where the *Local Network Service Provider* considers that the *connection* enquiry should be jointly examined by more than one *Network Service Provider*, 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.

- (f) 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 paragraph (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 relevant requirements of schedule [5.1](#), [5.2](#), [5.3](#) or [5.3a](#).

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (g) If applicable, a *Primary Network Service Provider* may charge a *Connection Applicant* an enquiry fee, the amount of which must not be more than necessary to cover the reasonable costs of work required to provide the information in clauses [5.3.3\(b\)\(5A\)](#) and [\(7\)](#) to (10).

CLAUSE
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:
- (1) within:
- (i) 40 *business days* after receipt of the *connection* enquiry which relates to a *designated network asset* and all such additional information (if any) advised under [clause 5.3.2\(b\)](#);
- (ii) 30 *business days* after receipt of any other *connection* enquiry and all such additional information (if any) advised under [clause 5.3.2\(b\)](#); or

- (2) within 30 *business days* after receipt of a request from the *Connection Applicant* to the *Local Network Service Provider* to process the *connection* enquiry under [clause 5.3.2\(d\)](#),

provide the following information in writing to the *Connection Applicant*:

- (3) 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 services* or *distribution services* in the appropriate jurisdiction;
- (4) whether it will be necessary for any of the parties identified in subparagraph (3) to enter into an agreement with the *Connection Applicant* in respect of the provision of *connection* or other *transmission services* or *distribution services* or both, to the *Connection Applicant*;
- (5) in relation to *Distribution Network Service Providers* and *Network Service Providers* for *declared transmission systems*, whether any service the *Network Service Provider* proposes to provide is *contestable* in the relevant *participating jurisdiction*;
- (5A) whether any service a *Transmission Network Service Provider* proposes to provide in relation to the *connection* enquiry is a *prescribed transmission service*, a *negotiated transmission service* or a *non-regulated transmission service* including, if applicable:
- (i) whether the capital cost of any *identified user shared asset* is reasonably expected to exceed \$10 million; and
 - (ii) if so, the *contestable IUSA components* and *non-contestable IUSA components*;
- (5B) whether the *connection* enquiry relates to *connection* to a part of a *network* that is a *designated network asset*;
- (6) a *preliminary program* showing proposed milestones for *connection* and access activities which may be modified from time

to time by agreement of the parties, where such agreement must not be unreasonably withheld;

- (7) the specification of the interface required to provide the *connection*, including plant and equipment requirements for the *connection* of a *dedicated connection asset* or *designated network asset* (as applicable), to the *transmission network* and of the interface between the *transmission network* and any *contestable IUSA components* or *designated network asset*;
- (8) if applicable, the scope of work for any *non-contestable IUSA components*;
- (9) if the response to the *connection enquiry* specifies the need for an *identified user shared asset* the capital cost of which is reasonably expected to exceed \$10 million or includes a *designated network asset*, a functional specification:
 - (i) setting out the technical parameters for that asset as described in the table in [clause 5.2A.4](#) with sufficient detail to enable the *Connection Applicant* to obtain binding tenders for the provision of detailed design, construction and ownership services for the *contestable IUSA components* or *designated network asset*; and;
 - (ii) at the *Primary Transmission Network Service Provider's* option in respect of an *identified user shared asset*, that is above those minimum requirements in subparagraph (i) subject to the *Primary Transmission Network Service Provider* separately identifying the additional requirements and agreeing to fund the additional works related to those requirements;
- (10) an indicative costing for operation and maintenance services for any *identified user shared asset* or *designated network asset*, based on the functional specification provided pursuant to subparagraph (9); and
- (11) the amount of any enquiry fee under [clause 5.3.2\(g\)](#).

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b1) The *Network Service Provider* must:

- (1) within 30 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under [clause 5.3.2\(b\)](#); or
- (2) within 30 *business days* after receipt of a request from the *Connection Applicant* to the *Local Network Service Provider* to process the *connection* enquiry under [clause 5.3.2\(d\)](#),

provide the *Connection Applicant* with the following written details of each technical requirement relevant to the proposed *plant*:

- (3) the *automatic access standards*;
- (4) the *minimum access standards*;
- (5) the applicable *plant standards*;
- (6) the *negotiated access standards* that will require *AEMO's* involvement in accordance with [clause 5.3.4A\(c\)](#); and
- (7) the *normal voltage* level, if that is to change from the *nominal voltage* level.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b2)** A *Registered Participant*, *AEMO* 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 *AEMO* using the *Rules consultation procedures*.
- (b5) For a *connection point* for a proposed new *connection* in relation to which [clause 5.3.4B](#) applies, within the time applicable under paragraph (b1), the *Network Service Provider* must provide the *Connection Applicant* with the following written details:
- (1) the minimum *three phase fault level* at the *connection point*;
 - (2) the results of the *Network Service Provider's* preliminary assessment of the impact of the new *connection* undertaken in accordance with the *system strength impact assessment guidelines* and [clause 5.3.4B](#); and
 - (3) except where, under [clause 5.3.4B\(a3\)](#), the *Network Service Provider* is not required to calculate the *system strength locational factor*:
 - (i) the indicative *system strength quantity* for the *connection point*;
 - (ii) the *system strength locational factor* for the *connection point*; and
 - (iii) the relevant *system strength node* and the indicative *system strength charge* using the then applicable *system strength unit price*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (c) Within 30 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under [clause 5.3.2\(b\)](#) or, if the *Connection Applicant* has requested the *Local Network Service Provider* to process the *connection* enquiry under [clause 5.3.2\(d\)](#), 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 rules [6.21](#) and [6A.28](#);
- (4A) the *DER generation information* that the *Network Service Provider* requires;
- (5) the amount of the application fee which is payable on lodgement of an *application to connect*, such amount:
 - (i) not being more than necessary to cover the reasonable costs of all work anticipated to arise from investigating the *application to connect* and preparing the associated offer to *connect* and to meet the reasonable costs anticipated to be incurred by *AEMO* and other *Network Service Providers* whose participation in the assessment of the *application to connect* will be required; and
 - (ii) must not include any amount for, or in anticipation of, the costs of the person using an *Independent Engineer*; and
- (6) any other information relevant to the submission of an *application to connect*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

CLAUSE
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, [clause 5.3.4A](#) and [clause 5.3.4B](#).
- (b) To be eligible for *connection* the *Connection Applicant* must submit an *application to connect* containing:
- (1) the information specified in [clause 5.3.3\(c\)](#);
 - (2) the relevant application fee to the relevant *Network Service Provider*;
 - (3) for services related to *contestable IUSA components* that the *Connection Applicant* has not obtained from the *Primary Transmission Network Service Provider* or a *designated network asset* (as applicable):
 - (i) the *Connection Applicant's* process for how the *Primary Transmission Network Service Provider* will undertake a review of the detailed design and inspect the construction of those components or assets and how risks of defects will be addressed;
 - (ii) the detailed design of those components or assets; and
 - (iii) if the *Primary Transmission Network Service Provider* will not own the *contestable IUSA components* or *designated network asset*, the *Connection Applicant's* proposed changes (if any) to the form of *network operating agreement* published pursuant to [schedule 5.10](#); and
 - (4) if the *Connection Applicant* has obtained services related to *contestable IUSA components* or a *designated network asset* other than from the *Primary Transmission Network Service Provider*, all information reasonably required for the *Primary Transmission Network Service Provider* to properly provide

operation and maintenance services for the life of those components or assets, including details of the *contestable IUSA components* or *designated network assets*' construction, instructions for operation and maintenance and health safety and *asset management* manuals; and

- (5) except where, under [clause 5.3.4B\(a3\)](#), the *Network Service Provider* is not required to calculate the *system strength locational factor*, the *Connection Applicant's* election under [clause 5.3.4B\(b1\)](#).
- (b1) The *Connection Applicant's* detailed design under paragraph (b)(3) (ii):
- (1) must be consistent with the minimum functional specification provided by the *Primary Transmission Network Service Provider* under [clause 5.3.3\(b\)\(9\)\(i\)](#);
 - (2) must not unreasonably inhibit the capacity for future expansion of the *identified user shared asset* or preclude the possibility of future *connections* to that asset; and
 - (3) subject to the *Connection Applicant* considering the *Primary Transmission Network Service Provider's* additional requirements under [clause 5.3.3\(b\)\(9\)\(ii\)](#), in good faith, may be (but is not required to be) consistent with those additional requirements.
- (c) In relation to *Distribution Network Service Providers* and *Network Service Providers* for *declared transmission systems*, 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 *AEMO* 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 *AEMO*, 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;
 - (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*; or
 - (3) lodge a combined *application to connect* with the *Primary Network Service Provider* where the *connection* involves more than one *Connection Applicant* due to different persons developing and owning *contestable IUSA components, dedicated connection assets, designated network assets* and *Transmission Network User facilities* in relation to that *connection*.
- (g) A *Connection Applicant* who proposes a *system strength remediation scheme* under [clause 5.3.4B](#) must submit its proposal with the *application to connect*.

CLAUSE
5.3.4A

Negotiated access standards

- (a) *AEMO* must advise on *AEMO advisory matters*.
- (b) A *negotiated access standard* must:
- (1) subject to subparagraph (1A), be no less onerous than the corresponding *minimum access standard* provided by the *Network Service Provider* under clauses [5.3.3\(b1\)\(4\)](#) or [S5.4B\(b\)\(2\)](#);
 - (1A) with respect to a submission by a *Generator* under [clause 5.3.9\(b\)\(3\)](#), or a *Network User* or *Market Network Service Provider* under [clause 5.3.12\(b\)\(3\)](#), be no less onerous than the *performance standard* that corresponds to the technical requirement that is affected by the alteration to the *generating system* or *plant* (as applicable);

- (2) be set at a level that will not adversely affect *power system security*;
 - (3) be set at a level that will not adversely affect the quality of *supply* for other *Network Users*; and
 - (4) in respect of *generating plant*, meet the requirements applicable to a *negotiated access standard* in Schedule 5.2.
- (b1) When submitting a proposal for a *negotiated access standard* under clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3), and where there is a corresponding *automatic access standard* for the relevant technical requirement, a *Connection Applicant* must propose a standard that is as close as practicable to the corresponding *automatic access standard*, having regard to:
- (1) the need to protect the *plant* from damage;
 - (2) *power system* conditions at the location of the proposed *connection*; and
 - (3) the commercial and technical feasibility of complying with the *automatic access standard* with respect to the relevant technical requirement.
- (b2) When proposing a *negotiated access standard* under paragraph (b1), the *Connection Applicant* must provide reasons and evidence to the *Network Service Provider* and *AEMO* as to why, in the reasonable opinion of the *Connection Applicant*, the proposed *negotiated access standard* is appropriate, including:
- (1) how the *Connection Applicant* has taken into account the matters outlined in subparagraphs (b1)(1) to (3); and
 - (2) how the proposed *negotiated access standard* meets the requirements of paragraph (b).
- (c) Following the receipt of a proposed *negotiated access standard* under clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3), the *Network Service Provider* must consult with *AEMO* as soon as practicable in relation to *AEMO advisory matters* for that proposed standard.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (d) Within 20 *business days* following the later of:
- (1) receipt of a proposed *negotiated access standard* under [clauses 5.3.4\(e\)](#), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3); and
 - (2) receipt of all information required to be provided by the *Connection Applicant* under clauses [S5.2.4](#), [S5.5.6](#), [S5.3.1\(a1\)](#) or [S5.3a.1\(a1\)](#).

AEMO must advise the *Network Service Provider* in writing, in respect of *AEMO advisory matters*, whether the proposed *negotiated access standard* should be accepted or rejected.

- (d1) When advising the *Network Service Provider* under paragraph (d) to reject a proposed *negotiated access standard*, and subject to obligations in respect of *confidential information*, *AEMO* must:
- (1) provide detailed reasons in writing for the rejection to the *Network Service Provider*, including:
 - (i) where the basis of *AEMO*'s advice is lack of evidence from the *Connection Applicant*, details of the additional evidence of the type referred to in paragraph (b2) *AEMO* requires to continue assessing the proposed *negotiated access standard*; and
 - (ii) the extent to which each of the matters identified at subparagraphs (b)(1), (b)(1A), (b)(2) and (b)(4) contributed to *AEMO*'s decision to reject the proposed *negotiated access standard*; and
 - (2) recommend a *negotiated access standard* that *AEMO* considers meets the requirements of subparagraphs (b)(1), (b)(1A), (b)(2) and (b)(4).

- (e) Within 30 *business days* following the later of:
- (1) receipt of a proposed *negotiated access standard* in accordance with [clauses 5.3.4\(e\)](#), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3); and

- (2) receipt of all information required to be provided by the *Connection Applicant* under clauses [S5.2.4](#), [S5.5.6](#), [S5.3.1\(a1\)](#), or [S5.3a.1\(a1\)](#),

the *Network Service Provider* must accept or reject a proposed *negotiated access standard*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (f) The *Network Service Provider* must reject the proposed *negotiated access standard* where:

- (1) in the *Network Service Provider's* reasonable opinion, one or more of the requirements at subparagraphs (b)(1), (b)(1A), (b)(3) and (b)(4) are not met; or
- (2) *AEMO* has advised the *Network Service Provider* under paragraph (d) to reject the proposed *negotiated access standard*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (g) If a *Network Service Provider* rejects a proposed *negotiated access standard*, the *Network Service Provider* must, at the same time:

- (1) subject to obligations in respect of *confidential information*, provide to the *Connection Applicant*:
 - (i) where the basis for the *Network Service Provider's* rejection is lack of evidence from the *Connection Applicant*, details of the additional evidence of the type referred to in paragraph (b2) the *Network Service Provider* requires to continue assessing the proposed *negotiated access standard*;
 - (ii) detailed reasons in writing for the rejection, including the extent to which each of the matters identified at subparagraphs (b)(1), (b)(1A), (b)(3) and (b)(4) contributed to the *Network Service Provider's* decision to reject the proposed *negotiated access standard*; and

- (iii) the detailed reasons and recommendation (if any) provided by *AEMO* to the *Network Service Provider* in respect of an *AEMO advisory matter* under subparagraphs (d1)(1) and (2); and
- (2) advise the *Connection Applicant* of a *negotiated access standard* that the *Network Service Provider* considers meets the requirements of subparagraphs (b)(1), (b)(1A), (b)(3) and (b)(4).

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (h) The *Connection Applicant* may in relation to a proposed *negotiated access standard* advised by a *Network Service Provider* in accordance with subparagraph (g)(2):
 - (1) accept the proposed *negotiated access standard*;
 - (2) reject the proposed *negotiated access standard*;
 - (3) propose an alternative *negotiated access standard* to be further evaluated in accordance with the criteria in paragraph (b); or
 - (4) elect to adopt the relevant *automatic access standard* or a corresponding *plant standard*.
- (i) 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.

CLAUSE
5.3.4B

System strength mitigation requirement

- (a)
 - (a) This clause applies in relation to:
 - (1) a proposed new *connection* of a *generating system* or *market network service facility* to which rule [5.3](#) or [5.3A](#) applies;
 - (2) a proposed new *connection* for a *Network User* to whom [schedule 5.3](#) applies where the *facility* to be *connected* includes an *inverter based resource*; and

- (3) a proposed alteration to a *generating system* where [clause 5.3.9](#) applies or to other *connected plant* where [clause 5.3.12](#) applies.
- (a1) In this clause, a reference to a *Connection Applicant* includes a reference to a *Generator* to whom [clause 5.3.9](#) applies and a *Network User* or *Market Network Service Provider* to whom [clause 5.3.12](#) applies.
 - (a2) For each proposed new *connection* or proposed alteration to a *generating system* or other *connected plant* to which this clause applies, a *Network Service Provider* must:
 - (1) undertake a preliminary *system strength impact assessment* in accordance with the *system strength impact assessment guidelines*;
 - (2) subject to paragraph (a3), calculate the *system strength locational factor* for the new *connection* or proposed alteration in accordance with the *system strength impact assessment guidelines*;
 - (3) undertake a full *system strength impact assessment* following the preliminary assessment, unless:
 - (i) the preliminary assessment indicates there will be no *general system strength impact* or the impact is below any threshold specified in the *system strength impact assessment guidelines* for the purposes of paragraph (f)(3); or
 - (ii) where applicable, the *Connection Applicant* has elected in accordance with paragraph (b1) to pay the *system strength charge* in relation to the *connection*; and
 - (4) where the *Connection Applicant* has elected in accordance with paragraph (b1) to pay the *system strength charge* in relation to the *connection* or proposed alteration, undertake modelling in accordance with the *system strength impact assessment guidelines* to verify the stability of the *plant*.
 - (a3) A *Network Service Provider* is not required to calculate the *system strength locational factor* where it determines in accordance with the *system strength impact assessment guidelines* that a *system strength locational factor* cannot reasonably be calculated or would be manifestly excessive.

- (a4) A *Connection Applicant* in receipt of the *Network Service Provider's* calculation of the *system strength locational factor* may request the *Network Service Provider* to undertake a further preliminary *system strength impact assessment* in accordance with the *system strength impact assessment guidelines* and provide a revised *system strength locational factor* for a new *connection* or proposed alteration to a *generating system* or other *connected plant*. The *Network Service Provider* may require payment of a fee to meet the reasonable costs anticipated to be incurred by the *Network Service Provider* in undertaking any further preliminary assessment.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b)
- (b) The *Network Service Provider* must give the results of the preliminary assessment and where applicable the full assessment to the *Connection Applicant* concerned following consultation with *AEMO*.
- (b1) A *Connection Applicant* must elect in its *application to connect*, its submission under [clause 5.3.9\(b\)](#) or its submission under [clause 5.3.12\(b\)](#) (as applicable) whether the *system strength charge* will be payable in relation to the new *connection* or alteration to the *generating system* or other *connected plant* (as applicable). The election cannot be revoked.
- (c) A dispute referred to in paragraph (d) between any of:
- (1) *AEMO*;
 - (2) a *Network Service Provider* required to conduct an assessment under paragraph (a);
 - (3) a *Connection Applicant* who has submitted an *application to connect* for which a full assessment is required under paragraph (a2)(3);
 - (4) a *Generator* who proposes an alteration to a *generating system* to which [clause 5.3.9](#) applies and for which a full assessment is required under paragraph (a2)(3); and

- (5) a *Network User* or *Market Network Service Provider* who proposes an alteration to *connected plant* to which [clause 5.3.12](#) applies and for which a full assessment is required under paragraph (a2)(3),

may be determined under [rule 8.2](#).

(d)

- (d) Paragraph (c) applies to any dispute relating to the assessment of the *general system strength impact* as a result of conducting a *system strength impact assessment* including a dispute in relation to:

- (1) whether the model specified by *AEMO* for the purposes of [clause 4.6.6\(b\)\(2\)](#) was reasonably appropriate for conducting the *system strength impact assessment*; and
- (2) the application of the *system strength impact assessment guidelines* when undertaking a *system strength impact assessment*.

- (e) Subject to paragraph (f), a *Network Service Provider* must undertake *system strength connection works* at the cost of the *Connection Applicant* if the full assessment undertaken in accordance with the *system strength impact assessment guidelines* indicates that the *Connection Applicant's* proposed new *connection* or proposed alteration will have a *general system strength impact*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (f) Paragraph (e) does not require a *Network Service Provider* to undertake, nor permit a *Network Service Provider* to require, *system strength connection works* in the following circumstances:
 - (1) the proposed new *connection* or alteration does not proceed;
 - (2) (2) to the extent that the *general system strength impact* referred to in paragraph (e) is or will be avoided or remedied by a *system strength remediation scheme* agreed or determined under this clause and implemented by the *Connection Applicant* in accordance with its *connection agreement*;

(3)

(3) to the extent that the impact is below any threshold specified in the *system strength impact assessment guidelines* for this purpose; or

(4) the *Connection Applicant* has elected for the *system strength charge* to be payable in relation to the new *connection* or proposed alteration.

(g)

(g) A *Connection Applicant* must include any proposal for a *system strength remediation scheme* in its *application to connect* or its proposal under [clause 5.3.9\(b\)\(4\)](#) or under [clause 5.3.12\(b\)\(4\)](#).

(h)

(h) A *Connection Applicant* proposing to install *plant* as part of a *system strength remediation scheme* must include a description of the *plant* and other information (including models) reasonably required by the *Network Service Provider* and *AEMO* to assess the *system strength remediation scheme*.

(i) A *Network Service Provider* must, following the receipt of a proposal for a *system strength remediation scheme*, consult with *AEMO* as soon as practical in relation to the proposal.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(j) Following the submission of a proposal for a *system strength remediation scheme*, *AEMO* must use reasonable endeavours to respond to the *Network Service Provider* in writing in respect of the proposal within 20 *business days*.

(k) A *Network Service Provider* must within 10 *business days* following the receipt of a response from *AEMO* under paragraph (h) to a proposal for a *system strength remediation scheme*, accept or reject the proposal.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National

- (l) The *Network Service Provider* must reject a proposal for a *system strength remediation scheme* if the scheme is not reasonably likely to achieve its required outcome or would:
 - (1) in the reasonable opinion of the *Network Service Provider* adversely affect quality of *supply* for other *Network Users*; or
 - (2) on *AEMO's* reasonable advice, adversely affect *power system security*.
- (m) If a *Network Service Provider* rejects a proposal for a *system strength remediation scheme*, the *Network Service Provider* must give its reasons but has no obligation to propose a *system strength remediation scheme* that it will accept.
- (n) The *Connection Applicant* submitting a proposal for a *system strength remediation scheme* rejected by a *Network Service Provider* may:
 - (1) propose an alternative *system strength remediation scheme* to be further evaluated following the process initiated under paragraph (i); or
 - (2) request negotiations under paragraph (o).
- (o) If a *Connection Applicant* requests negotiations under this paragraph, the *Connection Applicant*, the *Network Service Provider* and *AEMO* must negotiate in good faith to reach agreement in respect of the proposal for a *system strength remediation scheme*.
- (p) If the matter is not resolved by negotiation under paragraph (o):
 - (1) in the case of a *connection* to a *transmission system* other than the *declared transmission system* of an *adoptive jurisdiction*, the matter may be dealt with as a dispute under [rule 5.5](#) (but not [rule 8.2](#)); or
 - (2) otherwise, may be dealt with under [rule 8.2](#) or as a *distribution service access dispute* as applicable.
- (q) The parties to a *connection agreement* containing a *system strength remediation scheme* must not modify the scheme unless the modified scheme has been agreed or determined under this clause. A *Registered Participant* proposing to modify a *system strength*

remediation scheme must submit its proposal for modification to the *Network Service Provider* for evaluation by the *Network Service Provider* and *AEMO* under this clause. Once agreed or determined, the modified scheme must be incorporated as an amendment to the *connection agreement* and notified to *AEMO* under [clause 5.3.7\(g\)](#).

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

CLAUSE
5.3.4C

Information about system strength connection points

- (a) A *Network Service Provider* for a *system strength connection point* who is not also the *System Strength Service Provider* for the *system strength connection point* must notify the information in paragraph (b) to the relevant *System Strength Service Provider* within 10 *business days* of either of the following occurring:
- (1) an election being made under [clause 5.3.4B\(b1\)](#) for the *system strength charge* to be payable in relation to a new *connection* or proposed alteration; or
 - (2) agreement being reached under [clause 5.3.9](#) or [clause 5.3.12](#) to vary the performance of *plant* at a *system strength connection point*, relative to the technical requirements in [clause S5.2.5.15](#), clause S5.3.11 or [clause S5.3a.7](#) (as applicable).
- (b) The *Network Service Provider* must notify the:
- (1) *system strength locational factor*;
 - (2) *short circuit ratio* and *rated active power*, rated *power transfer capability* or *maximum demand* for the *system strength connection point* agreed in accordance with [clause S5.2.5.15](#), clause S5.3.11 or [clause S5.3a.7](#) (as applicable);
 - (3) the expected date from which the *system strength charge* for the *connection* will commence or the amendment take effect; and
 - (4) information reasonably required by the *System Strength Service Provider* to identify the relevant *connection*.
- (c) A *Network Service Provider* for a *system strength connection point* must, within 20 *business days* of a request of the relevant *System*

Strength Service Provider:

- (1) calculate in accordance with the *system strength impact assessment guidelines* and notify to the *System Strength Service Provider*, the *system strength locational factor* applicable to the *system strength connection point* for each year of the *system strength charging period* specified by the *System Strength Service Provider*; and
 - (2) provide any other information reasonably required by the *System Strength Service Provider* for the purposes of calculating and billing *system strength charges* for the *system strength connection point*.
- (d) A *System Strength Service Provider* must establish and maintain arrangements to enable other *Network Service Providers* to provide information to the *System Strength Service Provider* in accordance with this clause 5.3.4C.
- (e) A *System Strength Service Provider* must establish and maintain a record of all *connections* subject to the *system strength charge* and for which it is the *System Strength Service Provider* and must include in the record all information reasonably required by the *System Strength Service Provider* to identify the relevant *connection* for the purposes of calculating and billing *system strength charges*.

CLAUSE
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 standard* under [clause 5.3.4](#); or
 - (2) at a *negotiated access standard* that the *provider* has accepted under [clause 5.3.4A\(e\)](#),

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* (including the details of any person undertaking the construction, detailed design and/or ownership of *contestable IUSA components*) or *designated network asset* 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 *AEMO* 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 technical 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) The *Network Service Provider* preparing the offer to *connect* must specify in reasonable detail any *system strength connection works* to be undertaken by the *Network Service Provider*.
- (f) [Deleted]
- (g) 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 *AEMO* and it may be a condition of the offer to *connect* that the *Connection Applicant* pay such costs.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

Offer to connect

- (a) Subject to paragraph (a3), a *Network Service Provider* processing an *application to connect* must make an offer to *connect* the *Connection Applicant's facilities* to the *network* within the following timeframes:
- (1) where the *application to connect* was made under [clause 5.3.4\(a\)](#), the timeframe specified in the *preliminary program*, subject to [clause 5.3.3\(b\)\(6\)](#); and
 - (2) where the *application to connect* was made under [clause 5.3A.9\(b\)](#), a period of time no longer than 4 months from the date of receipt of the *application to connect* and any additional information requested under [clause 5.3A.9\(d\)](#), unless agreed otherwise.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (a1) The *Network Service Provider* may amend the time period referred to in paragraph (a)(1) 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](#) or a *system strength remediation scheme* in accordance with [clause 5.3.4B](#) or any time taken by *AEMO* to respond under [clause 5.3.4B\(j\)](#) in excess of 20 *business days*.
- (a2) In relation to the timeframes fixed in paragraph (a)(2), for the purposes of calculating elapsed time, the following periods shall be disregarded:
- (1) the period that commences on the day when a dispute is initiated under [clause 8.2.4\(a\)](#) and ends of the day on which the dispute is withdrawn or is resolved in accordance with clauses [8.2.6D](#) or [8.2.9\(a\)](#);
 - (2) any time taken to resolve a *distribution services access dispute*; and
 - (3) any time taken by *AEMO* to respond under [clause 5.3.4B\(j\)](#) in excess of 20 *business days*.

- (a3) In relation to a *Connection Applicant's application to connect* made under [clause 5.3.4\(a\)](#) for *connection* to a part of a *network* that is a *designated network asset*, the *Network Service Provider* must not make an offer to *connect* under paragraph (a), unless the owner of the *designated network asset* has given notice to the *Network Service Provider*:
- (1) confirming access to *DNA services* in respect of that the *designated network asset* has been agreed with the *Connection Applicant* in accordance with the relevant *access policy*; and
 - (2) providing any details on technical requirements or limitations agreed as part of the *DNA services* that are relevant to the offer to *connect*.
- (b) In relation to an *application to connect* made under [clause 5.3.4\(a\)](#), 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 Part A and (where applicable) Part B of [schedule 5.6](#),

and must be capable of acceptance by the *Connection Applicant* so as to constitute a *connection agreement* and (where applicable) a *network operating agreement*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

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

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b2)** An offer to *connect* made under paragraph (a)(2), must be accompanied by:
- (1)** so far as is relevant, and in relation to services the *Distribution Network Service Provider* intends to provide, an itemised statement of *connection* costs including:
 - (i)** *connection service* charges;
 - (ii)** costs associated with metering requirements contained in the offer to *connect*;
 - (iii)** costs of *network extension*;
 - (iv)** details of *augmentation* required to provide the *connection* and associated costs;
 - (v)** details of the interface equipment required to provide the *connection* and associated costs;
 - (vi)** details of any ongoing operation and maintenance costs and charges by the *Distribution Network Service Provider*; and
 - (vii)** other incidental costs and their basis of calculation;
 - (2)** if any item in the statement of costs in subparagraph (1) differs substantially from the estimate provided under clause S5.4B(h), an explanation of the differences;
 - (3)** a *connection agreement* capable of execution by the *Connection Applicant*, which must contain the proposed terms and conditions for *connection* to the *distribution network* (of the kind set out in Part A of [schedule 5.6](#)) including, for each technical requirement identified by the *Distribution Network Service Provider* in the *detailed response* provided under [clause 5.3A.8\(c\)](#), the *automatic access standard* or the negotiated access standard as determined in accordance with [clause 5.3.4A](#); and
 - (4)** an explanation:
 - (i)** of how the offer to *connect* can be accepted; and
 - (ii)** that the offer to *connect* remains open for 20 *business days*, unless otherwise agreed.
- (b3)** An offer to *connect* made under paragraph (a)(2) must remain open for acceptance for 20 *business days* from the date it is made and, if

not accepted within that period, lapses unless the *Connection Applicant* has sought an extension of the period of time from the *Distribution Network Service Provider*. The *Distribution Network Service Provider* may not unreasonably withhold consent to the extension.

- (b4) An offer to *connect* by a *Primary Transmission Network Service Provider* made under paragraph (a)(1) must include:
- (1) the *Primary Transmission Network Service Provider's* requirements in relation to the matters proposed in [clause 5.3.4\(b\)\(3\)](#) and (b)(4); and
 - (2) the costs of the services proposed to be provided by the *Primary Transmission Network Service Provider* separated between *negotiated transmission services* and *non-regulated transmission services* (if applicable).
- (b5) A *Connection Applicant* may seek amendments to the offer to *connect* provided that the *Connection Applicant* agrees to changes to the *preliminary program* to reflect the additional time required to agree the amendments.
- (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](#).

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (c1) **[Deleted]**
- (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) 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*.
- (f) 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.
- (g) An offer to *connect* must define the basis for determining *transmission service* charges in accordance with [Chapter 6A](#), including the prudential requirements set out in that Chapter.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (h) An offer to *connect* must define the basis for determining *distribution service* charges in accordance with [Chapter 6](#), including the prudential requirements set out in [Part K](#) of [Chapter 6](#).

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (i) **[Deleted]**
- (j) An offer to *connect* in respect of a *distribution network* made to an *Embedded Generator* or a *Market Network Service Provider*, must conform with the relevant access arrangements set out in [rule 5.3AA](#).

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (k) **[Deleted]**

Finalisation of connection agreements and network operating agreements

- (a) If a *Connection Applicant* wishes to accept an offer to *connect*, the *Connection Applicant* must negotiate and enter into:
- (1) a *connection agreement* with each relevant *Network Service Provider* identified in accordance with clauses [5.3.3\(b\)\(3\)](#) and [\(4\)](#) or clauses S5.4A(d) and (e); and
 - (2) if applicable, a *network operating agreement* with the *Primary Transmission Network Service Provider*,

and in doing so must use its reasonable endeavours to negotiate in good faith with all parties with which the *Connection Applicant* must negotiate such a *connection agreement* and (if applicable) *network operating agreement*.

- (b) The *connection agreement* must include proposed *performance standards* with respect to each of the technical requirements identified in schedules [5.2](#), [5.3](#) and [5.3a](#) and each proposed *performance standard* must have been established in accordance with the relevant technical requirement.
- (c) The proposed *performance standards* must be based on the *automatic access standard* or, if the procedures in [clause 5.3.4A](#) have been followed, the *negotiated access standard*.
- (d) 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* or any *system strength connection works*.
- (e) 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 paragraph (d) 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.
- (f) Subject to paragraph (e), each *connection agreement* must be based on the offer to *connect* as varied by agreement between the parties.

- (f1) The parties may agree to have one *connection agreement* between a *Primary Transmission Network Service Provider*, owner of a *dedicated connection asset* or *designated network asset* and a *Transmission Network User* for a *connection*.
- (f2) A *network operating agreement* must be based on the offer to *connect* as varied by agreement between the parties.
- (g) Within 20 *business days* of execution of the *connection agreement*, the *Network Service Provider* responsible for the *connection point* and the *Registered Participant* must jointly notify *AEMO* that a *connection agreement* has been entered into between them and forward to *AEMO* 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:
 - (i) updating the *releasable user guide* and other information required under [clause S5.2.4\(b\)](#); and
 - (ii) informing *AEMO* when the *connection agreement* expires or is terminated;
 - (3) the proposed *metering installation*;
 - (4) arrangements to obtain physical access to the *metering installation* for the *Metering Provider* and the *Metering Data Provider* for *metering installations* type 4A, 5 and 6;
 - (5) the terms upon which a *Registered Participant* is to supply any *ancillary services* under the *connection agreement*; and
 - (6) the details of any *system strength remediation scheme* agreed, determined or modified under [clause 5.3.4B](#).

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (h) *AEMO* must, within 20 *business days* of receipt of the notice under paragraph (g), 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 7.4](#).

CLAUSE
5.3.8

Provision and use of information

- (a) The data and information provided under [rules 5.2A](#), 5.3 and 5.3A is *confidential information* and must:
- (1) be prepared, given and used in good faith; and
 - (2) not be disclosed or made available by the recipient to a third party except as set out in [rule 3.7E](#), [clause 3.13.3](#), this clause 5.3.8 or in accordance with [rule 8.6](#).
- (a1) The data and information provided to a *Primary Transmission Network Service Provider* in relation to its provision of non-contestable services as specified under [clause 5.2A.4\(a\)](#) must not be used by the *Primary Transmission Network Service Provider* for the purpose of tendering for, or negotiating, *contestable* services specified under [clause 5.2A.4\(a\)](#) in the *connection* process in which the data or information was given, or in future *connection* processes, without the consent of the *Connection Applicant*.
- (b) The data and information to be provided under this rule 5.3 may be shared between a *Network Service Provider* and *AEMO* for the purpose of enabling:
- (1) the *Network Service Provider* to advise *AEMO* of *ancillary services* ; and
 - (2) either party to:
 - (i) assess the effect of a proposed *facility* or proposed alteration to *generating plant* (as the case may be) on:
 - (A) the performance of the *power system*; or
 - (B) another proposed *facility* or another proposed alteration;
 - (ii) assess proposed *negotiated access standards*;
 - (iii) determine the extent of any required *augmentation* or *extension* or *system strength connection works*; or
 - (iv) assess *system strength remediation scheme* proposals.

- (c) A *Network Service Provider* may disclose the data and information to be provided under [rules 5.2A](#), 5.3 and 5.3A to another *Network Service Provider* if the *Network Service Provider* considers the information or data is materially relevant to that *provider* for *connection*.
- (d) A person intending to disclose information under paragraphs (b) or (c) must first advise the relevant *Connection Applicant* of the extent of the disclosure, unless the information may be disclosed in accordance with [rule 8.6](#).
- (d1) If a *Connection Applicant* becomes aware of any material change to information contained in or relevant to a *connection* enquiry under [rule 5.3](#) following receipt of the response from the *Network Service Provider* under [clause 5.3.3](#), that *Connection Applicant* must promptly notify the *Network Service Provider* of that change.
- (e) 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*, it must promptly notify the other party in writing of that change.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (f) A *Registered Participant* must, within 5 *business days* of becoming aware that any information provided to *AEMO* in relation to a *performance standard* or other information of a kind required to be provided to *AEMO* under [clause 5.3.7](#) is incorrect, advise *AEMO* of the correct information.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

**CLAUSE
5.3.9**

Procedure to be followed by a Generator proposing to alter a generating system

- (a) Subject to paragraph (a1), this clause 5.3.9 applies where a *Generator* proposes to alter a *connected generating system* or a *generating system* for which *performance standards* have been previously

accepted by the *Network Service Provider* and *AEMO* (in relation to *AEMO advisory matters*) and that alteration:

- (1) will affect the performance of the *generating system* relative to any of the technical requirements set out in clauses [S5.2.5](#), [S5.2.6](#), [S5.2.7](#) and [S5.2.8](#); or
 - (2) will, in *AEMO's* reasonable opinion, have a *general system strength impact*; or
 - (3) will, in *AEMO's* reasonable opinion, adversely affect *network capability, power system security*, quality or reliability of *supply, inter-regional power transfer capability* or the use of a *network* by another *Network User*.
- (a1) This clause 5.3.9 does not apply in relation to any modifications made to a *generating system* by a *Scheduled Generator* or *Semi-Scheduled Generator* in order to comply with the *Primary Frequency Response Requirements* as applicable to that *generating system*.
- (b) A *Generator* to which this clause applies, must submit to the *Network Service Provider* with a copy to *AEMO*:
- (1) a description of the nature of the alteration and the timetable for implementation;
 - (2) in respect of the proposed alteration to the *generating system*, details of the *generating unit* design data and *generating unit* setting data in accordance with the *Power System Model Guidelines, Power System Design Data Sheet* and *Power System Setting Data Sheet*;

Note

This subparagraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (3) in relation to each relevant technical requirement for which the proposed alteration to the equipment will affect the performance of the *generating system*, the proposed amendments to the *plant's* existing corresponding *performance standard* for that technical requirement; and
- (4)

- (4) where relevant, the *Generator's* proposed *system strength remediation scheme* or its election for the *system strength charge* to be payable in relation to the alteration.
- (c) [Clause 5.3.4A](#) applies to a submission by a *Generator* under subparagraph (b)(3).
- (c1) [Clause 5.3.4B](#) applies to a submission by a *Generator* under subparagraph (b)(4). A *Generator* may request the *Network Service Provider* to undertake a preliminary assessment in accordance with the *system strength impact assessment guidelines* before making a submission under paragraph (b).
- (d) Without limiting paragraph (a), a proposed alteration to the equipment specified in column 1 of the table set out below is deemed to affect the performance of the *generating system* relative to technical requirements specified in column 2, thereby necessitating a submission under subparagraph (b)(3), unless *AEMO* and the *Network Service Provider* otherwise agree.

Column 1 (altered equipment)	Column 2 (clause)
machine windings	S5.2.5.1, S5.2.5.2, S5.2.8
power converter	S5.2.5.1, S5.2.5.2, S5.2.5.5, S5.2.5.12, S5.2.5.13, S5.2.8, 5.2.5.15
reactive compensation plant	S5.2.5.1, S5.2.5.2, S5.2.5.5, S5.2.5.12, S5.2.5.13
<i>excitation control system</i>	S5.2.5.5, S5.2.5.7, S5.2.5.12, S5.2.5.13
<i>voltage control system</i>	S5.2.5.5, S5.2.5.7, S5.2.5.12, S5.2.5.13
governor <i>control system</i>	S5.2.5.7, S5.2.5.11, S5.2.5.14
power <i>control system</i>	S5.2.5.11, S5.2.5.14
<i>protection system</i>	S5.2.5.3, S5.2.5.4, S5.2.5.5, S5.2.5.7, S5.2.5.8, S5.2.5.9, S5.2.5.10, 5.2.5.16
auxiliary supplies	S5.2.5.1, S5.2.5.2, S5.2.7
remote <i>control</i> and monitoring system	S5.2.5.14, S5.2.6.1, S5.2.6.2

- (e) The *Network Service Provider* may as a condition of considering a submission made under paragraph (b), require payment of a fee to meet the reasonable costs anticipated to be incurred by the *Network Service Provider*, other *Network Service Providers* and *AEMO*, in the assessment of the submission.

- (f) The *Network Service Provider* must require payment of a fee under paragraph (e) if so requested by *AEMO*.
- (g) On payment of the required fee referred to in paragraph (e), the *Network Service Provider* must pay such amounts as are on account of the costs anticipated to be incurred by the other *Network Service Providers* and *AEMO*, as appropriate.
- (h) If the application of this clause 5.3.9 leads to a variation to an existing *connection agreement* the *Network Service Provider* and the *Generator* must immediately jointly advise *AEMO*, including the details of any *performance standards* amended pursuant to this clause 5.3.9.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

**CLAUSE
5.3.10**

Acceptance of performance standards for generating plant that is altered

- (a) A *Generator* must not commission altered *generating plant* until the *Network Service Provider* has advised the *Generator* that the *provider* and *AEMO* are satisfied in accordance with paragraph (b).

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b) In relation to altered *generating plant*, the *Network Service Provider* and *AEMO*, to the extent of *AEMO's* advisory role under [clause 5.3.4A](#) and [clause 5.3.4B](#), must be satisfied that:
 - (1) the *Generator* has complied with [clause 5.3.9](#); and
 - (2) each amended *performance standard* submitted by the *Generator* either meets:
 - (i) the *automatic access standard* applicable to the relevant technical requirement; or
 - (ii) the *negotiated access standard* under [clause 5.3.4A](#) as applied in accordance with [clause 5.3.9\(c\)](#); and

- (3) any *system strength remediation scheme* satisfies [clause 5.3.4B](#).
- (c) For the purposes of paragraph (a), *AEMO* must advise the *Network Service Provider* as to whether it is satisfied with the matters referred to paragraph (b).

CLAUSE
5.3.11

Notification of request to change normal voltage

- (a) On receipt of a request from a *Network Service Provider* to change *normal voltage*, *AEMO* must *publish* a notice to *Registered Participants* advising:
 - (1) the change in *normal voltage* requested; and
 - (2) the *connection point* to which the request relates.
- (b) Within a reasonable period after publication of the notice in paragraph (a), *AEMO* must *publish* a further notice to *Registered Participants* advising:
 - (1) whether the *normal voltage* at the relevant *connection point* will change; and
 - (2) the nature of, and reasons for, any such change.

CLAUSE
5.3.12

Procedure to be followed for alterations to other connected plant

- (a) This clause 5.3.12 applies where a *Network User* specified in [clause S5.3.11\(a\)](#) or a *Market Network Service Provider* specified in [clause S5.3a.1a](#) proposes to alter *connected plant* and that alteration will affect the performance of the *plant* relative to the technical requirements in clause S5.3.11 or [clause S5.3a.7](#) (as applicable).
- (b) A *Network User* or *Market Network Service Provider* to whom this clause applies, must submit to the *Network Service Provider* with a copy to *AEMO*:
 - (1) a description of the nature of the alteration and the timetable for implementation;
 - (2) in respect of the proposed alteration to the *plant*, details of the design setting data in accordance with the *Power System Model*

Guidelines, Power System Design Data Sheet and Power System Setting Data Sheet;

- (3) in relation to the technical requirements in clause S5.3.11 or [clause S5.3a.7](#) (as applicable), the proposed amendments to the *plant's* existing corresponding *performance standard* for that technical requirement; and
 - (4) the *Network User's* or *Market Network Service Provider's* proposed *system strength remediation scheme* or its election for the *system strength charge* to be payable in relation to the alteration.
- (c) [Clause 5.3.4A](#) applies to a submission under subparagraph (b)(3).
- (d) [Clause 5.3.4B](#) applies to a submission under subparagraph (b)(4). A *Network User* or *Market Network Service Provider* (as applicable) may request the *Network Service Provider* to undertake a preliminary assessment in accordance with the *system strength impact assessment guidelines* before making a submission under paragraph (b).
- (e) The *Network Service Provider* may as a condition of considering a submission made under paragraph (b), require payment of a fee to meet the reasonable costs anticipated to be incurred by the *Network Service Provider*, other *Network Service Providers* and *AEMO*, in the assessment of the submission.
- (f) The *Network Service Provider* must require payment of a fee under paragraph (e) if so requested by *AEMO*.
- (g) On payment of the required fee referred to in paragraph (d), the *Network Service Provider* must pay such amounts as are on account of the costs anticipated to be incurred by the other *Network Service Providers* and *AEMO*, as appropriate.
- (h) If the application of this clause 5.3.12 leads to a variation to the agreed technical requirements in clause S5.3.11 or [clause S5.3a.7](#) (as applicable) in an existing *connection agreement*, the *Network Service Provider* and the *Network User* or *Market Network Service Provider* (as applicable) must immediately jointly advise *AEMO*, including the details of any *performance standards* amended pursuant to this clause 5.3.12.

Acceptance of performance standards for other plant that is altered

- (a) A *Network User* or *Market Network Service Provider* to whom [clause 5.3.12](#) applies must not commission altered *plant* until the *Network Service Provider* has advised the *Network User* or *Market Network Service Provider* (as applicable) that the provider and *AEMO* are satisfied in accordance with paragraph (b).
- (b) In relation to altered *plant*, the *Network Service Provider* and *AEMO*, to the extent of *AEMO's* advisory role under [clause 5.3.4A](#) and [clause 5.3.4B](#), must be satisfied that:
- (1) the *Network User* or *Market Network Service Provider* (as applicable) has complied with [clause 5.3.12](#); and
 - (2) each amended *performance standard* submitted by the *Network User* or *Market Network Service Provider* (as applicable) meets the requirements of clause S5.3.11 or [clause S5.3a.7](#) (as applicable); and
 - (3) any *system strength remediation scheme* satisfies [clause 5.3.4B](#).
- (c) For the purposes of paragraph (a), *AEMO* must advise the *Network Service Provider* as to whether it is satisfied with the matters referred to paragraph (b).

Obligations of network service providers

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

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (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 *AEMO* on an annual basis. *AEMO* must allow access to such information to all other *Network Service Providers* and the *Network Service Providers* must keep such information confidential.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (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 rules [5.3](#) or [5.3A](#) (as is relevant) 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 rules [5.3](#) or [5.3A](#) (as is relevant);
- (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 [rule 5.6](#) 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 [Part D](#) of [Chapter 5](#);
- (5) permit and participate in inspection and testing of *facilities* and equipment in accordance with [rule 5.7](#);
- (6) permit and participate in commissioning of *facilities* and equipment which are to be *connected* to its *network* in accordance with [rule 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*;

Note

This subparagraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (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 [rule 5.7](#) where there are reasonable grounds to question the validity of data;

Note

This subparagraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (9) provide to *AEMO* 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 *AEMO* and other *Network Service Providers* subsequent updates of the data referred to in subparagraph (9) and, to the best of its ability and knowledge, ensure that all data used for the purposes referred to in rules [5.3](#) or [5.3A](#) (as is relevant) is consistent with data used for such purposes by other *Network Service Providers*;

Note

This subparagraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (11) provide to *AEMO* 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

Note

This subparagraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

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

Note

This subparagraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

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

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (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 breach 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*.

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

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

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (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 [rule 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 *AEMO* 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 [rule 5.6](#) and [schedule 5.3a](#);
- (3) provide forecast information to the relevant *Network Service Provider* in accordance with [Part D](#) of [Chapter 5](#);
- (4) permit and participate in inspection and testing of *facilities* and equipment in accordance with [rule 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 [rule 5.8](#); and
- (6) **[Deleted]**
- (7) give notice of intended voluntary permanent *disconnection* in accordance with [rule 5.9](#).

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (g1) A *Network Service Provider* must comply with any terms and conditions of a *connection agreement* for its *market network service facilities* that provide for the implementation, operation, maintenance or performance of a *system strength remediation scheme*.

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (h) **[Deleted]**
- (h1) **[Deleted]**
- (h2) **[Deleted]**
- (h3) **[Deleted]**

- (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*.
- (j) If in *AEMO*'s reasonable opinion, there is a risk a *Network Service Provider*'s *plant* or equipment will:
 - (1) adversely affect *network capability, power system security*, quality or reliability of *supply, inter-regional power transfer capability*;
 - (2) adversely affect the use of a *network* by a *Network User*; or
 - (3) have an *adverse system strength impact*,

AEMO may request the *Network Service Provider* to provide information of the type described in [clause 4.3.4\(o\)](#), and following such a request, the *Network Service Provider* must provide the information to *AEMO* and any other relevant *Network Service Provider*(s) in accordance with the requirements and circumstances specified in the *Power System Model Guidelines*, the *Power System Design Data Sheet* and the *Power System Setting Data Sheet*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (k) If in *AEMO*'s reasonable opinion, information of the type described in [clause 4.3.4\(o\)](#) is required to enable a *Network Service Provider* to conduct the assessment required by [clause 5.3.4B](#), *AEMO* may request any other relevant *Network Service Provider* to provide the information, and following such a request, that *Network Service Provider* must provide the information to *AEMO* and the other relevant *Network Service Provider*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (l) All information provided to *AEMO* and the relevant *Network Service Provider*(s) under paragraphs (j) and (k) must be treated as *confidential information* by those recipients.

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

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.

Together, these are the *power system* performance and quality of *supply* standards that *Network Service Providers* must comply with in accordance with [clause 5.2.3\(b\)](#).

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 system* 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*.

This schedule does not apply to a *Distribution Network Service Provider* in relation to a *regulated SAPS*. The performance and quality of *supply* standards for a *regulated SAPS* are defined by the *Distribution Network Service Provider* in accordance with [clause 5.13B.1](#) and [schedule 5.13](#).

CLAUSE
S5.1.2 **Network reliability**

CLAUSE
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.

CLAUSE

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 rules [5.12](#) and [5.13](#) 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.

CLAUSE

S5.1.2.3

Network service between regions

The *power transfer capability* between *regions* must be determined by the process set out in [Part B](#) of [Chapter 5](#).

The following paragraphs of this section set out a framework within which *Network Service Providers* must describe to *AEMO* 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 *AEMO* 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* *AEMO* must provide for the effect on *power system frequency* in the separate *transmission systems* following this event when determining the maximum *power transfer*.

CLAUSE
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 manual *load shedding* in accordance with [clause S5.1.10](#), or is required by *AEMO* to be switched for operational purposes or is required to be switched or *disconnected* for operation of an *emergency frequency control scheme*.

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*.

CLAUSE
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* or *protected 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 *AEMO* 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 endeavours 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* or *protected event* (and how these target ranges may be required to vary with *loading level*).

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.

CLAUSE
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*.

CLAUSE
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*.

CLAUSE
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 points* 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 S5.3.1a\(a\)](#): 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*.

- (c) A *Network Service Provider* must include conditions in *connection agreements* to ensure that each *Generator* will balance:
- (1) the *voltage generated* in each phase of its *generating system*;
and
 - (2) when not generating, the current drawn in each phase,

in order to achieve average levels of negative sequence *voltage* at each of the *generating system connection points* due to phase imbalances within the *generating plant* that are not more than the values determined by the *Network Service Provider* to achieve average levels of negative sequence *voltage* at the *connection points* of other *Network Users* in accordance with [clause S5.1a.7](#).

- (d) When including conditions under paragraph (c), the *Network Service Provider* must have regard to the capabilities of the relevant *generating plant* technology.

CLAUSE
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* or any *protected event* 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* or any *protected 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* or any *protected 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 in consultation with *AEMO*, install, maintain and *upgrade* emergency controls within the *Network Service Provider's* or *Registered Participant's* system or in both, as necessary, to minimise disruption to any *transmission network* 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.

CLAUSE
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 clauses [S5.1.9\(a\)\(2\)](#) or [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 clauses [S5.1.9\(a\)\(2\)\(i\)](#) or [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) [Deleted]

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 *AEMO* 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, investments 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*.

CLAUSE

S5.1.10 Load, generation and network control facilities

CLAUSE

S5.1.10.1 General

Each *Network Service Provider* in consultation with *AEMO* must ensure that:

- (a) sufficient *load* is under the *control* of under-frequency relays or other *facilities* where required to minimise or reduce the risk that in the event of the sudden, unplanned simultaneous occurrence of multiple *contingency events*, the *power system frequency* moves outside the *extreme frequency excursion tolerance limits*;
- (b) where determined to be necessary, sufficient *load* is under the *control* of under-voltage 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 *control* either locally or from remotely located *control centres* to allow the *load shedding*

procedures to be implemented on instruction from *AEMO* to enable *AEMO* to maintain *power system security*.

A *Network Service Provider* may require *load shedding* arrangements to be installed to cater for abnormal operating conditions including abnormal operating conditions in which *emergency frequency control schemes* are intended to operate.

Transmission Network Service Providers and *connected Distribution Network Service Providers* must cooperate to agree arrangements to implement *load shedding*. The arrangements may include the opening of circuits in either a *transmission network* 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* including *emergency frequency control schemes*.

CLAUSE

S5.1.10.1a Emergency frequency control schemes

- (a) A *Network Service Provider* must:
- (1) [Deleted]
 - (2) provide to *AEMO* all information and assistance reasonably requested by *AEMO* for the development and review of *EFCS settings schedules*.
- (b) Where a *protected event EFCS standard* has been determined for an *emergency frequency control scheme* applicable in respect of a *Network Service Provider's transmission system* or *distribution system*, the *Network Service Provider* must:
- (1) design, procure, commission, maintain, monitor, test, modify and report to *AEMO* in respect of, the *emergency frequency control scheme*;
 - (2) perform its obligations under subparagraph (1) so as to achieve the availability and operation of the scheme in accordance with the *protected event EFCS standard*; and
 - (3) coordinate with *AEMO* in relation to the monitoring and testing of the scheme once it is in operation.

- (c) A *Network Service Provider* must use reasonable endeavours to achieve commissioning of a new or upgraded *emergency frequency control scheme* within the time contemplated by the relevant *general power system risk review* or, where applicable, *AEMO's* request to the *Reliability Panel* for declaration of a *non-credible contingency event* as a *protected event* and the decision of the *Reliability Panel* with respect to that request.
- (d) For an *over-frequency scheme*:
- (1) a *Network Service Provider* must identify which elements of the scheme (if any) can be implemented by *facilities* provided by a *Generator* for the *Generator's generating unit* or by modification to the *facilities* of the *Generator* or by changes to the settings of *protection systems* or *control systems* for the *Generator's generating units*.
 - (2) Where those opportunities are identified, the *Network Service Provider* must notify the *Generator* concerned of the opportunity and must request the *Generator* to negotiate with the *Network Service Provider* to reach agreement on the modifications to be made and the other arrangements required by the *Network Service Provider* to comply with its obligations with respect to the scheme (including commissioning, testing, monitoring and future modification).
 - (3) If the *Generator* declines the request, or if the *Generator* agrees to the request but good faith negotiations do not result in agreement being reached in a reasonable time (having regard to the implementation timetable for the scheme), the *Network Service Provider* may make other arrangements to implement the relevant elements of the scheme.
 - (4) If the *Generator* accepts the request, the *Generator* and the *Network Service Provider* must each negotiate in good faith with respect to the matters referred to above.
- (e) Nothing in paragraph (d) is intended to prevent the exercise of rights under a *connection agreement*.
- (f) Nothing in paragraph (d) is intended to constitute or require an *application to connect* for the purposes of [rule 5.3](#) or [rule 5.3A](#). If [clause 5.3.9](#) applies in respect of alterations for an *over-frequency scheme* the subject of negotiations under paragraph (d), the *Network*

Service Provider cannot charge a fee under [clause 5.3.9\(e\)](#) for assessment of a submission in respect of those alterations.

CLAUSE

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 Providers* in conducting periodic functional testing of the *facilities* and *emergency frequency control schemes*, which must not require *load* to be *disconnected*;
- (c) apply *frequency* settings to relays or other *facilities* as determined by *AEMO* in consultation with the *Network Service Provider*; and
- (d) apply under-voltage settings to relays as notified by the *Transmission Network Service Provider* in accordance with [clause S5.1.10.3\(b\)](#).

CLAUSE

S5.1.10.3 Transmission Network Service Providers

Transmission Network Service Providers must:

- (a) conduct periodic functional tests of the *load shedding facilities* and *emergency frequency control schemes*; and
- (b) notify *Distribution Network Service Providers* regarding the settings of under-voltage *load* shed relays as determined by *AEMO* in consultation with the *Transmission Network Service Provider*.

CLAUSE

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.

CLAUSE

S5.1.12 Rating of transmission lines and equipment

For operational purposes each *Network Service Provider* must, on reasonable request, advise *AEMO* of the maximum current that may be permitted to flow (under conditions nominated by *AEMO*) 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*).

AEMO 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 *AEMO* 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 *AEMO* 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 *AEMO* 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 [AEMO](#).

CLAUSE

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](#).

CLAUSE

S5.1.14

Minimum three phase fault levels and stability for system strength nodes

(a) In this clause:

relevant year means each period of 12 months commencing 2 December.

system strength standard specification means, for a *system strength node* at any time in a relevant year, the forecast system strength requirements for the *system strength node* determined for the relevant year three years prior (that is, in the *system strength requirements* due to be determined by 1 December falling three years before the relevant year commenced and disregarding any revision under [clause 5.20C.1\(e\)](#)).

Examples

If the relevant year is 2 December 2026 to 1 December 2027, the system strength standard specification on each day during that year will be the forecast made in the determination of the *system strength requirements* due to be made by 1 December 2023.

If a new *system strength node* is declared on 1 December 2028, there will be no system strength standard specification for that *system strength node* for the relevant years commencing 2 December 2028, 2 December 2029 and 2 December 2030. During those relevant years the *Transmission Network Service Provider* will nonetheless have obligations under paragraph (b) to plan, design etc its *network* to meet the standard for the relevant year commencing 2 December 2031.

forecast system strength requirements means, for a *system strength node* for a relevant year, *AEMO's* forecast under [clause 5.20C.1\(c\)](#) of:

- (i) the minimum *three phase fault level* applicable at the *system strength node*; and

- (ii) the level and type of *inverter based resources* and *market network service facilities* projected by *AEMO* for the *system strength node*.
- (b) A *Transmission Network Service Provider* who is a *System Strength Service Provider* must use reasonable endeavours to plan, design, maintain and operate its *transmission network*, or make *system strength services* available to *AEMO*, to meet the following requirements at *system strength nodes* on its *transmission network* in each relevant year:
 - (1) maintain the minimum *three phase fault level* specified by *AEMO* for the *system strength node* in the system strength standard specification for the relevant year; and
 - (2) achieve stable *voltage* waveforms for the level and type of *inverter based resources* and *market network service facilities* projected by *AEMO* in the system strength standard specifications for the *system strength node* for the relevant year:
 - (i) in steady state conditions; and
 - (ii) following any *credible contingency event* described in [clause S5.1.2.1](#) or any *protected event*.
- (c) For paragraph (b)(2), *voltage* waveforms must be sufficiently stable such that:
 - (1) in steady state conditions, *inverter based resources* and *market network service facilities* do not create, amplify or reflect instabilities;
 - (2) avoiding *voltage* waveform instability following any *credible contingency event* described in [clause S5.1.2.1](#) or any *protected event* is not dependent on any of the *inverter based resources* or *market network service facilities disconnecting* from the *power system* or significantly varying the *active power* or *reactive power* transfer at the *connection point* except in accordance with applicable *performance standards*; and
 - (3) the description of what is meant by stable *voltage* waveforms in the *system strength requirements methodology* is satisfied.

Conditions for Connection of Generators

Outline of requirements

- (a) This schedule sets out details of additional requirements and conditions that *Generators* must satisfy as a condition of *connection* of a *generating system* to the *power system*.
- (b) This schedule does not apply to a person, in respect of a *generating system* that is or will be owned, operated or controlled by that person, if:
 - (1) that person has received an exemption from the requirement to register as a *Generator* under [clause 2.2.1\(c\)](#), or is eligible for an automatic exemption under the *registration information resource and guidelines*, subject to any terms and conditions imposed by *AEMO* as part of that exemption; and
 - (2) that *generating system* is *connected*, or the person intends to *connect* it; and
 - (3) that *generating system* is intended for use in a manner the *Network Service Provider* considers is unlikely to cause a material degradation in the quality of *supply* to other *Network Users*.
- (c) This schedule also sets out the requirements and conditions which subject to [clause 5.2.5](#) of the *Rules*, are obligations on *Generators*:
 - (1) to co-operate with the relevant *Network Service Provider* on technical matters when making a new *connection*; and
 - (2) to provide information to the *Network Service Provider* or *AEMO*.
- (d) The equipment associated with each *generating system* must be designed to withstand without damage the range of operating conditions which may arise consistent with the *system standards*.
- (e) *Generators* must comply with the *performance standards* and any attached terms or conditions of agreement agreed with the *Network Service Provider* or *AEMO* in accordance with a relevant provision of schedules [5.1a](#) or [5.1](#).

- (f) This schedule does not set out arrangements by which a *Generator* may enter into an agreement or contract with *AEMO* to:
- (1) provide additional services that are necessary to maintain *power system security*; or
 - (2) provide additional services to facilitate management of the *market*.
- (g) This schedule provides for *automatic access standards* and the determination of *negotiated access standards* which once determined, must be recorded together with the *automatic access standards* in a *connection agreement* and registered with *AEMO* as *performance standards*.

CLAUSE
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 *AEMO* under [clause 5.3.4A\(c\)](#) of the *Rules*, also by *AEMO*. 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, then (except in the case of settings to be applied or changed by the *Generator* in connection with an *emergency frequency control scheme*) approval must not be withheld unless the *Network Service Provider* or, if the requirement is one that would involve *AEMO* under [clause 5.3.4A\(c\)](#) of the *Rules*, *AEMO*, 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 *AEMO* under [clause 5.3.4A\(c\)](#) of the *Rules*, *AEMO*, 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 *AEMO* (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 *AEMO* 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 *AEMO* 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.

CLAUSE
S5.2.3

Technical matters to be coordinated

- (a) A *Generator* and the relevant *Network Service Provider* must use all reasonable endeavours to agree upon relevant technical matters in respect of each new or altered *connection* of a *generating system* to a *network* including:
- (1) design at the *connection point*;
 - (2) physical layout adjacent to the *connection point*;
 - (3) primary protection and backup protection ([clause S5.2.5](#));
 - (4) *control* characteristics ([clause S5.2.5](#));
 - (5) communications *facilities* ([clause S5.2.6](#));
 - (6) insulation co-ordination and lightning protection (paragraph (b));
 - (7) fault levels and fault clearance ([clause S5.2.8](#));
 - (8) switching and *isolation* facilities ([clause S5.2.8](#));

- (9) interlocking and *synchronising* arrangements; and
 - (10) *metering installations*.
- (b) A *Generator* must ensure that in designing a *generating system's* electrical *plant*, including any *substation* for the *connection* of the *generating system* to the *network*, to operate at the same *nominal voltage* as at the *connection point*:
- (1) the *plant* complies with the relevant *Australian Standards* unless a provision of the *Rules* allows or requires otherwise;
 - (2) the earthing of the *plant* complies with the ENA EG1-2006: Substation Earthing Guide to reduce step and touch potentials to safe levels;
 - (3) the *plant* is capable of withstanding, without damage the *voltage* impulse levels specified in the *connection agreement*;
 - (4) the insulation levels of the *plant* are co-ordinated with the insulation levels of the *network* to which the *generating system* is *connected* as specified in the *connection agreement*; and
 - (5) safety provisions in respect of the *plant* comply with requirements applicable to the *participating jurisdiction* in which the *generating system* is located, as notified by the *Network Service Provider*.
- (c) If no relevant *Australian Standard* exists for the purposes of paragraph (b)(1), the *Generator* must agree with the *Network Service Provider* for the *Generator* to comply with another relevant standard.

CLAUSE
S5.2.4

Provision of information

- (a) A *Generator* or person who is negotiating a *connection agreement* with a *Network Service Provider* must promptly on request by *AEMO* or the *Network Service Provider* provide all data in relation to that *generating system* specified in [schedule 5.5](#).

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b) A *Generator*, or person required under the *Rules* to register as the *Generator* in respect of a *generating system* comprised of *generating*

units with a combined *nameplate rating* of 30 MW or more, by the earlier of:

- (1) the day on which an *application to connect* is made under [clause 5.3.4\(a\)](#);
- (2) the day on which amendments to *performance standards* are submitted under [rule 4.14\(p\)](#) or [clause 5.3.9\(b\)](#);
- (3) three months before commissioning of a *generating system* or planned alteration to a *generating system*; or
- (4) 5 *business days* before commissioning of a *generating system* alteration that is repairing *plant* after a *plant* failure, if *plant* performance after the alteration will differ from performance prior to the *plant* failure,

must provide:

- (5) to *AEMO* and the relevant *Network Service Provider*(s) (including the relevant *Transmission Network Service Provider* in respect of an *embedded generating unit*):
 - (i) information about the *protections systems* of the *generating system*;
 - (ii) information about the *control systems* of the *generating system* including:
 - (A) a set of functional block diagrams, including all functions between feedback signals and generating system output;
 - (B) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits;
 - (C) the characteristics of non-linear elements;
 - (D) encrypted models in a form suitable for the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*;
- (6) to *AEMO*, the model source code (in the circumstances required by the *Power System Model Guidelines*) associated with the *power system* simulation model in subparagraph (ii)(D) in an unencrypted form suitable for at least one of the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*, and in a form that would allow conversion for

use with other software products nominated by *AEMO* in the *Power System Model Guidelines*;

(7) **[Deleted]**

(7A) to *AEMO* and the relevant *Network Service Provider*(s), any other information specified in the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*; and

(8) to *AEMO* and the relevant *Network Service Providers* (including the relevant *Transmission Network Service Provider* in respect of an *embedded generating unit*) a *releasable user guide*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b1) The information provided under paragraph (b) must contain sufficient detail for *AEMO* and the relevant *Network Service Provider*(s) to perform *power system* simulation studies in accordance with the requirements and circumstances specified in the *Power System Model Guidelines*.

(c) The information provided under paragraph (b) must:

(1) encompass all *control systems* that respond to *voltage* or *frequency* disturbances on the *power system*, and which are either integral to the *generating units* or otherwise part of the *generating system*, including those applying to *reactive power* equipment that forms part of the *generating system*; and

(2) conform with the applicable models developed in accordance with the *Power System Model Guidelines*, or an alternative model agreed with *AEMO* to be necessary to adequately represent the *generating plant* to carry out load flow and dynamic simulations and (where applicable) specialised *power system* studies.

(d) The *Generator* must provide to *AEMO* information that updates the information provided under [clause S5.2.4\(b\)](#), and must provide to the relevant *Network Service Providers* information that updates the information provided under [clause S5.2.4\(b\)\(5\)](#):

- (1) within 3 months after commissioning tests or other tests undertaken in accordance with [clause 5.7.3](#) are completed;
 - (2) when the *Generator* becomes aware that the information is incomplete, inaccurate or out of date; or
 - (3) on request by *AEMO* or the relevant *Network Service Provider*, where *AEMO* or the relevant *Network Service Provider* considers that the information is incomplete, inaccurate or out of date.
- (d1) A *Generator* is only required to provide new information under [clause S5.2.4\(d\)](#) to the extent that it is different to the information previously provided under [clause S5.2.4\(b\)](#).
- (e) For the purposes of [clause S5.2.4\(e1\)](#), a *Connection Applicant* must be registered as an *Intending Participant* in accordance with [rule 2.7](#).
- (e1) For the purposes of [clause 5.3.2\(f\)](#), the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of a proposed *connection* for a *generating system* includes:
- (1) the highest expected single phase and three phase fault levels at the *connection point* with the *generating system* not *connected*;
 - (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 system* not *connected*;
 - (4) technical information relevant to the *connection point* with the *generating system* not *synchronised* including equivalent source impedance information, sufficient to estimate fault levels, *voltage* fluctuations, harmonic *voltage* distortion (for harmonics relevant to the *generating system*) and *voltage* unbalance;
 - (5) information relating to the performance of the *national grid* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*, including:

- (i) a model of the *power system*, including relevant *considered projects* and the range of expected operating conditions, sufficient to carry out load flow and dynamic simulations; and
 - (ii) information on *inter-regional* and *intra-regional power transfer capabilities* and relevant *plant* ratings; and
- (6) the *Network Service Provider's* expected *three phase fault level* at the *connection point* for the *generating system* following the *connection* of the *generating system*.
- (f) All information provided under this clause S5.2.4 must be treated as *confidential information*.

CLAUSE

S5.2.5

Technical requirements

CLAUSE

S5.2.5.1

Reactive power capability

Automatic access standard

- (a) The *automatic access standard* is a *generating system* operating at:

- (1) any level of *active power* output; and
- (2) any *voltage* at the *connection point* within the limits established under [clause S5.1a.4](#) without a *contingency event*,

must be capable of supplying and absorbing continuously at its *connection point* an amount of *reactive power* of at least the amount equal to the product of the *rated active power* of the *generating system* and 0.395.

Minimum access standard

- (b) The *minimum access standard* is no capability is required to supply or absorb *reactive power* at the *connection point*.

Negotiated access standard

- (c) When negotiating a *negotiated access standard*, the *Generator*, the *Network Service Provider* and *AEMO*:
- (1) must, subject to any agreement under subparagraph (d)(4), ensure that the *reactive power capability* of the *generating system* is consistent with maintaining *power system security* and sufficient

to ensure that all relevant *system standards* are met before and after *credible contingency events* under normal and planned *outage* operating conditions of the *power system*, taking into account existing *power system* conditions, *considered projects* and any other project for the *connection* of a *Network User* for which:

- (i) there is an existing *connection agreement*; or
 - (ii) the *Network Service Provider* and *AEMO* reasonably consider the *Network User* will *connect* to the *power system*;
- (2) may negotiate either a range of *reactive power* absorption and supply, or a range of *power factor*, at the *connection point*, within which the *plant* must be operated; and
- (3) may negotiate a limit that describes how the *reactive power capability* varies as a function of *active power* output due to a design characteristic of the *plant*.
- (d) If the *generating system* is not capable of the level of performance established under paragraph (c)(1) the *Generator*, depending on what is reasonable in the circumstances, must:
- (1) pay compensation to the *Network Service Provider* for the provision of the deficit of *reactive power* (supply and absorption) from within the *network*;
 - (2) install additional equipment *connecting* at the *generating system's connection point* or another location, to provide the deficit of *reactive power* (supply and absorption), and such equipment is deemed to be part of the *generating system*;
 - (3) reach a commercial arrangement with a *Registered Participant* to provide the deficit of *reactive power* (supply and absorption); or
 - (4) if the inability to meet the performance level only occurs for particular operating conditions, agree to and document as part of the proposed *negotiated access standard*, operational arrangements by which the *plant* can achieve an agreed level of performance for those operating conditions.
- (e) The *Generator* may select one or more options referred to in paragraph (d).

General requirements

- (f) A *performance standard* must record the agreed value for *rated active power* and where relevant the method of determining the value.
- (g) A *performance standard* for consumption of *energy* by a *generating system* when not supplying or absorbing *reactive power* under an *ancillary services agreement* is to be established under [clause S5.3.5](#) as if the *Generator* were a *Market Customer*.

CLAUSE

S5.2.5.2

Quality of electricity generated

- (a) For the purpose of this clause S5.2.5.2 in respect of a *synchronous generating unit*, AS 1359.101 and IEC 60034-1 are *plant standards* for harmonic *voltage* distortion.

Automatic access standard

- (b) The *automatic access standard* is a *generating system* when generating and when not generating must not produce at any of its *connection points* for *generation*:
 - (1) *voltage* fluctuation greater than the limits allocated by the *Network Service Provider* under [clause S5.1.5\(a\)](#);
 - (2) harmonic *voltage* distortion greater than the emission limits specified by a *plant standard* under paragraph (a) or allocated by the *Network Service Provider* under [clause S5.1.6\(a\)](#); and
 - (3) *voltage* unbalance greater than the limits allocated by the *Network Service Provider* in accordance with [clause S5.1.7\(c\)](#).

Minimum access standard

- (c) The *minimum access standard* is a *generating system* when generating and when not generating must not produce at any of its *connection points* for *generation*:
 - (1) *voltage* fluctuations greater than limits determined under [clause S5.1.5\(b\)](#);
 - (2) harmonic *voltage* distortion more than the lesser of the emission limits determined by the relevant *Network Service Provider* under [clause S5.1.6\(b\)](#) and specified by a *plant standard* under paragraph (a); and

- (3) *voltage* unbalance more than limits determined under [clause S5.1.7\(c\)](#).

Negotiated access standard

- (d) A *negotiated access standard* negotiated under this clause S5.2.5.2 must not prevent the *Network Service Provider* meeting the *system standards* or contractual obligations to existing *Network Users*.

CLAUSE

S5.2.5.3

Generating system response to frequency disturbances

- (a) For the purposes of this clause S5.2.5.3:

normal operating frequency band, operational frequency tolerance band, or extreme frequency excursion tolerance limits are references to the widest range specified for those terms for any condition (including an "island" condition) in the *frequency operating standards* that apply to the *region* in which the *generating unit* is located.

stabilisation time and **recovery time** mean the longest times allowable for the *frequency* of the *power system* to remain outside the *operational frequency tolerance band* and the *normal operating frequency band*, respectively, for any condition (including an "island" condition) in the *frequency operating standards* that apply to the *region* in which the *generating unit* is located.

transient frequency limit and **transient frequency time** mean the values of 47.5 Hz and 9 seconds respectively, or such other values determined by the *Reliability Panel*.

Automatic access standard

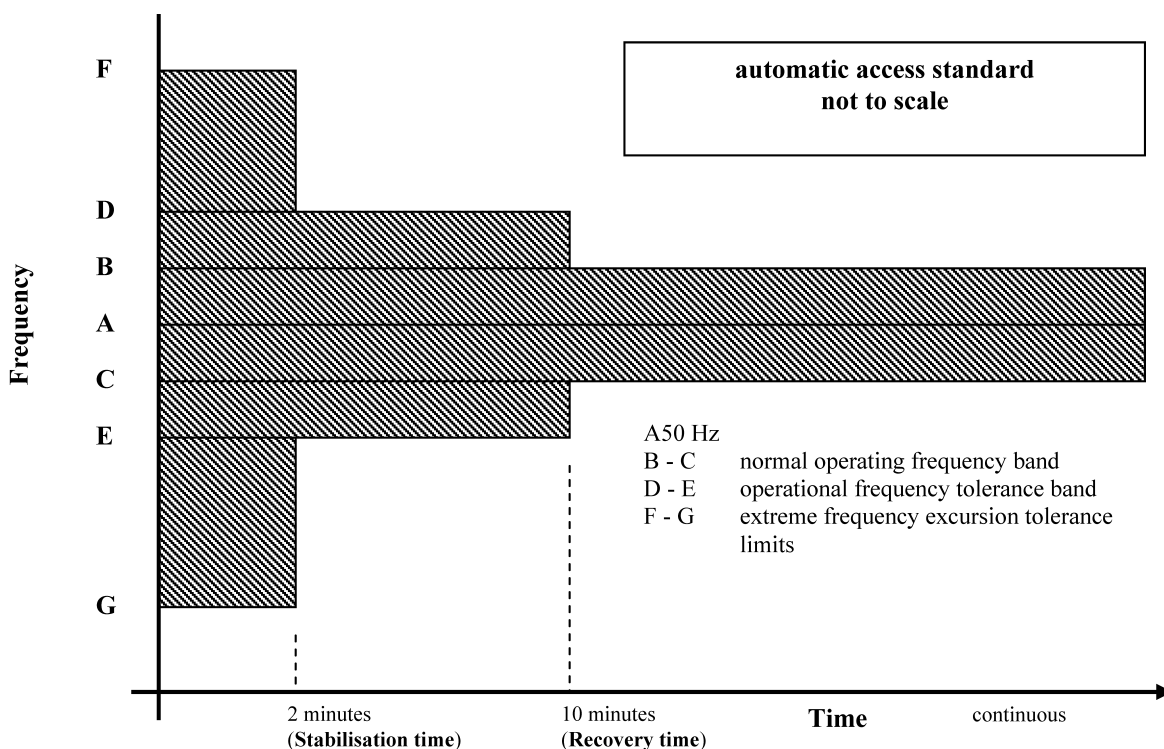
- (b) The *automatic access standard* is a *generating system* and each of its *generating units* must be capable of *continuous uninterrupted operation* for *frequencies* in the following ranges:
- (1) the lower bound of the *extreme frequency excursion tolerance limits* to the lower bound of the *operational frequency tolerance band* for at least the *stabilisation time*;
 - (2) the lower bound of the *operational frequency tolerance band* to the lower bound of the *normal operating frequency band*, for at least the *recovery time* including any time spent in the range under subparagraph (1);

- (3) the **normal operating frequency band** for an indefinite period;
- (4) the upper bound of the **normal operating frequency band** to the upper bound of the **operational frequency tolerance band**, for at least the **recovery time** including any time spent in the range under subparagraph (5); and
- (5) the upper bound of the **operational frequency tolerance band** to the upper bound of the **extreme frequency excursion tolerance limits** for at least the **stabilisation time**,

unless the rate of change of **frequency** is outside the range of -4 Hz to 4 Hz per second for more than 0.25 seconds, -3 Hz to 3 Hz per second for more than one second, or such other range as determined by the **Reliability Panel** from time to time.

Note:

The **automatic access standard** is illustrated in the following diagram. To the extent of any inconsistency between the diagram and paragraph (b), paragraph (b) prevails.



Minimum access standard

- (c) The **minimum access standard** is a **generating system** and each of its **generating units** must be capable of **continuous uninterrupted operation** for **frequencies** in the following ranges:

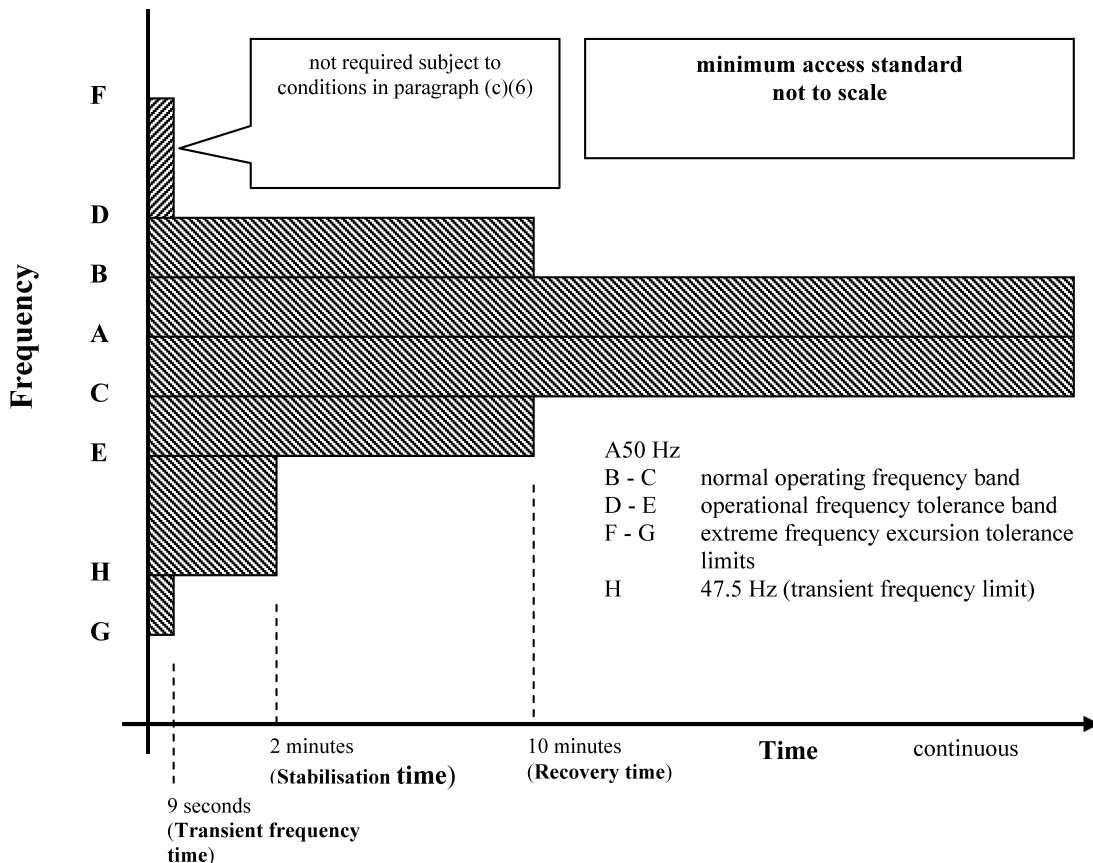
- (1) the lower bound of the **extreme frequency excursion tolerance limits** to the **transient frequency limit** for at least the **transient frequency time**;
- (2) the **transient frequency limit** to the lower bound of the **operational frequency tolerance band** for at least the **stabilisation time**;
- (3) the lower bound of the **operational frequency tolerance band** to the lower bound of the **normal operating frequency band** for at least the **recovery time** including any time spent in the ranges under subparagraphs (1) and (2);
- (4) the **normal operating frequency band** for an indefinite period;
- (5) the upper bound of the **normal operating frequency band** to the upper bound of the **operational frequency tolerance band** for at least the **recovery time** including any time spent in the ranges under subparagraph (6) unless the **generating system** has a **protection system** to trip a **generating unit** if the **frequency** exceeds a level agreed with **AEMO**; and
- (6) in respect of a **generating system**:
 - (i) of 30 MW or more; and
 - (ii) that does not have a **protection system** to trip the **generating unit** if the **frequency** exceeds a level agreed with **AEMO**,

the upper bound of the **operational frequency tolerance band** to the upper bound of the **extreme frequency excursion tolerance limits** (including an "island" condition) for at least the **transient frequency time**,

unless the rate of change of **frequency** is outside the range of -2 Hz to 2 Hz per second for more than 0.25 seconds, -1 Hz to 1 Hz per second for more than one second or such other range as determined by the **Reliability Panel** from time to time.

Note:

The **minimum access standard** is illustrated in the following diagram. To the extent of any inconsistency between the diagram and paragraph (c), paragraph (c) prevails.



Negotiated access standard

- (d) A *negotiated access standard* can be accepted by the *Network Service Provider* provided that *AEMO* and the *Network Service Provider* agree that the *frequency* would be unlikely to fall below the lower bound of the operational *frequency* tolerance band as a result of over-*frequency* tripping of *generating units*.

CLAUSE

S5.2.5.4 Generating system response to voltage disturbances

Automatic access standard

- (a) The *automatic access standard* is a *generating system* and each of its *generating units* must be capable of *continuous uninterrupted operation* where a *power system* disturbance causes the *voltage* at the *connection point* to vary within the following ranges:
- (1) over 130% of *normal voltage* for a period of at least 0.02 seconds after T(ov);
 - (2) 125% to 130% of *normal voltage* for a period of at least 0.2 seconds after T(ov);

- (3) 120% to 125% of *normal voltage* for a period of at least 2.0 seconds after T(ov);
- (4) 115% to 120% of *normal voltage* for a period of at least 20.0 seconds after T(ov);
- (5) 110% to 115% of *normal voltage* for a period of at least 20 minutes after T(ov);
- (6) 90% to 110% of *normal voltage* continuously;
- (7) 80% to 90% of *normal voltage* for a period of at least 10 seconds after T(uv); and
- (8) 70% to 80% of *normal voltage* for a period of at least 2 seconds after T(uv),

where T(ov) means a point in time when the *voltage* at the *connection point* first varied above 110% of *normal voltage* before returning to between 90% and 110% of *normal voltage*, and T(uv) means a point in time when the *voltage* at the *connection point* first varied below 90% of *normal voltage* before returning to between 90% and 110% of *normal voltage*.

Minimum access standard

- (b) The *minimum access standard* is a *generating system* including all operating *generating units* must be capable of *continuous uninterrupted operation* where a *power system* disturbance causes the *voltage* at the *connection point* to vary within the following ranges:
 - (1) 115% to 120% of *normal voltage* for a period of at least 0.1 seconds after T(ov);
 - (2) 110% to 115% of *normal voltage* for a period of at least 0.9 seconds after T(ov);
 - (3) 90% to 110% of *normal voltage* continuously, provided that the ratio of *voltage* to *frequency* (as measured at the *connection point* and expressed as a percentage of *normal voltage* and a percentage of 50 Hz) does not exceed:
 - (i) a value of 1.15 for more than 2 minutes; or
 - (ii) a value of 1.10 for more than 10 minutes;

- (4) 80% to 90% of *normal voltage* for a period of at least 5 seconds after T(uv); and
- (5) 70% to 80% of *normal voltage* for a period of at least 2 seconds after T(uv),

where T(ov) means a point in time when the *voltage* at the *connection point* first varied above 110% of *normal voltage* before returning to between 90% and 110% of *normal voltage*, and T(uv) means a point in time when the *voltage* at the *connection point* first varied below 90% of *normal voltage* before returning to between 90% and 110% of *normal voltage*.

Negotiated access standard

- (c) In negotiating a *negotiated access standard*, a *generating system* and each of its operating *generating units* must be capable of *continuous uninterrupted operation* for the range of *voltages* specified in the *automatic access standard*, except where *AEMO* and the *Network Service Provider* agree that the total reduction of *generation* in the *power system* as a result of any *voltage* excursion within levels specified by the *automatic access standard* would not exceed 100 MW, or a greater limit based on what *AEMO* and the *Network Service Provider* both consider to be reasonable in the circumstances.
- (d) In carrying out assessments of proposed *negotiated access standards* under this clause S5.2.5.4, *AEMO* and the *Network Service Provider* must at a minimum, in addition to the requirements of clauses [5.3.4A\(d1\)](#) and [5.3.4A\(g\)](#) respectively, take into account:
 - (1) the expected performance of existing *networks* and *considered projects*; and
 - (2) the expected performance of existing *generating plant* and other relevant projects.
- (e) **[Deleted]**

General requirement

- (f) The *access standard* must include any operational arrangements necessary to ensure the *generating system* and each of its *generating units* will meet its agreed performance levels under abnormal *network* or *generating system* conditions.

Generating system response to disturbances following contingency events

- (a) In this clause S5.2.5.5 a fault includes a fault of the relevant type having a metallic conducting path.

Automatic access standard

- (b) The *automatic access standard* is:
- (1) for a *generating system* and each of its *generating units*, the requirements of paragraphs (c) and (d);
 - (2) for a *generating system* comprised solely of *synchronous generating units*, the requirements of paragraph (e);
 - (3) for a *generating system* comprised solely of *asynchronous generating units*, the requirements of paragraphs (f) to (i); and
 - (4) for a *generating system* comprised of *synchronous generating units* and *asynchronous generating units*:
 - (i) for that part of the *generating system* comprised of *synchronous generating units*, the requirements of paragraph (e); and
 - (ii) for that part of the *generating system* comprised of *asynchronous generating units*, the requirements of paragraphs (f) to (i).

All generating systems

- (c) A *generating system* and each of its *generating units* must remain in *continuous uninterrupted operation* for any disturbance caused by:
- (1) a *credible contingency event*;
 - (2) a three phase fault in a *transmission system* cleared by all relevant primary *protection systems*;
 - (3) a two phase to ground, phase to phase or phase to ground fault in a *transmission system* cleared in:
 - (i) the longest time expected to be taken for a relevant *breaker fail protection system* to clear the fault; or

- (ii) if a *protection system* referred to in subparagraph (i) is not installed, the greater of the time specified in column 4 of Table S5.1a.2 (or if none is specified, 430 milliseconds) and the longest time expected to be taken for all relevant primary *protection systems* to clear the fault; or
- (4) a three phase, two phase to ground, phase to phase or phase to ground fault in a *distribution network* cleared in:
- (i) the longest time expected to be taken for the *breaker fail protection system* to clear the fault; or
 - (ii) if a *protection system* referred to in subparagraph (i) is not installed, the greater of 430 milliseconds and the longest time expected to be taken for all relevant primary *protection systems* to clear the fault,

provided that the event is not one that would *disconnect* the *generating unit* from the *power system* by removing *network elements* from service.

- (d) A *generating system* and each of its *generating units* must remain in *continuous uninterrupted operation* for a series of up to 15 disturbances within any five minute period caused by any combination of the events described in paragraph (c) where:
- (1) up to six of the disturbances cause the *voltage* at the *connection point* to drop below 50% of *normal voltage*;
 - (2) in parts of the *network* where three-phase automatic reclosure is permitted, up to two of the disturbances are three phase faults, and otherwise, up to one three phase fault where *voltage* at the *connection point* drops below 50% of *normal voltage*;
 - (3) up to one disturbance is cleared by a *breaker fail protection system* or similar back-up *protection system*;
 - (4) up to one disturbance causes the *voltage* at the *connection point* to vary within the ranges under [clause S5.2.5.4\(a\)\(7\)](#) and (a)(8);
 - (5) the minimum clearance from the end of one disturbance and commencement of the next disturbance may be zero milliseconds; and

- (6) all remaining disturbances are caused by faults other than three phase faults,

provided that none of the events would result in:

- (7) the islanding of the *generating system* or cause a material reduction in *power transfer capability* by removing *network elements* from service;
- (8) the cumulative time that *voltage* at the *connection point* is lower than 90% of *normal voltage* exceeding 1,800 milliseconds within any five minute period; or
- (9) the time integral, within any five minute period, of the difference between 90% of *normal voltage* and the *voltage* at the *connection point* when the *voltage* at the *connection point* is lower than 90% of *normal voltage* exceeding 1 pu second.

Synchronous generating systems

- (e) Subject to any changed *power system* conditions or energy source availability beyond the *Generator's* reasonable control, a *generating system* comprised of *synchronous generating units*, in respect of the types of fault described in subparagraphs (c)(2) to (4), must supply to or absorb from the *network*:
 - (1) to assist the maintenance of *power system voltages* during the fault, capacitive reactive current of at least the greater of its pre-disturbance reactive current and 4% of the *maximum continuous current* of the *generating system* including all operating *synchronous generating units* (in the absence of a disturbance) for each 1% reduction (from the level existing just prior to the fault) of *connection point voltage* during the fault;
 - (2) after clearance of the fault, *reactive power* sufficient to ensure that the *connection point voltage* is within the range for *continuous uninterrupted operation* under [clause S5.2.5.4](#); and
 - (3) from 100 milliseconds after clearance of the fault, *active power* of at least 95% of the level existing just prior to the fault.

Asynchronous generating systems

- (f) Subject to any changed *power system* conditions or energy source availability beyond the *Generator's* reasonable control, a *generating*

system comprised of *asynchronous generating units*, in respect of the types of fault described in subparagraphs (c)(2) to (4), must have *facilities* capable of supplying to or absorbing from the *network*:

- (1) to assist the maintenance of *power system voltages* during the fault:
 - (i) capacitive reactive current in addition to its pre-disturbance level of at least 4% of the *maximum continuous current* of the *generating system* including all operating *asynchronous generating units* (in the absence of a disturbance) for each 1% reduction of *voltage* at the *connection point* below the relevant range in which a reactive current response must commence, as identified in subparagraph (g)(1), with the *performance standards* to record the required response agreed with *AEMO* and the *Network Service Provider*; and
 - (ii) inductive reactive current in addition to its pre-disturbance level of at least 6% of the *maximum continuous current* of the *generating system* including all operating *asynchronous generating units* (in the absence of a disturbance) for each 1% increase of *voltage* at the *connection point* above the relevant range in which a reactive current response must commence, as identified in subparagraph (g)(1), with the *performance standards* to record the required response agreed with *AEMO* and the *Network Service Provider*,

during the disturbance and maintained until *connection point voltage* recovers to between 90% and 110% of *normal voltage*, or such other range agreed with the *Network Service Provider* and *AEMO*, except for *voltages* below the relevant threshold identified in paragraph (h); and
 - (2) from 100 milliseconds after clearance of the fault, *active power* of at least 95% of the level existing just prior to the fault.
- (g) For the purpose of paragraph (f):
- (1) the *generating system* must commence a response when the *voltage* is in an under-voltage range of 85% to 90% or an over-voltage range of 110% to 115% of *normal voltage*. These ranges may be varied with the agreement of the *Network Service Provider* and *AEMO* (provided the magnitude of the range between the upper and lower bounds remains at $\Delta 5\%$); and

- (2) the reactive current response must have a *rise time* of no greater than 40 milliseconds and a *settling time* of no greater than 70 milliseconds and must be *adequately damped*.
- (h) Despite paragraph (f), a *generating system* is not required to provide a capacitive reactive current response in accordance with subparagraph (f)(1)(i) where:
- (1) the *generating system* is directly *connected* to the *power system* with no step-up or *connection transformer*; and
 - (2) *voltage* at the *connection point* is 5% or lower of *normal voltage*.
- (i) Subject to paragraph (h), despite the amount of reactive current injected or absorbed during *voltage* disturbances, and subject to thermal limitations and energy source availability, a *generating system* must make available at all times:
- (1) sufficient current to maintain rated apparent power of the *generating system* including all operating *generating units* (in the absence of a disturbance), for all *connection point voltages* above 115% (or otherwise, above the over-voltage range agreed in accordance with subparagraph (g)(1)); and
 - (2) the *maximum continuous current* of the *generating system* including all operating *generating units* (in the absence of a disturbance) for all *connection point voltages* below 85% (or otherwise, below the under-voltage range agreed in accordance with subparagraph (g)(1)),

except that *AEMO* and the *Network Service Provider* may agree limits on active current injection where required to maintain *power system security* and/or the quality of *supply* to other *Network Users*.

Minimum access standard

- (j) The *minimum access standard* is:
- (1) for a *generating system* and each of its *generating units*, the requirements of paragraphs (k) and (l);
 - (2) for a *generating system* comprised solely of *synchronous generating units*, the requirements of paragraph (m);
 - (3) for a *generating system* comprised solely of *asynchronous generating units*, the requirements of paragraphs (n) to (p); and

- (4) for a *generating system* comprised of *synchronous generating units* and *asynchronous generating units*:
 - (i) for that part of the *generating system* comprised of *synchronous generating units*, the requirements of paragraph (m); and
 - (ii) for that part of the *generating system* comprised of *asynchronous generating units*, the requirements of paragraphs (n) to (p).

All generating systems

- (k) A *generating system* and each of its *generating units* must remain in *continuous uninterrupted operation* for any disturbance caused by:

- (1) a *credible contingency event*; or
- (2) a single phase to ground, phase to phase or two phase to ground fault in a *transmission system* or *distribution network* cleared in the longest time expected to be taken for all relevant primary *protection systems* to clear the fault, unless *AEMO* and the *Network Service Provider* agree that the total reduction of *generation* in the *power system* due to that fault would not exceed 100 MW, or a greater limit based on what *AEMO* and the *Network Service Provider* both consider to be reasonable in the circumstances,

provided that the event is not one that would *disconnect* the *generating unit* from the *power system* by removing *network elements* from service.

- (l) A *generating system* and each of its *generating units* must remain in *continuous uninterrupted operation* for a series of up to six disturbances within any five minute period caused by any combination of the events described in paragraph (k) where:
 - (1) up to three of the disturbances cause the *voltage* at the *connection point* to drop below 50% of *normal voltage*;
 - (2) up to one disturbance causes the *voltage* at the *connection point* to vary within the ranges agreed by *AEMO* and the *Network Service Provider* under [clause S5.2.5.4\(a\)\(7\)](#), (a)(8), (b)(4) or (b)(5) (as appropriate);

- (3) the time difference between the clearance of one disturbance and commencement of the next disturbance exceeds 200 milliseconds;
 - (4) no more than three of the disturbances occur within 30 seconds; and
 - (5) all disturbances are caused by faults other than three phase faults, provided that none of the events would result in:
 - (6) the islanding of the *generating system* or cause a material reduction in *power transfer capability* by removing *network elements* from service;
 - (7) the cumulative time that *voltage* at the *connection point* is lower than 90% of *normal voltage* exceeding 1,000 milliseconds within any five minute period; or
 - (8) the time integral, within any five minute period, of the difference between 90% of *normal voltage* and the *voltage* at the *connection point* when the *voltage* at the *connection point* is lower than 90% of *normal voltage* exceeding 0.5 pu second,
- and there is a minimum of 30 minutes where no disturbances occur following a five minute period of multiple disturbances.

Synchronous generating systems

- (m) Subject to any changed *power system* conditions or energy source availability beyond the *Generator's* reasonable *control* after clearance of the fault, a *generating system* comprised of *synchronous generating units*, in respect of the types of fault described in subparagraph (k)(2) must:
 - (1) deliver *active power* to the *network*, and supply or absorb leading or lagging *reactive power*, sufficient to ensure that the *connection point voltage* is within the range for *continuous uninterrupted operation* agreed under [clause S5.2.5.4](#); and
 - (2) return to at least 95% of the pre-fault *active power* output, after clearance of the fault, within a period of time agreed by the *Connection Applicant, AEMO* and the *Network Service Provider*.

Asynchronous generating systems

- (n) Subject to any changed *power system* conditions or energy source availability beyond the *Generator's* reasonable control, a *generating system* comprised of *asynchronous generating units* must:
- (1) for the types of fault described in subparagraph (k)(2), and to assist the maintenance of *power system voltages* during the fault, have *facilities* capable of supplying to or absorbing from the *network*:
- (i) capacitive reactive current in addition to its pre-disturbance level of a percentage greater than 0% of the *maximum continuous current* of the *generating system* including all operating *asynchronous generating units* (in the absence of a disturbance) for each 1% reduction of *voltage* at the *connection point* below the relevant point at which a reactive current response must commence, as identified in or agreed under paragraph (o)(1); and
- (ii) inductive reactive current in addition to its pre-disturbance level of a percentage greater than 0% of the *maximum continuous current* of the *generating system* including all operating *asynchronous generating units* (in the absence of a disturbance) for each 1% increase of *voltage* at the *connection point* above the relevant point at which a reactive current response must commence, as identified in or agreed under paragraph (o)(1),
- during the disturbance and maintained until *connection point voltage* recovers to between 90% and 110% of *normal voltage*, or such other range agreed with the *Network Service Provider* and *AEMO*, except for *voltages* below the relevant threshold identified in paragraph (p); and
- (2) return to at least 95% of:
- (i) the pre-fault *active power* output; or
- (ii) during a frequency disturbance, a level of *active power* output consistent with the *generating system's performance standard* under [clause S5.2.5.11](#),

after clearance of the fault and recovery of positive sequence *voltage* at the *connection point* to remain between 90% and 110% of *normal voltage*, within a period agreed by the *Connection*

Applicant, AEMO and the *Network Service Provider*, which period may differ according to the type of fault.

(o) For the purpose of paragraph (n):

(1) the *generating system* must commence a response when the *voltage*:

(i) falls to a threshold of 80% of *normal voltage* or other percentage threshold agreed with *AEMO* and the *Network Service Provider*; or

(ii) increases to a threshold of 120% of *normal voltage* or other percentage threshold agreed with *AEMO* and the *Network Service Provider*,

and in each case may commence a response before the threshold is reached;

(2) **[Deleted]**;

(2A) the response initiating conditions must be agreed with *AEMO* and the *Network Service Provider*;

(3) the reactive current *rise time* must be no longer than 80 milliseconds or a longer time agreed to by the *Network Service Provider* and *AEMO*;

(4) the reactive current response must be adequately controlled;

(5) the reactive current response must commence within a period after the response initiating condition of:

(i) 40 milliseconds; or

(ii) a longer time agreed to by the *Network Service Provider* and *AEMO*; and

(6) the time when the reactive current response commences may be measured at either:

(i) the *connection point*; or

(ii) if agreed by the *Network Service Provider* and *AEMO*, the *generating unit* terminals or a point between the *generating unit* terminals and the *connection point*.

- (o1) For the purposes of paragraphs (n) and (o), the *performance standards* must record:
- (1) the range applicable for subparagraph (n)(1);
 - (2) the period agreed for subparagraph (n)(2), where applicable for each type of fault;
 - (3) for subparagraph (o)(1), the percentage thresholds;
 - (4) for subparagraph (o)(2A), the response initiating condition;
 - (5) for subparagraph (o)(3), the reactive current *rise time*;
 - (6) for subparagraph (o)(5), the required response time; and
 - (7) for subparagraph (o)(6), where the time of commencement is to be measured.
- (p) Despite paragraph (n), a *generating system* is not required to provide a capacitive reactive current response in accordance with subparagraph (n)(1)(i) where:
- (1) *voltage* at the *connection point* is 15% or lower of *normal voltage*; or
 - (2) where the *generating system* is directly *connected* to the *power system* with no step-up or *connection transformer*, *voltage* at the *connection point* is 20% or lower of *normal voltage*.

Provision of minimum access standard

- (p1) For the purposes of providing *minimum access standards* under clauses [5.3.3\(b1\)\(4\)](#) and S5.4B(b)(2) in respect of reactive current response, and for the purposes of [clause 5.3.4A\(b\)](#), a *Network Service Provider* may provide the times in paragraphs (o)(3) and (o)(5)(i) or other longer times it may be prepared to agree.
- (p2) For the purposes of [clause 5.3.4A](#), and subject to clauses [5.3.4A\(b1\)](#) and [5.3.4A\(b2\)](#), when proposing a *negotiated access standard* in respect of reactive current response, the *Connection Applicant* may propose the times in paragraphs (o)(3) and (o)(5)(i) or other longer times it is seeking to agree.
- (p3) A *negotiated access standard* with a lower standard or longer time agreed to by the *Network Service Provider* and *AEMO* in accordance with paragraph (o) is taken to satisfy the requirements of [clause](#)

[5.3.4A\(b\)\(1\)](#) for a *negotiated access standard* to be no less onerous than the corresponding *minimum access standard* provided by the *Network Service Provider* under clauses [5.3.3\(b1\)\(4\)](#) or S5.4B(b)(2).

Negotiated access standard

- (q) In carrying out assessments of proposed *negotiated access standards* under this clause S5.2.5.5, the *Network Service Provider* and *AEMO* must take into account, without limitation:
- (1) the expected performance of:
 - (i) existing *networks* and *considered projects*;
 - (ii) existing *generating plant* and other relevant projects; and
 - (iii) *control systems* and *protection systems*, including auxiliary systems and *automatic reclose equipment*; and
 - (2) the expected range of *power system* operating conditions.
- (r) A proposed *negotiated access standard* may be accepted if the *connection* of the *plant* at the proposed access level would not cause other *generating plant* or *loads* to trip as a result of an event, when they would otherwise not have tripped for the same event.
- (r1) In carrying out assessments of proposed *negotiated access standards* under this clause S5.2.5.5 where the *Connection Applicant* has elected in accordance with [clause 5.3.4B\(b1\)](#) to pay the *system strength charge* in relation to the *connection*, the *Network Service Provider* and *AEMO* must take into account the performance required to be provided by the *System Strength Service Provider* at the relevant *system strength node* in accordance with [clause S5.1.14](#).

General requirement

All generating systems

- (s) The *performance standard* must include any operational arrangements to ensure the *generating system* including all operating *generating units* will meet its agreed performance levels under abnormal *network* or *generating system* conditions.
- (t) When assessing multiple disturbances, a fault that is re-established following operation of *automatic reclose equipment* shall be counted as a separate disturbance.

Asynchronous generating systems

- (u) For the purpose of paragraphs (f) and (n):
 - (1) the reactive current contribution may be limited to the *maximum continuous current* of a *generating system*, including its operating *asynchronous generating units*;
 - (1A) the reactive current contribution must not contribute excessively to *voltage* rise on unfaulted phases during unbalanced faults;
 - (2) the reactive current contribution and *voltage* deviation described may be measured at a location other than the *connection point* (including within the relevant *generating system*) where agreed with *AEMO* and the *Network Service Provider*, in which case the level of injection and absorption will be assessed at that agreed location;
 - (3) the reactive current contribution required may be calculated using phase to phase, phase to ground or sequence components of *voltages*. The ratio of the negative sequence to positive sequence components of the reactive current contribution must be agreed with *AEMO* and the *Network Service Provider* for the types of disturbances listed in this clause S5.2.5.5; and
 - (4) the *performance standards* must record:
 - (i) all conditions (which may include temperature) considered relevant by *AEMO* and the *Network Service Provider* under which the reactive current response is required; and
 - (ii) the maximum reactive current contribution to each phase.

Synchronous generating systems and units

- (v) For a *generating system* comprised solely of *synchronous generating units*, the reactive current contribution may be limited to 250% of the *maximum continuous current* of the *generating system*.
- (w) For a *synchronous generating unit* within a *generating system* (other than a *generating system* described in paragraph (v)), the reactive current contribution may be limited to 250% of the *maximum continuous current* of that *synchronous generating unit*.

Minimum access standard

The *minimum access standard* is a *generating system* including each of its operating *generating units* and *reactive plant*, must not *disconnect* from the *power system* as a result of *voltage* fluctuation, harmonic *voltage* distortion and *voltage* unbalance conditions at the *connection point* within the levels specified in [clauses S5.1a.5](#), S5.1a.6 and S5.1a.7.

CLAUSE

S5.2.5.7 Partial load rejection

- (a) For the purposes of this clause S5.2.5.7 **minimum generation** means minimum *sent out generation* for continuous stable operation.
- (b) [Deleted]

Automatic access standard

- (c) The *automatic access standard* is a *generating system* must be capable of *continuous uninterrupted operation* during and following a *power system load* reduction of 30% from its pre-disturbance level or equivalent impact from separation of part of the *power system* in less than 10 seconds, provided that the *loading level* remains above minimum generation.

Minimum access standard

- (d) The *minimum access standard* is a *generating system* must be capable of *continuous uninterrupted operation* during and following a *power system load* reduction of 5% or equivalent impact from separation of part of the *power system* in less than 10 seconds provided that the *loading level* remains above minimum generation.

[Deleted]

(e) [Deleted]

(f) [Deleted]

General requirements

- (g) The agreed partial load rejection performance must be recorded in the *performance standards*.

CLAUSE

S5.2.5.8 Protection of generating systems from power system disturbances

Minimum access standard

- (a) The *minimum access standard* is:
- (1) subject to subparagraph (2) and paragraph (e), for a *generating system* or any of its *generating units* that is required by a *Generator* or *Network Service Provider* to be automatically *disconnected* from the *power system* in response to abnormal conditions arising from the *power system*, the relevant *protection system* or *control system* must not *disconnect* the *generating system* for:
 - (i) conditions for which it must remain in *continuous uninterrupted operation*; or
 - (ii) conditions it must withstand under the *Rules*; and
 - (2) a *generating system* with a *nameplate rating* of 30MW or more, or *generating system* comprised of *generating units* with a combined *nameplate rating* of 30 MW or more, *connected* to a *transmission system* must have *facilities* to automatically and rapidly reduce its *generation*:
 - (i) by at least half, if the *frequency* at the *connection point* exceeds a level nominated by *AEMO* (not less than the upper limit of the *operational frequency tolerance band*) and the duration above this *frequency* exceeds a value nominated by *AEMO* where the reduction may be achieved:
 - (A) by reducing the output of the *generating system* within 3 seconds, and holding the output at the reduced level until the *frequency* returns to within the *normal operating frequency band*; or
 - (B) by disconnecting the *generating system* from the *power system* within 1 second; or
 - (ii) in proportion to the difference between the *frequency* at the *connection point* and a level nominated by *AEMO* (not less than the upper limit of the *operational frequency tolerance band*), such that the *generation* is reduced by at least half, within 3 seconds of the *frequency* reaching the upper limit of the *extreme frequency excursion tolerance limits*.

[Deleted]

(b) [Deleted]

General requirements

- (c) *AEMO* or the *Network Service Provider* may require that an *access standard* include a requirement for the *generating system* to be automatically *disconnected* by a local or remote *control* scheme whenever the part of the *network* to which it is *connected* has been *disconnected* from the *national grid*, forming an island that *supplies* a *Customer*.
- (d) The *access standard* must include specification of conditions for which the *generating unit* or *generating system* must trip and must not trip.
- (e) Notwithstanding [clauses S5.2.5.3](#), S5.2.5.4, S5.2.5.5, S5.2.5.6 and S5.2.5.7, a *generating system* may be automatically *disconnected* from the *power system* under any of the following conditions:
- (1) in accordance with an *ancillary services agreement* between the *Generator* and *AEMO*;
 - (2) where a *load* that is not part of the *generating system* has the same *connection point* as the *generating system* and *AEMO* and the *Network Service Provider* agree that the *disconnection* would in effect be under-frequency *load shedding*;
 - (3) where the *generating system* is automatically *disconnected* under paragraph (a), [clause S5.2.5.9](#) or by an *emergency frequency control scheme*;
 - (4) where the *generating system* is automatically *disconnected* under [clause S5.2.5.10](#); or
 - (5) in accordance with an agreement between the *Generator* and a *Network Service Provider* (including an agreement in relation to an *emergency control* scheme under [clause S5.1.8](#)) to provide a service that *AEMO* agrees is necessary to maintain or restore *power system security* in the event of a specified *contingency event*.
- (f) 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**Automatic access standard**

- (a) The *automatic access standard* is:
- (1) subject to clauses [S5.1.9\(k\)](#) and [S5.1.9\(l\)](#), primary *protection systems* must be provided to *disconnect* from the *power system* any faulted element in a *generating system* and in protection zones that include the *connection point* within the applicable *fault clearance time* determined under [clause S5.1.9\(a\)\(1\)](#);
 - (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; and
 - (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) In relation to an *automatic access standard* under this clause S5.2.5.9, the *Generator* must provide redundancy in the primary *protection systems* under paragraph (a)(2) and provide *breaker fail protection systems* under paragraph (a)(3) if *AEMO* or the *Network Service Provider* consider that a lack of these *facilities* could result in:
- (1) a material adverse impact on *power system security* or quality of *supply* to other *Network Users*; or
 - (2) a reduction in *inter-regional* or *intra-regional power transfer capability*,
- through any mechanism including:
- (3) consequential tripping of, or damage to, other *network* equipment or *facilities* of other *Network Users*, that would have a *power system security* impact; or
 - (4) instability that would not be detected by other *protection systems* in the *network*.

Minimum access standard

- (c) The *minimum access standard* is:
- (1) subject to clauses [S5.1.9\(k\)](#) and [S5.1.9\(l\)](#), *protection systems* must be provided to *disconnect* from the *power system* any faulted element within a *generating system* and in protection zones that include the *connection point* within the applicable *fault clearance time* determined under [clause S5.1.9\(a\)\(2\)](#); and
 - (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\(a\)\(3\)](#).

[Deleted]

(d) [Deleted]

General requirements

- (e) The *Network Service Provider* and the *Generator* must cooperate in the design and implementation of *protection systems* to comply with this clause S5.2.5.9, including cooperation on:
- (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;
 - (2) tripping of one party's circuit breakers by a *protection system* of the other party; and
 - (3) co-ordination of *protection system* settings to ensure inter-operation.
- (f) The *protection system* design referred to in paragraphs (a) and (c) must:
- (1) be coordinated with other *protection systems*;
 - (2) avoid consequential *disconnection* of other *Network Users' facilities*; and

- (3) take into account existing obligations of the *Network Service Provider* under *connection agreements* with other *Network Users*.

CLAUSE

S5.2.5.10 Protection to trip plant for unstable operation

Automatic access standard

- (a) The *automatic access standard* is a *generating system* must have:
 - (1) for its *synchronous generating units*, a *protection system* to *disconnect* it promptly when a condition that would lead to pole slipping is detected, to prevent pole slipping or other conditions where a *generating unit* causes *active power*, *reactive power* or *voltage* at the *connection point* to become unstable as assessed in accordance with the *power system* stability guidelines established under [clause 4.3.4\(h\)](#); and
 - (2) for its *asynchronous generating units*, a *protection system* to *disconnect* it promptly for conditions where the *active power*, *reactive power* or *voltage* at the *connection point* becomes unstable as assessed in accordance with the guidelines for *power system* stability established under [clause 4.3.4\(h\)](#).

Minimum access standard

- (b) The *minimum access standard* is a *generating system* must not cause a *voltage* disturbance at the *connection point* due to sustained unstable behaviour of more than the maximum level specified in Table 7 of *Australian Standard* AS/NZS 61000.3.7:2001.

Negotiated access standard

- (c) If the *Network Service Provider* and the *Generator* agree, a *protection system* may also trip any other part of the *generating system* to cease the instability.
- (d) Notwithstanding paragraph (c), a *protection system* must be provided in the *access standard* to trip the affected *generating unit* where:
 - (1) the *Network Service Provider* considers it necessary to prevent consequential tripping of, or damage to, other *generating units*, *network* equipment or other *Network Users' facilities*, or

- (2) *AEMO* considers it necessary to prevent unstable operation having an adverse impact on *power system security*.

CLAUSE

S5.2.5.11 Frequency control

- (a) For the purpose of this clause S5.2.5.11:

droop means, in relation to *frequency response mode*, the percentage change in *power system frequency* as measured at the *connection point*, divided by the percentage change in *power transfer* of the *generating system* expressed as a percentage of the *maximum operating level* of the *generating system*. Droop must be measured at *frequencies* that are outside the deadband and within the limits of *power transfer*.

maximum operating level means in relation to:

- (1) a *non-scheduled generating unit*, the maximum *sent out generation* consistent with its *nameplate rating*;
- (2) a *scheduled generating unit* or *semi-scheduled generating unit*, the maximum *generation* to which it may be *dispatched* and as provided to *AEMO* in the most recent *bid and offer validation data*;
- (3) a *non-scheduled generating system*, the combined maximum *sent out generation* consistent with the *nameplate ratings* of its in-service *generating units*; and
- (4) a *scheduled generating system* or *semi-scheduled generating system*, the combined maximum *generation* to which its in-service *generating units* may be *dispatched* and as provided to *AEMO* in the most recent *bid and offer validation data*.

minimum operating level means in relation to:

- (1) a *non-scheduled generating unit*, its minimum *sent out generation* for continuous stable operation;
- (2) a *scheduled generating unit* or *semi-scheduled generating unit*, its minimum *sent out generation* for continuous stable operation;
- (3) a *non-scheduled generating system*, the combined *minimum operating level* of its in-service *generating units*; and

- (4) a *scheduled generating system* or *semi-scheduled generating system*, the combined minimum *sent out generation* of its in-service *generating units*.

Automatic access standard

(b) The *automatic access standard* is:

- (1) a *generating system's power transfer* to the *power system* must not:
 - (i) increase in response to a rise in the *frequency* of the *power system* as measured at the *connection point*; or
 - (ii) decrease in response to a fall in the *frequency* of the *power system* as measured at the *connection point*; and
- (2) a *generating system* must be capable of operating in *frequency response mode* such that it automatically provides a proportional:
 - (i) decrease in *power transfer* to the *power system* in response to a rise in the *frequency* of the *power system* as measured at the *connection point*; and
 - (ii) increase in *power transfer* to the *power system* in response to a fall in the *frequency* of the *power system* as measured at the *connection point*,

sufficiently rapidly and sustained for a sufficient period for the *Generator* to be in a position to offer measurable amounts of all *market ancillary services* for the provision of *power system frequency control*.

Note

[Clause 4.4.2\(b\)](#) of the *Rules* sets out the obligations on *Generators* in relation to compliance with the technical requirements in [clause S5.2.5.11](#), including being capable of operating in *frequency response mode*. [Clause 4.4.2\(c1\)](#) of the *Rules* sets out the obligations on *Scheduled* and *Semi-Scheduled Generators* in relation to the operation of their *generating systems* in accordance with the *Primary Frequency Response Requirements*.

Minimum access standard

(c) The *minimum access standard* is:

- (1) for a *generating system* under relatively stable input energy, *power transfer* to the *power system* must not:

- (i) increase in response to a rise in the *frequency* of the *power system* as measured at the *connection point*; and
 - (ii) decrease more than 2% per Hz in response to a fall in the *frequency* of the *power system* as measured at the *connection point*; and
- (2) a *generating system* must be capable of operating in *frequency response mode* such that, subject to energy source availability, it automatically provides:
- (i) a decrease in *power transfer* to the *power system* in response to a rise in the *frequency* of the *power system* as measured at the *connection point*; or
 - (ii) an increase in *power transfer* to the *power system* in response to a fall in the *frequency* of the *power system* as measured at the *connection point*,

where the change in *active power* is either proportional or otherwise as agreed with *AEMO* and the *Network Service Provider*.

Note

[Clause 4.4.2\(b\)](#) of the *Rules* sets out the obligations on *Generators* in relation to compliance with the technical requirements in [clause S5.2.5.11](#), including being capable of operating in *frequency response mode*. [Clause 4.4.2\(c1\)](#) of the *Rules* sets out the obligations on *Scheduled* and *Semi-Scheduled Generators* in relation to the operation of their *generating systems* in accordance with the *Primary Frequency Response Requirements*.

[Deleted]

(d) **[Deleted]**

(e) **[Deleted]**

(f) **[Deleted]**

General requirements

(g) Each *control system* used to satisfy this clause S5.2.5.11 must be *adequately damped*.

(h) The amount of a relevant *market ancillary service* for which the *plant* may be registered must not exceed the amount that would be

consistent with the *performance standard* registered in respect of this requirement.

- (i) For the purposes of subparagraph (b)(2), and with respect to a *negotiated access standard* proposed for the technical requirements relevant to this clause S5.2.5.11:
 - (1) the change in *power transfer* to the *power system* must occur with no delay beyond that required for stable operation, or inherent in the *plant* controls, once the *frequency* of the *power system* as measured at the *connection point* leaves a deadband around 50 Hz;
 - (2) a *generating system* must be capable of setting the deadband and *droop* within the following ranges:
 - (i) the deadband referred to in subparagraph (1) must be set within the range of 0 to ± 1.0 Hz. Different deadband settings may be applied for a rise or fall in the *frequency* of the *power system* as measured at the *connection point*; and
 - (ii) the *droop* must be set within the range of 2% to 10%, or such other settings as agreed with the *Network Service Provider* and *AEMO*;
 - (3) nothing in subparagraph (b)(2) is taken to require a *generating system* to operate below its *minimum operating level* in response to a rise in the *frequency* of the *power system* as measured at the *connection point*, or above its *maximum operating level* in response to a fall in the *frequency* of the *power system* as measured at the *connection point*;
 - (4) **[Deleted]**
 - (5) the *performance standards* must record:
 - (i) agreed values for *maximum operating level* and *minimum operating level*, and where relevant the method of determining the values, and the values for a *generating system* must take into account its in-service *generating units*; and
 - (ii) for the purpose of subparagraph (b)(2), or a *negotiated access standard* offering measureable amounts of *market ancillary services* under this clause S5.2.5.11, the *market ancillary services*, including the performance parameters and

requirements that apply to each such *market ancillary service*.

CLAUSE

S5.2.5.12 Impact on network capability

Automatic access standard

- (a) The *automatic access standard* is a *generating system* must have *plant* capabilities and *control systems* that are sufficient so that when *connected* it does not reduce any *inter-regional* or *intra-regional power transfer capability* below the level that would apply if the *generating system* were not *connected*.

Minimum access standard

- (b) The *minimum access standard* is a *generating system* must have *plant* capabilities, *control systems* and operational arrangements sufficient to ensure there is no reduction in:
- (1) the ability to *supply Customer load* as a result of a reduction in *power transfer capability*; and
 - (2) *power transfer capabilities* into a region by more than the combined *sent out generation* of its *generating units*.

Negotiated access standard

- (c) In carrying out assessments of proposed *negotiated access standards* under this clause S5.2.5.12, the *Network Service Provider* and *AEMO* must take into account:
- (1) the expected performance of:
 - (i) existing *networks* and *considered projects*;
 - (ii) existing *generating plant* and other relevant projects; and
 - (iii) *control systems* and *protection systems*, including *automatic reclose equipment*; and
 - (2) the expected range of *power system* operating conditions.
- (d) The *negotiated access standard* must include:
- (1) *control systems* to minimise any reduction in *power transfer capabilities*; and

- (2) operational arrangements, including curtailment of the *generating system's* output if necessary to ensure that the *generating plant* is operated in a way that meets at least the *minimum access standard* under abnormal *network* and *generating system* conditions, so that *power system security* can be maintained.
- (e) A *negotiated access standard* under this clause S5.2.5.12 must detail the *plant* capabilities, *control systems* and operational arrangements that will be maintained by the *Generator*, notwithstanding that change to the *power system*, but not changes to the *generating system*, may reduce the efficacy of the *plant* capabilities, *control systems* and operational arrangements over time.
- (f) [Deleted]

General requirement

- (g) If a *Network Service Provider* considers that *power transfer capabilities* of its *network* would be increased through provision of additional *control system facilities* to a *generating system* (such as a *power system* stabiliser), the *Network Service Provider* and the *Generator* may negotiate for the provision of such additional *control system facilities* as a commercial arrangement.

CLAUSE

S5.2.5.13 Voltage and reactive power control

- (a)

[Deleted]

Automatic access standard

- (b) The *automatic access standard* is:
- (1) a *generating system* must have *plant* capabilities and *control systems* sufficient to ensure that:
- (i) *power system* oscillations, for the frequencies of oscillation of the *generating unit* against any other *generating unit*, are *adequately damped*;
- (ii) operation of the *generating system* does not degrade the damping of any critical mode of oscillation of the *power system*; and

- (iii) operation of the *generating system* does not cause instability (including hunting of *tap-changing transformer control systems*) that would adversely impact other *Registered Participants*;
- (2) a *control system* must have:
- (i) for the purposes of disturbance monitoring and testing, permanently installed and operational, monitoring and recording *facilities* for key variables including each input and output; and
 - (ii) *facilities* for testing the *control system* sufficient to establish its dynamic operational characteristics;
- (2A) a *generating system* must have *facilities* with a *control system* to regulate *voltage*, *reactive power* and *power factor*, with the ability to:
- (i) operate in any *control* mode; and
 - (ii) switch between *control* modes,
- as shown in the manufacturer's and/or design specifications of the relevant equipment and demonstrated to the reasonable satisfaction of the *Network Service Provider* and *AEMO*;
- (2B) a *generating system* must have a *voltage control system* that:
- (i) regulates *voltage* at the *connection point* or another agreed location in the *power system* (including within the *generating system*) to within 0.5% of the setpoint, where that setpoint may be adjusted to incorporate any *voltage droop* or reactive current compensation agreed with *AEMO* and the *Network Service Provider*;
 - (ii) regulates *voltage* in a manner that helps to support *network voltages* during faults and does not prevent the *Network Service Provider* from achieving the requirements of [clauses S5.1a.3](#) and S5.1a.4;
 - (iii) allows the *voltage* setpoint to be continuously controllable in the range of at least 95% to 105% of the target *voltage* (as determined by the *Network Service Provider* in accordance with [clause S5.1.4\(c\)](#)) and recorded in the *connection*

agreement in accordance with [clause S5.1.4](#)) at the *connection point* or agreed location on the *power system*, without reliance on a *tap-changing transformer* and subject to the *reactive power* capability agreed with *AEMO* and the *Network Service Provider* under [clause S5.2.5.1](#); and

- (iv) has limiting devices to ensure that a *voltage* disturbance does not cause a *generating unit* to trip at the limits of its operating capability;
- (3) a synchronous *generating system* must have an *excitation control system* that:
- (i) **[Deleted]**
 - (ii) can operate the stator continuously at 105% of *nominal voltage* with *rated active power* output;
 - (iii) **[Deleted]**
 - (iv) **[Deleted]**
 - (v) **[Deleted]**
 - (vi) has an excitation ceiling *voltage* of at least:
 - (A) for a *static excitation system*, 2.3 times; or
 - (B) for other *excitation control systems*, 1.5 times,the excitation required to achieve *generation* at the *nameplate rating* for rated *power factor*, rated speed and *nominal voltage*;
 - (vii) has settling *times* for a step change of *voltage* setpoint or *voltage* at the location agreed under subparagraph (2B)(i) of:
 - (A) generated *voltage* less than 2.5 seconds for a 5% *voltage* disturbance with the *generating unit* not *synchronised*;
 - (B) *active power*, *reactive power* and *voltage* less than 5.0 seconds for a 5% *voltage* disturbance with the *generating unit* *synchronised*, from an operating point where the *voltage* disturbance would not cause any limiting device to operate; and
 - (C) in respect of each limiting device, *active power*, *reactive power* and *voltage* less than 7.5 seconds for a 5% *voltage* disturbance with

the *generating unit synchronised*, when operating into a limiting device from an operating point where a *voltage* disturbance of 2.5% would just cause the limiting device to operate;

- (viii) can increase field *voltage* from rated field *voltage* to the excitation ceiling *voltage* in less than:
 - (A) 0.05 second for a *static excitation system*; or
 - (B) 0.5 second for other *excitation control systems*; and
- (ix) has a *power system* stabiliser with sufficient flexibility to enable damping performance to be maximised, with characteristics as described in paragraph (c);
- (4) a *generating system*, other than one comprised of *synchronous generating units*, must have a *voltage control system* that:
 - (i) [Deleted]
 - (ii) [Deleted]
 - (iii) [Deleted]
 - (iv) [Deleted]
 - (v) with the *generating system connected* to the *power system*, has settling *times* for *active power*, *reactive power* and *voltage* due to a step change of *voltage* setpoint or *voltage* at the location agreed under clause subparagraph (2B)(i), of less than:
 - (A) 5.0 seconds for a 5% *voltage* disturbance with the *generating system connected* to the *power system*, from an operating point where the *voltage* disturbance would not cause any limiting device to operate; and
 - (B) 7.5 seconds for a 5% *voltage* disturbance with the *generating system connected* to the *power system*, when operating into any limiting device from an operating point where a *voltage* disturbance of 2.5% would just cause the limiting device to operate;
 - (vi) has *reactive power* rise time, for a 5% step change in the *voltage* setpoint, of less than 2 seconds; and
 - (vii) has a power oscillation damping capability with sufficient flexibility to enable damping performance to be maximised:

- (A) with characteristics as described in paragraph (c); or
 - (B) where *AEMO* has published characteristics for a *generating system* other than one comprised of *synchronous generating units*, following consultation in accordance with the *Rules consultation procedures*, with characteristics as published by *AEMO*.
- (c) A *power system* stabiliser provided under paragraph (b) must have:
- (1) for a *synchronous generating unit*, measurements of rotor speed and *active power* output of the *generating unit* as inputs, and otherwise, measurements of *power system frequency* and *active power* output of the *generating unit* as inputs;
 - (2) two washout filters for each input, with ability to bypass one of them if necessary;
 - (3) sufficient (and not less than two) lead-lag transfer function blocks (or equivalent number of complex poles and zeros) with adjustable gain and time-constants, to compensate fully for the phase lags due to the *generating plant*;
 - (4) an output limiter, which for a *synchronous generating unit* is continually adjustable over the range of -10% to $+10\%$ of stator *voltage*;
 - (5) monitoring and recording *facilities* for key variables including inputs, output and the inputs to the lead-lag transfer function blocks; and
 - (6) *facilities* to permit testing of the *power system* stabiliser in isolation from the *power system* by injection of test signals, sufficient to establish the transfer function of the *power system* stabiliser.
- (c1) A *reactive power* or *power factor control system* provided under paragraph (b)(2A) must:
- (1) regulate *reactive power* or *power factor* (as applicable) at the *connection point* or another agreed location in the *power system* (including within the *generating system*), to within:
 - (i) for a *generating system* operating in *reactive power* mode, 2% of the rating (in MVA) of the *generating system* (expressed in MVA_r); or

- (ii) for a *generating system* operating in *power factor* mode, a *power factor* equivalent to 2% of the rating (in MVA) of the *generating system* (expressed in MVA_r);
- (2) allow the *reactive power* or *power factor* setpoint to be continuously controllable across the *reactive power* capability range established under [clause S5.2.5.1](#); and
- (3) with the *generating system connected* to the *power system*, and for a step change in setpoint of at least 50% of the *reactive power* capability agreed with *AEMO* and the *Network Service Provider* under [clause S5.2.5.1](#), or a 5% *voltage* disturbance at the location agreed under subparagraph (1):
- (i) have *settling times* for *active power*, *reactive power* and *voltage* of less than 5.0 seconds from an operating point where the *voltage* disturbance would not cause any limiting device to operate; and
 - (ii) have *settling times* for *active power*, *reactive power* and *voltage* of less than 7.5 seconds when operating into any limiting device from an operating point where a *voltage* disturbance of 2.5% would just cause the limiting device to operate.

The *Network Service Provider* may determine whether to use a setpoint step test or a 5% *voltage* disturbance test for the purposes of this subparagraph (c1)(3).

Minimum access standard

- (d) The *minimum access standard* is:
- (1) a *generating system* must have *plant* capabilities and *control systems*, including, if appropriate, a *power system* stabiliser, sufficient to ensure that:
 - (i) *power system* oscillations, for the frequencies of oscillation of the *generating unit* against any other *generating unit*, are *adequately damped*;
 - (ii) operation of the *generating unit* does not degrade:
 - (A) any mode of oscillation that is within 0.3 nepers per second of being unstable, by more than 0.01 nepers per second; and

- (B) any other mode of oscillation to within 0.29 nepers per second of being unstable; and
 - (iii) operation of the *generating unit* does not cause instability (including hunting of *tap-changing transformer control systems*) that would adversely impact other *Registered Participants*;
- (2) a *generating system* comprised of *generating units* with a combined *nameplate rating* of 30 MW or more must have *facilities* for testing its *control systems* sufficient to establish their dynamic operational characteristics;
- (2A) a *generating system* must have *facilities* with a *control system* to regulate:
 - (i) *voltage*; or
 - (ii) either of *reactive power* or *power factor* with the agreement of *AEMO* and the *Network Service Provider*;
- (2B) a *voltage control system* for a *generating system* must:
 - (i) regulate *voltage* at the *connection point* or another agreed location in the *power system* (including within the *generating system*), to within 2% of the setpoint, where that setpoint may be adjusted to incorporate any *voltage droop* or reactive current compensation agreed with *AEMO* and the *Network Service Provider*; and
 - (ii) allow the *voltage* setpoint to be controllable in the range of at least 98% to 102% of the target *voltage* (as determined by the *Network Service Provider* in accordance with [clause S5.1.4\(c\)](#) and recorded in the *connection agreement* in accordance with [clause S5.1.4](#)) at the *connection point* or the agreed location, subject to the *reactive power* capability agreed with *AEMO* and the *Network Service Provider* under [clause S5.2.5.1](#);
- (3) a *generating system's reactive power* or *power factor control system* must:
 - (i) regulate *reactive power* or *power factor* (as applicable) at the *connection point* or another agreed location in the *power system* (including within the *generating system*), to within:

- (A) for a *generating system* operating in *reactive power* mode, 5% of the rating (in MVA) of the *generating system* (expressed in MVA); or
 - (B) for a *generating system* operating in *power factor* mode, a *power factor* equivalent to 5% of the rating (in MVA) of the *generating system* (expressed in MVA); and
- (ii) allow the *reactive power* or *power factor* setpoint to be continuously controllable across the *reactive power* capability range established under [clause S5.2.5.1](#);
- (4) a synchronous *generating system* with a *nameplate rating* of 30 MW or more, with an *excitation control system* required to regulate *voltage* under subparagraph (d)(2A)(i) must:
- (i) **[Deleted]**
 - (ii) have excitation ceiling *voltage* of at least 1.5 times the excitation required to achieve *generation* at the *nameplate rating* for rated *power factor*, rated speed and *nominal voltage*;
 - (iii) subject to co-ordination under paragraph (i), have a *settling time* of less than 7.5 seconds for a 5% *voltage* disturbance with the *generating unit synchronised*, from an operating point where such a *voltage* disturbance would not cause any limiting device to operate; and
 - (iv) have over and under excitation limiting devices sufficient to ensure that a *voltage* disturbance does not cause the *generating unit* to trip at the limits of its operating capability; and
- (5) a *generating system* comprised of *asynchronous generating units* with a *nameplate rating* of 30 MW or more, with a *voltage control system* required to regulate *voltage* under subparagraph (d)(2A)(i) must:
- (i) **[Deleted]**
 - (ii) subject to co-ordination under paragraph (i), have a *settling time* less than 7.5 seconds for a 5% *voltage* disturbance with the *generating unit* electrically connected to the *power system* from an operating point where such a *voltage*

disturbance would not cause any limiting device to operate;
and

- (iii) have limiting devices to ensure that a *voltage* disturbance would not cause the *generating unit* to trip at the limits of its operating capability.

Negotiated access standard

(e) [Deleted]

- (f) The *negotiated access standard* proposed by the *Generator* under [clause 5.3.4A\(b1\)](#) must be the highest level that the *generating system* can reasonably achieve, including by installation of additional dynamic *reactive power* equipment, and through optimising its *control systems*.

(g) [Deleted]

General requirements

- (g1) For the purposes of subparagraph (b)(2A), the *Network Service Provider* and *AEMO* will nominate one or more *control* modes to be implemented when the *generating system* is commissioned, and may require additional *control* modes to be commissioned after *connection* if the *Network Service Provider* or *AEMO* reasonably considers such additional modes to be necessary to ensure *power system security* or quality of *supply*. Where a *generating system* has been commissioned for more than one *control* mode, the *Generator*, *Network Service Provider* and *AEMO* must agree on a procedure for switching between *control* modes. The initial operating mode, other available modes and the procedure for switching between modes must be recorded as part of the *performance standard*.
- (h) A limiting device provided under paragraphs (b) and (d) must:
 - (1) not detract from the performance of any power system stabiliser or power oscillation damping capability; and
 - (2) be co-ordinated with all *protection systems*.
- (i) The *Network Service Provider* may require that the design and operation of the *control systems* of a *generating unit* or *generating system* be coordinated with the existing *voltage control systems* of the *Network Service Provider* and of other *Network Users*, in order to

avoid or manage interactions that would adversely impact on the *Network Service Provider* and other *Network Users*.

- (j) Any requirements imposed by the *Network Service Provider* under paragraph (i) must be recorded in the *performance standard*.
- (k) The assessment of impact of the *generating units* on *power system* stability and damping of *power system* oscillations shall be in accordance with the guidelines for *power system* stability established under [clause 4.3.4\(h\)](#).

CLAUSE

S5.2.5.14 Active power control

- (a) The *automatic access standard* is a *generating system* must have an *active power control system* capable of:
 - (1) for a *scheduled generating unit* or a *scheduled generating system*:
 - (i) maintaining and changing its *active power* output in accordance with its *dispatch instructions*;
 - (ii) ramping its *active power* output linearly from one level of *dispatch* to another; and
 - (iii) receiving and automatically responding to signals delivered from the *AGC*, as updated at a rate of once every 4 seconds (or such other period specified by *AEMO* as required);
 - (2) subject to energy source availability, for a *non-scheduled generating unit* or *non-scheduled generating system*:
 - (i) automatically reducing or increasing its *active power* output within 5 minutes, at a constant rate, to or below the level specified in an instruction electronically issued by a *control centre*, subject to subparagraph (iii);
 - (ii) automatically limiting its *active power* output, to below the level specified in subparagraph (i); and
 - (iii) not changing its *active power* output within 5 minutes by more than the raise and lower amounts specified in an instruction electronically issued by a *control centre*; and

- (3) subject to energy source availability, for a *semi-scheduled generating unit* or a *semi-scheduled generating system*:
- (i) automatically reducing or increasing its *active power* output within 5 minutes at a constant rate, to or below the level specified in an instruction electronically issued by a *control centre*;
 - (ii) automatically limiting its *active power* output, to or below the level specified in subparagraph (i);
 - (iii) not changing its *active power* output within 5 minutes by more than the raise and lower amounts specified in an instruction electronically issued by a *control centre*;
 - (iv) ramping its *active power* output linearly from one level of *dispatch* to another; and
 - (v) receiving and automatically responding to signals delivered from the *AGC*, as updated at a rate of once every 4 seconds (or such other period specified by *AEMO* as required).

Minimum access standard

- (b) The *minimum access standard* is a *generating system* must have an *active power control system* capable of:
- (1) for a *scheduled generating unit* or a *scheduled generating system*:
 - (i) maintaining and changing its *active power* output in accordance with its *dispatch instructions*; and
 - (ii) receiving and automatically responding to signals delivered from the *AGC*, as updated at a rate of once every four seconds (or such other period specified by *AEMO* as required);
 - (2) for a *non-scheduled generating system*:
 - (i) reducing its *active power* output, within 5 minutes, to or below the level required to manage *network* flows that is specified in a verbal instruction issued by the *control centre*;
 - (ii) limiting its *active power* output, to or below the level specified in subparagraph (i); and

- (iii) subject to energy source availability, ensuring that the change of *active power* output in a 5 minute period does not exceed a value agreed with *AEMO* and the *Network Service Provider*; and
- (3) subject to energy source availability, for a *semi-scheduled generating unit* or a *semi-scheduled generating system*:
 - (i) maintaining and changing its *active power* output in accordance with its *dispatch instructions*;
 - (ii) not changing its *active power* output within five minutes by more than the rise and lower amounts specified in an instruction electronically issued by a *control centre*; and
 - (iii) receiving and automatically responding to signals delivered from the *AGC*, as updated at a rate of once every 4 seconds (or such other period specified by *AEMO* as required).

Negotiated access standard

- (c) A *negotiated access standard* may provide that if the number or frequency of verbal instructions becomes difficult for a *control centre* to manage, *AEMO* may require the *Generator* to *upgrade* its *facilities* to receive electronic instructions and fully implement them within 5 minutes.
- (d) The *negotiated access standard* must document to *AEMO's* satisfaction any operational arrangements necessary to manage *network* flows that may include a requirement for the *generating system* to be operated in a manner that prevents its output changing within 5 minutes by more than an amount specified by a *control centre*.
- (e) [Deleted]

General requirements

- (f) Each *control system* used to satisfy the requirements of paragraphs (a) and (b) must be *adequately damped*.

CLAUSE

S5.2.5.15 Short circuit ratio

- (a) This clause S5.2.5.15:

- (1) applies to a *generating system* comprised solely of *asynchronous generating units*;
- (2) does not apply to a *generating system* comprised solely of *synchronous generating units*; and
- (3) for a *generating system* comprised of both *synchronous generating units* and *asynchronous generating units*, applies only to the *asynchronous generating units* and to the *generating system* to the extent it relates to its *asynchronous generating units*.

Minimum access standard

- (b) The *minimum access standard* is a *generating system* comprised of *asynchronous generating units* must have *plant* capability sufficient to operate stably and remain *connected* at a *short circuit ratio* of 3.0, assessed in accordance with the methodology prescribed in the *system strength impact assessment guidelines*.

General requirements

- (c) The *performance standards* in the *connection agreement* must record:
 - (1) the agreed value of the *short circuit ratio* which must be the minimum of 3.0 and the value at which the *generating system* has *plant* capability sufficient to operate stably and remain *connected*;
 - (2) the *rated active power* used to calculate the value of the *short circuit ratio*; and
 - (3) any arrangements agreed under paragraph (e).
- (d) The *plant* capability referred to in paragraph (c)(1) may be demonstrated with any appropriate *control system* and/or *protection system* settings. The settings used may be different to the setting required for compliance with other *performance standards* established under this clause S5.2.5.
- (e) If the *generating system* is not capable of meeting the *minimum access standard*, the *Generator* may, if agreed by *AEMO*, the *Network Service Provider* and the *System Strength Service Provider*, achieve compliance by demonstrating it has:

- (1) in accordance with paragraph (f), legally binding commitments to make additional investment in its *plant* or for the supply to it of services to remedy, at its cost, the shortfall in capability, either on *connection* or in agreed circumstances (such as the occurrence of an event that results in a change to the *three phase fault level* at the *connection point*); together with
 - (2) operational arrangements agreed with the *Network Service Provider* that apply when the investment or services referred to in subparagraph (1) have not yet been made or are not available.
- (f) For paragraph (e)(1), the *Generator* may:
- (1) reach agreement with the *Network Service Provider* for the *Generator* to undertake investment in its *plant* to achieve *plant* capability sufficient to operate stably and remain *connected* at a *short circuit ratio* of 3.0; or
 - (2) procure from the *Network Service Provider*, the *System Strength Service Provider* or another *Registered Participant*, services to enable the *generating system* to operate stably and remain *connected* at a *short circuit ratio* of 3.0 but calculated using a *three phase fault level* at the *connection point* that excludes any contribution from the facilities providing the service.

CLAUSE

S5.2.5.16 Voltage phase angle shift

- (a) This clause S5.2.5.16:
- (1) applies to a *generating system* comprised solely of *asynchronous generating units*;
 - (2) does not apply to a *generating system* comprised solely of *synchronous generating units*; and
 - (3) for a *generating system* comprised of both *synchronous generating units* and *asynchronous generating units*, applies only to the *asynchronous generating units* and to the *generating system* to the extent it relates to its *asynchronous generating units*.

Minimum access standard

- (b) The *minimum access standard* is a *generating system* and each of its *asynchronous generating units* must not include any vector shift or similar relay or protective function that acts upon *voltage* phase angle which might operate for phase angle changes less than 20 degrees at the *connection point*.

General requirements

- (c) The agreed value of the settings of any *protection system* must be recorded in the *performance standards*.

CLAUSE

S5.2.6

Monitoring and control requirements

CLAUSE

S5.2.6.1

Remote Monitoring

Automatic access standard

- (a) The *automatic access standard* is a:
- (1) *scheduled generating unit*;
 - (2) *scheduled generating system*;
 - (3) *non-scheduled generating unit*;
 - (4) *non-scheduled generating system*;
 - (5) *semi-scheduled generating unit*; or
 - (6) *semi-scheduled generating system*,

must have *remote monitoring equipment* and *remote control equipment* to transmit to, and receive from, *AEMO's control centres* in real time in accordance with [rule 4.11](#) the quantities that *AEMO* reasonably requires to discharge its *market* and *power system security* functions set out in Chapters 3 and 4.

- (b) The remote monitoring quantities referred to under paragraph (a) that *AEMO* may request include:
- (1) in respect of a *generating system* of a type referred to in subparagraphs (a)(1) to (6):
 - (i) the status of all switching devices that carry the *generation*;
 - (ii) *tap-changing transformer* tap position(s) and *voltages*;

- (iii) *active power* and *reactive power* aggregated for groups of identical *generating units*;
 - (iv) either the number of identical *generating units* operating or the operating status of each non-identical *generating unit*;
 - (v) *active power* and *reactive power* for the *generating system*;
and
 - (vi) *voltage control system* setpoint and mode (as applicable);
- (2) in respect of a *generating unit* with a *nameplate rating* of 30 MW or more, current, *voltage*, *active power* and *reactive power* in respect of *generating unit* stators or power conversion systems (as applicable);
 - (3) in respect of an auxiliary supply system with a capacity of 30 MW or more associated with a *generating unit* or *generating system*, *active power* and *reactive power*;
 - (4) in respect of *reactive power* equipment that is part of a *generating system* but not part of a particular *generating unit*, its *reactive power*;
 - (5) in respect of a *semi-scheduled generating system*, all data specified as mandatory in the relevant *energy conversion model* applicable to that type of *semi-scheduled generating system*;
 - (6) in respect of a *scheduled generating system* or *semi-scheduled generating system*:
 - (i) maximum *active power* limit;
 - (ii) minimum *active power* limit;
 - (iii) maximum *active power* raise *ramp rate*; and
 - (iv) maximum *active power* lower *ramp rate*;
 - (7) in respect of a run-back scheme agreed with the *Network Service Provider*:
 - (i) run-back scheme status; and
 - (ii) *active power*, *reactive power* or other *control* limit, as applicable;

- (8) the mode of operation of the *generating unit*, turbine control limits, or other information required to reasonably predict the *active power* response of the *generating system* to a change in *power system frequency* at the *connection point*; and
 - (9) any other quantity that *AEMO* reasonably requires to discharge its *market* and *power system security* functions as set out in Chapters 3 and 4.
- (b1) The remote control quantities referred to under paragraph (a) that *AEMO* may request include:
- (1) in respect of a *generating system*:
 - (i) *voltage control* setpoint; and
 - (ii) *voltage control* mode (where applicable);
 - (2) in respect of a *scheduled generating system* or *semi-scheduled generating system*, the *AGC* signal; and
 - (3) in respect of a *non-scheduled generating system*, to the extent required to manage *network* flows:
 - (i) *active power* limit; and
 - (ii) *active power* ramp limit.

Minimum access standard

- (c) The *minimum access standard* is a:
- (1) *scheduled generating unit*;
 - (2) *scheduled generating system*;
 - (3) *non-scheduled generating system*;
 - (4) *semi-scheduled generating unit*; or
 - (5) *semi-scheduled generating system*,

must have *remote monitoring equipment* to transmit to *AEMO's control centres* in real time in accordance with [rule 4.11](#) the quantities that *AEMO* reasonably requires to discharge its *market* and *power system security* functions set out in Chapters 3 and 4.

- (d) The quantities referred to under paragraph (c) that *AEMO* may request include:
- (1) the *active power* output of the *generating unit* or *generating system* (as applicable);
 - (2) if *connected* to a *transmission system*, the *reactive power* output of the *generating unit* or *generating system* (as applicable); and
 - (3) if a *semi-scheduled generating system*, all data specified as mandatory in the relevant *energy conversion model* applicable to that type of *semi-scheduled generating system*.

CLAUSE

S5.2.6.2 Communications equipment

Automatic access standard

- (a) The *automatic access standard* is a *Generator* must:
- (1) provide and maintain two separate telephone *facilities* using independent telecommunications service providers, for the purposes of *operational communications* between the *Generator's* responsible operator under [clause 4.11.3\(a\)](#) and *AEMO's control centre*; and
 - (2) provide electricity supplies for *remote monitoring equipment* and *remote control equipment* installed in relation to its *generating system* capable of keeping such equipment available for at least 3 hours following total loss of *supply* at the *connection point* for the relevant *generating unit*.

Minimum access standard

- (b) The *minimum access standard* is a *Generator* must:
- (1) provide and maintain a telephone facility for the purposes of *operational communications* between the *Generator's* responsible operator under [clause 4.11.3\(a\)](#) and *AEMO's control centre*; and
 - (2) provide electricity supplies for *remote monitoring equipment* and *remote control equipment* installed in relation to its *generating system* capable of keeping such equipment available for at least 1 hour following total loss of *supply* at the *connection point* for the relevant *generating unit*.

Negotiated access standard

- (c) A *negotiated access standard* must include, where the *Network Service Provider* or *AEMO* reasonably require, a back-up telephone facility be independent of commercial telephone service providers, and the *Network Service Provider* must provide and maintain the separate facility on a cost-recovery basis only through the charge for *connection*.
- (d) A *negotiated access standard* must include that a *Generator* must provide communications paths (with appropriate redundancy) from the *remote monitoring equipment* or *remote control equipment* installed for each of its *generating systems* as appropriate, to an interface for communication purposes in a location reasonably acceptable to the *Network Service Provider* at the relevant *generation* facility.
- (e) Communications systems between the interface for communication purposes under paragraph (d) and the *control centre* must be the responsibility of the *Network Service Provider* unless otherwise agreed by the *Generator* and the *Network Service Provider*.
- (f) A *negotiated access standard* must include that the *Generator* provide accommodation and secure power supplies for communications *facilities* provided by the *Network Service Provider* under this clause S5.2.6.2.

CLAUSE S5.2.7

Power station auxiliary supplies

In cases where a *generating system* takes its auxiliary supplies via a *connection point* through which its *generation* is not transferred to the *network*, the *access standards* must be established under [clause S5.3.5](#) as if the *Generator* were a *Market Customer*.

CLAUSE S5.2.8

Fault current

Automatic access standard

- (a) The *automatic access standard* is:
 - (1) the contribution of the *generating system* to the fault current on the *connecting network* through its *connection point* must not exceed the contribution level that will ensure that the total fault current can be safely interrupted by the circuit breakers of the *connecting network* and safely carried by the *connecting network* for the duration of the applicable *breaker fail protection system*

fault clearance times, as specified for the relevant *connection point* by the *Network Service Provider*;

- (2) a *generating system's connected plant* must be capable of withstanding fault current through the *connection point* up to the higher of:
 - (i) the level specified in [clause S5.2.4\(e1\)\(1\)](#); and
 - (ii) the highest level of current at the *connection point* that can be safely interrupted by the circuit breakers of the *connecting network* and safely carried by the *connecting network* for the duration of the applicable *breaker fail protection system fault clearance times*, as specified by the *Network Service Provider*; and
- (3) a circuit breaker provided to isolate a *generating unit* or *generating system* from the *network* must be capable of breaking, without damage or restrike, the maximum fault currents that could reasonably be expected to flow through the circuit breaker for any fault in the *network* or in the *generating unit* or *generating system*, as specified in the *connection agreement*.

Minimum access standard

- (b) The *minimum access standard* is:
 - (1) the *generating system* does not need to limit fault current contribution;
 - (2) a *generating system's connected plant* must be capable of withstanding fault current through the *connection point* up to the level specified in [clause S5.2.4\(e1\)\(1\)](#); and
 - (3) a circuit breaker provided to isolate a *generating unit* or *generating system* from the *network* must be capable of breaking, without damage or restrike, the maximum fault currents that could reasonably be expected to flow through the circuit breaker for any fault in the *network* or in the *generating unit* or *generating system*, as specified in the *connection agreement*.

Negotiated access standard

- (c) In negotiating a *negotiated access standard*, the *Network Service Provider* must consider alternative *network* configurations in the

determination of the applicable fault current level and must prefer those options that maintain an equivalent level of service to other *Network Users* and which, in the opinion of the *Generator*, impose the least obligation on the *Generator*.

- (d) In carrying out assessments of proposed *negotiated access standards* under this clause S5.2.8, the *Network Service Provider* must take into account, without limitation:
- (1) the expected performance of existing *networks* and *considered projects*;
 - (2) the expected performance of existing *generating plant* and other relevant projects; and
 - (3) the expected range of *power system* operating conditions.

Transmission Annual Planning Report

- (a) Subject to paragraph (b), by 31 October each year all *Transmission Network Service Providers* must *publish* a *Transmission Annual Planning Report* setting out the results of the annual planning review conducted in accordance with [clause 5.12.1](#).
- (b) If a *Network Service Provider* is a *Transmission Network Service Provider* only because it owns, operates or controls *dual function assets* then it may *publish* its *Transmission Annual Planning Report* in the same document and at the same time as its *Distribution Annual Planning Report*.
- (c) The *Transmission Annual Planning Report* must be consistent with the *TAPR Guidelines* and set out:
- (1) the forecast *loads* submitted by a *Distribution Network Service Provider* in accordance with [clause 5.11.1](#) or as modified in accordance with [clause 5.11.1\(d\)](#), including at least:
- (i) a description of the forecasting methodology, sources of input information, and the assumptions applied in respect of the forecast *loads*;
 - (ii) a description of high, most likely and low growth scenarios in respect of the forecast *loads*;
 - (iii) an analysis and explanation of any aspects of forecast *loads* provided in the *Transmission Annual Planning Report* that have changed significantly from forecasts provided in the *Transmission Annual Planning Report* from the previous year; and
 - (iv) an analysis and explanation of any aspects of forecast *loads* provided in the *Transmission Annual Planning Report* from the previous year which are significantly different from the actual outcome;
- (1A) for all *network* asset retirements, and for all *network* asset de-ratings that would result in a *network constraint*, that are planned over the minimum planning period specified in [clause 5.12.1\(c\)](#), the following information in sufficient detail relative to the size or significance of the asset:
- (i) a description of the *network* asset, including location;

- (ii) the reasons, including methodologies and assumptions used by the *Transmission Network Service Provider* for deciding that it is necessary or prudent for the *network* asset to be retired or *de-rated*, taking into account factors such as the condition of the *network* asset;
 - (iii) the date from which the *Transmission Network Service Provider* proposes that the *network* asset will be retired or *de-rated*; and
 - (iv) if the date to retire or *de-rate* the *network* asset has changed since the previous *Transmission Annual Planning Report*, an explanation of why this has occurred;
- (1B) for the purposes of subparagraph (1A), where two or more *network* assets are:
- (i) of the same type;
 - (ii) to be retired or *de-rated* across more than one location;
 - (iii) to be retired or *de-rated* in the same calendar year; and
 - (iv) each expected to have a replacement cost less than \$200,000 (as varied by a *cost threshold determination*),

those assets can be reported together by setting out in the *Transmission Annual Planning Report*:

- (v) a description of the *network* assets, including a summarised description of their locations;
 - (vi) the reasons, including methodologies and assumptions used by the *Transmission Network Service Provider*, for deciding that it is necessary or prudent for the *network* assets to be retired or *de-rated*, taking into account factors such as the condition of the *network* assets;
 - (vii) the date from which the *Transmission Network Service Provider* proposes that the *network* assets will be retired or *de-rated*; and
 - (viii) if the calendar year to retire or *de-rate* the *network* assets has changed since the previous *Transmission Annual Planning Report*, an explanation of why this has occurred;
- (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, including at least:
- (i) a description of the *constraints* and their causes;
 - (ii) the timing and likelihood of the *constraints*;
 - (iii) a brief discussion of the types of planned future projects that may address the *constraints* over the next 5 years, if such projects are required; and
 - (iv) sufficient information to enable an understanding of the *constraints* and how such forecasts were developed;
- (4) in respect of information required by subparagraph (3), where an estimated reduction in forecast *load* would defer a forecast *constraint* for a period of 12 months, include:
- (i) the year and months in which a *constraint* is forecast to occur;
 - (ii) the relevant *connection points* at which the estimated reduction in forecast *load* may occur;
 - (iii) the estimated reduction in forecast *load* in MW needed; and
 - (iv) a statement of whether the *Transmission Network Service Provider* plans to issue a request for proposals for *augmentation*, replacement of *network* assets, or a *non-network option* identified by the annual planning review conducted under [clause 5.12.1\(b\)](#) and if so, the expected date the request will be issued;
- (5) for all proposed *augmentations* to the *network* and proposed replacements of *network* assets 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 subparagraph (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 *AEMO* in accordance with clause 5.21 (if any such criteria have been *published* by *AEMO*); and
 - (vi) other reasonable *network options* and *non-network options* considered to address the actual or potential *constraint* or inability to meet the *network* performance requirements identified in subparagraph (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*;
- (6) the manner in which the proposed *augmentations* and proposed replacements of *network* assets relate to the most recent *Integrated System Plan*;
- (6A) for proposed new or modified *emergency frequency control schemes*, the manner in which the project relates to the most recent *general power system risk review*;
- (6B) information about which parts of its *transmission network* are *designated network assets* and the identities of the owners of those *designated network assets*;
- (7) information on the *Transmission Network Service Provider's asset management* approach, including:
- (i) a summary of any *asset management* strategy employed by the *Transmission Network Service Provider*;
 - (ii) a summary of any issues that may impact on the system *constraints* identified in the *Transmission Annual Planning Report* that has been identified through carrying out *asset management*; and

- (iii) information about where further information on the *asset management* strategy and methodology adopted by the *Transmission Network Service Provider* may be obtained.
- (8) any information required to be included in a *Transmission Annual Planning Report* under:
- (i) clauses [5.16.3\(c\)](#) and [5.16A.3](#) in relation to a *network* investment which is determined to be required to address an urgent and unforeseen *network* issue; or
 - (ii) clauses [5.20B.4\(h\)](#) and [\(i\)](#) and clauses [5.20C.3\(f\)](#) and [\(g\)](#) in relation to *network* investment and other activities to:
 - (A) provide *inertia network services* or *inertia support activities*; or
 - (B) meet the standard in [clause S5.1.14](#) in relation to a *system strength node*;
- (9) emergency controls in place under [clause S5.1.8](#), including the *Network Service Provider's* assessment of the need for new or altered emergency controls under that clause;
- (9A) the analysis of the operation of, and any known or potential interactions between:
- (i) any *emergency frequency control schemes*, or emergency controls place under clause S5.1.8, on its *network*; and
 - (ii) *protection systems* or *control systems* of *plant connected* to its *network* (including consideration of whether the settings of those systems are fit for purpose for the future operation of its *network*), undertaken under clause 5.12.1(b)(7), including a description of proposed actions to be undertaken to revise those schemes, controls or systems, or to address any adverse interactions;
- (10) *facilities* in place under [clause S5.1.10](#);
- (11) an analysis and explanation of any other aspects of the *Transmission Annual Planning Report* that have changed significantly from the preceding year's *Transmission Annual Planning Report*, including the reasons why the changes have occurred;
- (12) the results of joint planning (if any) undertaken with a *Transmission Network Service Provider* under [clause 5.14.3](#) in the preceding year,

including a summary of the process and methodology used by the *Transmission Network Service Providers* to undertake joint planning and the outcomes of that joint planning; and

- (13) the *system strength locational factor* for each *system strength connection point* for which it is the *Network Service Provider* and the corresponding *system strength node*.
- (d) A *declared transmission system operator* for all or part of the *declared shared network* must provide to *AEMO* within a reasonable period of receiving a request, such information as reasonably requested by *AEMO* to enable it to comply with:
 - (1) [clause 5.12.1\(b\)\(5\)](#);
 - (2) [clause 5.12.1\(b\)\(6\)](#);
 - (3) [clause 5.12.2\(c\)\(1A\)](#);
 - (4) clauses [5.12.2\(c\)\(4\)](#), [\(5\)](#) and [\(6\)](#) as they relate to the proposed replacement of *network* assets; and
 - (5) [clause 5.12.2\(c\)\(7\)](#).

Sub-threshold tariffs

- (a) No later than four months before the start of a *regulatory year* (other than the first *regulatory year* of a *regulatory control period*), a *Distribution Network Service Provider* may notify the *AER*, affected *retailers* and *Market Small Generation Aggregators* and affected *retail customers* of a new proposed tariff (a **relevant tariff**) that is determined otherwise than in accordance with the *Distribution Network Service Provider's* current *tariff structure statement*, if both of the following are satisfied:
- (1) the *Distribution Network Service Provider's* forecast revenue from the **relevant tariff** during each *regulatory year* in which the tariff is to apply is no greater than 0.5 per cent of the *Distribution Network Service Provider's annual revenue requirement* for that *regulatory year* (the **individual threshold**); and
 - (2) the *Distribution Network Service Provider's* forecast revenue from the **relevant tariff**, as well as from all other relevant tariffs, during each *regulatory year* in which those tariffs are to apply is no greater than one per cent of the *Distribution Network Service Provider's annual revenue requirement* for that *regulatory year* (the **cumulative threshold**).
- (b) Notwithstanding any other provision in the *Rules* to the contrary, a **relevant tariff** notified by the *Distribution Network Service Provider* in accordance with paragraph (a) is, for the remainder of the *regulatory control period* in which the notification is given:
- (1) not required to comply with the *pricing principles for direct control services*; and
 - (2) for the purposes of the submission and approval of a *pricing proposal*, deemed to comply with the *Distribution Network Service Provider's* current *tariff structure statement*,

unless, at any point in time after the notification of the **relevant tariff** is given under paragraph (a) (the **post-notification point**), either the **individual threshold** or the **cumulative threshold** (in each case calculated using actual rather than forecast revenue) are exceeded by virtue of the amount of revenue that is attributable to the **relevant tariff**, in which case sub-paragraphs (1) and (2) cease to apply to the **relevant tariff** in relation to the *regulatory years* that commence after the **post-notification point**.

- (c) Where sub-paragraphs (b)(1) and (2) cease to apply to a **relevant tariff** in accordance with paragraph (b), then sub-paragraphs (b)(1) and (2) will be taken to continue to apply to other relevant tariffs that were notified before the **post-notification point**, but only to the extent that those sub-paragraphs would apply if the first-mentioned **relevant tariff** were not a **relevant tariff**.

11.141.8 Sub-threshold tariffs

- (a) This clause applies in relation to a *Distribution Network Service Provider* in relation to each *regulatory year* in the following *regulatory control periods* of the *Distribution Network Service Provider*:
- (1) the *regulatory control period* in which the *commencement date* occurs; and
 - (2) the *regulatory control period* immediately following the *regulatory control period* in which the *commencement date* occurs.
- (b) Where in accordance with paragraph (a) this clause applies in relation to a *Distribution Network Service Provider* and *regulatory year*:
- (1) for the purposes of calculating the individual threshold for the *Distribution Network Service Provider* for the *regulatory year* under [clause 6.18.1C\(a\)\(1\)](#), the clause will apply as if '0.5 per cent' had been omitted and '1 per cent' inserted in its place; and
 - (2) for the purposes of calculating the cumulative threshold for the *Distribution Network Service Provider* for the *regulatory year* under [clause 6.18.1C\(a\)\(2\)](#), the clause will apply as if 'one per cent' had been omitted and 'five per cent' inserted in its place.

Preparation of, and requirements for, connection policy

- (a) A *Distribution Network Service Provider* must prepare a document (its proposed *connection policy*) setting out:
- (1) the circumstances in which it may require a *retail customer* or *real estate developer* to pay a *connection charge*, for the provision of a *connection service* under [Chapter 5A](#); and
 - (2) the circumstances in which it may specify a *static zero export limit* in a *connection offer* for a *retail customer*.
- (b) The proposed *connection policy*:
- (1) must be consistent with:
 - (i) the *connection charge principles*; and
 - (ii) the *connection charge guidelines*; and
 - (2) must specify:
 - (i) the categories of persons that may be required to pay a *connection charge* and the circumstances in which such a requirement may be imposed; and
 - (ii) the aspects of a *connection service* for which a *connection charge* may be made; and

Example

The *Distribution Network Service Provider* might (for example) make separate *connection charges* for the provision of a *distribution connection asset* and for making a necessary *extension* to, or other *augmentation* of, the *distribution network*.

- (iii) the basis on which *connection charges* are determined; and
- (iv) the manner in which *connection charges* are to be paid (or equivalent consideration is to be given); and

Examples

The payment (or equivalent consideration) might take the form of a capital contribution, prepayment or financial guarantee.

- (v) a threshold (based on capacity or any other measure identified in the *connection charge guidelines*) below which a *retail customer* (not being a *non-registered embedded generator*, a *real estate developer*, a *Registered Participant* or an *Intending Participant*) will not be liable for a *connection charge* for an *augmentation* other than an *extension*.

Connection charge principles

- (a) This clause states the *connection charge principles*.
- (b) A *retail customer* (other than a *non-registered embedded generator*, a *real estate developer*, a *Registered Participant* or an *Intending Participant*) who applies for a *connection service* for which an *augmentation* is required cannot be required to make a capital contribution towards the cost of the *augmentation* (insofar as it involves more than an *extension*) if:
- (b1) Paragraph (a) does not apply to charges for *system strength connection works* in accordance with [clause 5.3.4B\(e\)](#).
- (1) the application is for a *basic connection service*; or
 - (2) a relevant threshold set in the *Distribution Network Service Provider's connection policy* is not exceeded.

Note

In general, the intention is to exclude deep system *augmentation* charges for *retail customers*.

- (c) Subject to paragraph (b), in determining *connection charges* in accordance with its *connection policy*, a *Distribution Network Service Provider* must apply the following principles:
- (1) if an *extension* to the *distribution network* is necessary in order to provide a *connection service*, *connection charges* for the service may include a reasonable capital contribution towards the cost of the *extension* necessary to provide the service;
 - (2) if *augmentation* of *premises connection assets* at the *retail customer's connection point* is necessary in order to provide a *connection service*, *connection charges* for the service may include a reasonable capital contribution towards the cost of the *augmentation* of *premises connection assets* at the *connection point* necessary to provide the service;
 - (3) if *augmentation* of the *distribution system* is necessary in order to provide a *standard connection service*, *connection charges* for the service may include a reasonable capital contribution towards the cost of the *augmentation* necessary to provide the service;
 - (4) if *augmentation* of the *distribution system* is necessary in order to provide a *connection service* under a *negotiated connection contract*,

connection charges for the service may, subject to any agreement to the contrary, include a reasonable capital contribution towards the cost of *augmentation* of the *distribution system* to the extent necessary to provide the service and to any further extent that a prudent service provider would consider necessary to provide efficiently for forecast *load* growth;

(5) despite subparagraphs (1) to (4) if *augmentation* of the *distribution system* is necessary in order to provide, on the application of a *real estate developer, Registered Participant* or *Intending Participant, connection services* for premises comprised in a *real estate development, connection charges* for the services may, subject to any agreement to the contrary, include a reasonable capital contribution towards the cost of *augmentation* of the *distribution system* to the extent necessary to provide the services and to any further extent that a prudent service provider would consider necessary to provide efficiently for forecast *load* growth;

(6) however, a capital contribution may only be required in the circumstances described in subparagraphs (1) to (5) if provision for the costs has not already been made through existing *distribution use of system* charges or a tariff applicable to the *connection*.

(d) If:

(1) a *connection asset* ceases, within 7 years after its construction or installation, to be dedicated to the exclusive use of the *retail customer* occupying particular premises; and

(2) the *retail customer* is entitled, in accordance with the *connection charge guidelines*, to a refund of *connection charges*,

the *Distribution Network Service Provider* must make the refund, and may recover the amount of the refund, by way of a *connection charge*, from the new users of the asset.

(e) For the purposes of paragraph (d), a person is taken to be a new user of a *connection asset* if the asset comes to be used to provide a *connection* to that person's premises

(f) For the purposes of this clause capital contribution includes a prepayment or financial guarantee.

Negotiation framework

(a) The following rules (collectively described as the **negotiation framework**) govern negotiations between a *Distribution Network Service Provider* and a *connection applicant*:

(1) each party must negotiate in good faith.

(1A) the *connection applicant* must, at the request of the *Distribution Network Service Provider*, provide the *Distribution Network Service Provider* with *DER generation information*.

(2) the *connection applicant* must, at the request of the *Distribution Network Service Provider*, provide the *Distribution Network Service Provider* with information it reasonably requires in order to negotiate on an informed basis.

Note

The information might (for example) include estimates of average and *maximum demand* for electricity to be *supplied* through the *connection*.

(3) the *Distribution Network Service Provider* must provide the *connection applicant* with information the *connection applicant* reasonably requires in order to negotiate on an informed basis including:

(i) an estimate of the amount to be charged by the *Distribution Network Service Provider* for assessment of the application and the making of a *connection offer* for a *negotiated connection contract*; and

(ii) an estimate of *connection charges*; and

(iii) a statement of the basis on which *connection charges* are calculated; and

(iv) if the *connection applicant* has elected to extend the negotiations to *supply services*— an estimate of any applicable charges for *supply services* and a statement of the basis of their calculation; and

(v) if the *connection applicant* is proposing to connect a new or replacement *embedded generating unit* by way of a *basic micro EG connection service*, that the *embedded generating unit* must be compliant with the *DER Technical Standards*.

Note

The *Distribution Network Service Provider* might, according to the circumstances of a particular case, need to provide further information to ensure the *connection applicant* is properly informed – for example, information about:

- technical and safety requirements;
 - the types of *connection* that are technically feasible;
 - *network* capacity at the proposed *connection point*;
 - possible strategies to reduce the cost of the *connection*.
- (4) the *Distribution Network Service Provider* may consult with other users of the *distribution network* who may be adversely affected by the proposed *new connection* or *connection alteration*.
- (5) in assessing the application, the *Distribution Network Service Provider* must determine:
- (i) the technical requirements for the proposed *new connection* or *connection alteration*; and
 - (ii) the extent and costs of any necessary *augmentation* of the *distribution system*; and
 - (iii) any consequent change in charges for *distribution use of system* services; and
 - (iv) any possible material effect of the proposed *new connection* or *connection alteration* on the *network power transfer capability* of the *distribution network* to which the *new connection* or *connection alteration* is proposed to be made and any other *distribution network* that might be affected by the proposed *new connection* or *connection alteration*.
- (6) the *Distribution Network Service Provider* must make reasonable endeavours to make a *connection offer* that complies with the *connection applicant's* reasonable requirements.

Example

Reasonable requirements as to the location of the proposed *connection point* or the level and standard of the *distribution network's power transfer capability*.

- (7) the *Distribution Network Service Provider* must comply with its *connection policy*.
- (b) The following supplementary rules apply:

- (1) if a *Distribution Network Service Provider* requires information from a *connection applicant* in addition to the information provided in the application, a request for the additional information under paragraphs (a) (1A) or (a)(2) must (if practicable) be made within 20 *business days* after the *Distribution Network Service Provider* receives the relevant application;
 - (2) the *Distribution Network Service Provider* must provide the information required under paragraph (a)(3) as soon as practicable after the *Distribution Network Service Provider* receives the *connection applicant's* application or, if the *Distribution Network Service Provider* requests additional information under paragraph (a)(2), as soon as practicable after the *Distribution Network Service Provider* receives the relevant information.
- (c) Each party to the negotiations must maintain the confidentiality of *confidential information* disclosed by the other party in the course of the negotiations unless disclosure of the information is authorised:
- (1) by the party to whom the duty of confidentiality is owed; or
 - (2) under:
 - (i) *NEL* or the *Rules*; or
 - (ii) any other law.

Access arrangements relating to Distribution Networks

- (a) In this rule 5.3AA:
- (1) the *Distribution Network Service Provider* is the *Distribution Network Service Provider* required under clauses [5.3.3](#) or [5.3A.5](#) to process and respond to a *connection* enquiry or required under clauses [5.3.5](#) or [5.3A.10](#) to prepare an offer to *connect* for the establishment or modification of a *connection* to the *distribution network* owned, controlled or operated by that *Distribution Network Service Provider* or for the provision of *network service*; and
 - (2) the references to a *Connection Applicant* are to:
 - (i) an *Embedded Generator*;
 - (ii) a *Market Network Service Provider*; or
 - (iii) a *non-registered embedded generator* who makes an election for [rule 5.3A](#) to apply instead of [Chapter 5A](#),

who makes a *connection* enquiry under clauses [5.3.2](#) or [5.3A.5](#) or an application to *connect* under clauses [5.3.4](#) or [5.3A.10](#) in relation to any *generating units* or group of *generating units*, or any *network elements* used in the provision of a *network service*, as the case may be.
- (b) If requested by a *Connection Applicant*, whether as part of a *connection* enquiry, application to *connect* or the subsequent negotiation of a *connection agreement*, the *Distribution Network Service Provider* must negotiate in good faith with the *Connection Applicant* to reach agreement in respect of the *distribution network user access* arrangements sought by the *Connection Applicant*.
- (c) As a basis for negotiations under paragraph (b):
- (1) the *Connection Applicant* must provide to the *Distribution Network Service Provider* such information as is reasonably requested relating to the expected operation of:
 - (i) its *generating units* (in the case of an *Embedded Generator*); or
 - (ii) its *network elements* used in the provision of *network service* (in the case of a *Market Network Service Provider*); and

- (2) the *Distribution Network Service Provider* must provide to the *Connection Applicant* such information as is reasonably requested to allow the *Connection Applicant* to fully assess the commercial significance of the *distribution network user access* arrangements sought by the *Connection Applicant* and offered by the *Distribution Network Service Provider*.
- (d) A *Connection Applicant* may seek *distribution network user access* arrangements at any level of *power transfer capability* between zero and:
 - (1) in the case of an *Embedded Generator*, the maximum output of the relevant *generating units* or group of *generating units*; and
 - (2) in the case of a *Market Network Service Provider*, the *power transfer capability* of the relevant *network elements*.
- (e) The *Distribution Network Service Provider* must use reasonable endeavours to provide the *distribution network user access* arrangements being sought by the *Connection Applicant* subject to those arrangements being consistent with *good electricity industry practice* considering:
 - (1) the *distribution connection assets* to be provided by the *Distribution 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 *distribution network user access* arrangements in respect of all affected *distribution networks*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (f) The *Distribution Network Service Provider* and the *Connection Applicant* must negotiate in good faith to reach agreement as appropriate on:
 - (1) the *connection service* charge to be paid by the *Connection Applicant* in relation to *distribution connection assets* to be provided by the *Distribution Network Service Provider*;

- (2) in the case of a *Market Network Service Provider*, the service level standards to which the *Market Network Service Provider* requires the *Distribution Network Service Provider* to adhere in providing its services;
- (3) the *use of system services* charge to be paid:
- (i) by the *Connection Applicant* in relation to any *augmentations* or *extensions* required to be undertaken on all affected *transmission networks* and *distribution networks*; and
 - (ii) where the *Connection Applicant* is a *Market Network Service Provider*, to the *Market Network Service Provider* in respect of any reduction in the long run marginal cost of *augmenting* the *distribution network* as a result of it being *connected* to the *distribution network*,

(*negotiated use of system charges*); and
- (4) the following amounts:
- (i) the amount to be paid by the *Connection Applicant* to the *Distribution Network Service Provider* in relation to the costs reasonably incurred by the *Distribution Network Service Provider* in providing *distribution network user access*;
 - (ii) where the *Connection Applicant* is an *Embedded Generator*:
 - (A) the compensation to be provided by the *Distribution Network Service Provider* to the *Embedded Generator* in the event that the *generating units* or group of *generating units* of the *Embedded Generator* are *constrained off* or *constrained on* during a *trading interval*; and
 - (B) the compensation to be provided by the *Embedded Generator* to the *Distribution Network Service Provider* in the event that dispatch of the *Embedded 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*; and
 - (iii) where the *Connection Applicant* is a *Market Network Service Provider*:
 - (A) the compensation to be provided by the *Distribution Network Service Provider* to the *Market Network Service Provider* in the event that the *distribution network user access* is not provided; and

- (B) the compensation to be provided by the *Market Network Service Provider* to the *Distribution 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*.
- (g) The maximum *negotiated use of system charges* applied by a *Distribution Network Service Provider* must be in accordance with the applicable requirements of [Chapter 6](#) and the *Negotiated Distribution Service Criteria* applicable to the *Distribution Network Service Provider*.
- (h) A *Distribution Network Service Provider* must pass through to a *Connection Applicant* the amount calculated in accordance with paragraph (i) for the locational component of *prescribed TUOS services* that would have been payable by the *Distribution Network Service Provider* to a *Transmission Network Service Provider* had the *Connection Applicant* not been *connected* to its *distribution network*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (i) To calculate the amount to be passed through to a *Connection Applicant* in accordance with paragraph (h), a *Distribution Network Service Provider* must, if prices for the locational component of *prescribed TUOS services* were in force at the relevant *transmission network connection point* throughout the relevant *financial year*:
- (1) determine the charges for the locational component of *prescribed TUOS services* that would have been payable by the *Distribution Network Service Provider* for the relevant *financial year*:
- (i) where the *Connection Applicant* is an *Embedded Generator*, if that *Embedded Generator* had not injected any *energy* at its *connection point* during that *financial year*;
- (ii) where the *Connection Applicant* is a *Market Network Service Provider*, 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 subparagraph (1) exceed the amount for the locational component of *prescribed TUOS services* actually payable by the *Distribution Network Service Provider*, which amount will be the relevant amount for the purposes of paragraph (h).
- (j) Where prices for the locational component of *prescribed TUOS services* were not in force at the relevant *distribution network connection point* throughout the relevant *financial year*, as referred to in paragraph (i), the *Distribution Network Service Provider* must apply an equivalent procedure to that referred to in paragraph (i) in relation to that component of its *TUOS 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 paragraph (h).

General

- (a) A *Metering Data Provider* must be accredited by and registered by *AEMO*.
- (b) *AEMO* must accredit and register a *Metering Data Provider* only for the type of work the *Metering Data Provider* is qualified to provide.
- (c) *AEMO* must establish a qualification process for *Metering Data Providers* that enables registration to be achieved in accordance with the requirements of this Schedule 7.3.

Regulatory investment test for distribution

Principles

- (a) The *AER* must develop and *publish* the *regulatory investment test for distribution* in accordance with the *distribution consultation procedures* and this clause 5.17.1.
- (b) The purpose of the *regulatory investment test for distribution* is to identify the *credible option* that maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the *NEM* (the *preferred option*). For the avoidance of doubt, a *preferred option* may, in the relevant circumstances, have a negative net economic benefit (that is, a net economic cost) where the *identified need* is for *reliability corrective action*.
- (c) The *regulatory investment test for distribution* must:
 - (1) be based on a cost-benefit analysis that must include an assessment of reasonable scenarios of future supply and demand;
 - (2) not require a level of analysis that is disproportionate to the scale and likely impact of each of the *credible options* being considered;
 - (3) be capable of being applied in a predictable, transparent and consistent manner;
 - (4) require the *RIT-D proponent* to consider whether each *credible option* could deliver the following classes of market benefits:
 - (i) changes in voluntary *load* curtailment;
 - (ii) changes in involuntary *load shedding* and *customer* interruptions caused by *network* outages, using a reasonable forecast of the value of electricity to *customers*;
 - (iii) changes in costs for parties, other than the *RIT-D proponent*, due to differences in:
 - (A) the timing of new *plant*;
 - (B) capital costs; and
 - (C) the operating and maintenance costs;

- (iv) differences in the timing of expenditure;
 - (v) changes in *load transfer capacity* and the capacity of *embedded generating units* to take up *load*;
 - (vi) any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing the *credible option* with respect to the likely future investment needs of the *NEM*;
 - (vii) changes in *electrical energy losses*; and
 - (viii) any other class of market benefit determined to be relevant by the *AER*.
- (5) with respect to the classes of market benefits set out in subparagraphs (4)(i) and (ii), ensure that, if a *credible option* is for *reliability corrective action*, the consideration and any quantification assessment of these classes of market benefits will only apply insofar as the market benefit delivered by that *credible option* exceeds the minimum standard required for *reliability corrective action*;
- (6) require the *RIT-D proponent* to consider whether the following classes of costs would be associated with each *credible option* and, if so, quantify the:
- (i) financial costs incurred in constructing or providing the *credible option*;
 - (ii) operating and maintenance costs over the operating life of the *credible option*;
 - (iii) cost of complying with laws, regulations and applicable administrative requirements in relation to the construction and operation of the *credible option*; and
 - (iv) any other financial costs determined to be relevant by the *AER*.
- (7) require a *RIT-D proponent*, in exercising judgement as to whether a particular class of market benefit or cost applies to each *credible option*, to have regard to any submissions received on the *non-network options report* and/or *draft project assessment report* where relevant;

- (8) provide that any market benefit or cost which cannot be measured as a market benefit or cost to persons in their capacity as *Generators, Distribution Network Service Providers, Transmission Network Service Providers* or consumers of electricity must not be included in any analysis under the *regulatory investment test for distribution*; and
- (9) specify:
- (i) the method or methods permitted for estimating the magnitude of the different classes of market benefits;
 - (ii) the method or methods permitted for estimating the magnitude of the different classes of costs;
 - (iii) the appropriate method and value for specific inputs, where relevant, for determining the discount rate or rates to be applied;
 - (iv) that a sensitivity analysis is required for modelling the cost-benefit analysis; and
 - (v) that the *credible option* that maximises the present value of net economic benefit to all those who produce, consume or transport electricity in the *NEM* may, in some circumstances, be a negative net economic benefit (that is, a net economic cost) where the *identified need* is for *reliability corrective action*.
- (d) A *RIT-D proponent* may, under the *regulatory investment test for distribution*, quantify each class of market benefits under paragraph (c)(4) where the *RIT-D proponent* considers that:
- (1) any applicable market benefits may be material; or
 - (2) the quantification of market benefits may alter the selection of the *preferred option*.
- (e) The *regulatory investment test for distribution* permits a single assessment of an integrated set of related and similar investments.

CLAUSE
5.17.2

Regulatory investment test for distribution application guidelines

Definitions

(a0) In this clause 5.17.2:

current application has the meaning given to it by [clause 5.17.2\(g\)](#).

- (a) At the same time as the *AER* develops and *publishes* a proposed *regulatory investment test for distribution* under the *distribution consultation procedure*, the *AER* must also develop and *publish* guidelines for the operation and application of the *regulatory investment test for distribution* in accordance with the *distribution consultation procedures* and this clause 5.17.2.
- (b) The *regulatory investment test for distribution application guidelines* must:
- (1) give effect to and be consistent with this clause 5.17.2 and clauses [5.15.2](#), [5.17.3](#), [5.17.4](#) and [5.17.5](#); and
 - (2) provide guidance on:
 - (i) the operation and application of the *regulatory investment test for distribution*;
 - (ii) the process to be followed in applying the *regulatory investment test for distribution*;
 - (iii) what will be considered to be a material and adverse *NEM* impact for the purposes of the definition of *interested parties* in [clause 5.15.1](#).
 - (iv) how disputes raised in relation to the *regulatory investment test for distribution* and its application will be addressed and resolved.
- (c) The *regulatory investment test for distribution application guidelines* must provide guidance and worked examples as to:
- (1) how to make a determination under [clause 5.17.4\(c\)](#);
 - (2) what constitutes a *credible option*;
 - (3) the suitable modelling periods and approaches to scenario development;
 - (4) the classes of market benefits to be considered for the purposes of [clause 5.17.1\(c\)\(4\)](#);

- (5) the acceptable methodologies for valuing the market benefits of a *credible option* referred to in [clause 5.17.1\(c\)\(4\)](#);
 - (6) acceptable methodologies for valuing the costs of a *credible option* referred to in [clause 5.17.1\(c\)\(6\)](#);
 - (7) the appropriate approach to undertaking a sensitivity analysis for the purposes of [clause 5.17.1\(c\)\(9\)\(iv\)](#);
 - (8) the appropriate approaches to assessing uncertainty and risks; and
 - (9) what may constitute an externality under the *regulatory investment test for distribution*.
- (d) The *AER* must develop and *publish* the first *regulatory investment test for distribution* and *regulatory investment test for distribution application guidelines* by 31 August 2013, and there must be a *regulatory investment test for distribution* and *regulatory investment test for distribution application guidelines* in force at all times after that date.
- (e) The *AER* may, from time to time, amend or replace the *regulatory investment test for distribution* and *regulatory investment test for distribution application guidelines* in accordance with the *distribution consultation procedures*, provided the *AER publishes* any amendments to, or replacements of, the *regulatory investment test for distribution* or *regulatory investment test for distribution application guidelines* at the same time.
- (f) An amendment referred to in paragraph (e) does not apply to a *current application* of the *regulatory investment test for distribution* and the *regulatory investment test for distribution application guidelines* under the *Rules* by a *RIT-D proponent*.
- (g) For the purposes of paragraph (f), a "*current application*" means any action or process initiated under the *Rules* which relies on or is referenced to the *regulatory investment test for distribution* and/or the *regulatory investment test for distribution application guidelines* and is not completed at the date of the relevant amendment to the *regulatory investment test for distribution* and/or the *regulatory investment test for distribution application guidelines*.

- (h) The *AER* may *publish* the *regulatory investment test for distribution*, the *regulatory investment test for distribution application guidelines*, the *regulatory investment test for transmission* and the *regulatory investment test for transmission application guidelines* in a single document.

CLAUSE
5.17.3

Projects subject to the regulatory investment test for distribution

- (a) A *RIT-D proponent* must apply the *regulatory investment test for distribution* to a *RIT-D project* except in circumstances where:
- (1) the *RIT-D project* is required to address an urgent and unforeseen *network* issue that would otherwise put at risk the reliability of the *distribution network* or a significant part of that *network* as described in paragraph (c);
 - (2) the estimated capital cost to the *Network Service Providers* affected by the *RIT-D project* of the most expensive *potential credible option* to address the *identified need* is less than \$5 million (as varied in accordance with a *cost threshold determination*);
 - (3) the cost of addressing the *identified need* is to be fully recovered through charges other than charges in respect of *standard control services* or *prescribed transmission services*;
 - (4) the *identified need* can only be addressed by expenditure on a *connection asset* which provides services other than *standard control services* or *prescribed transmission services*;
 - (5) the *RIT-D project* is related to the maintenance of existing assets and is not intended to *augment* a *network* or replace *network* assets;
 - (6) **[Deleted]**; or
 - (7) the proposed expenditure relates to *protected event EFCS investment* and is not intended to *augment* a *network*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b) If a *potential credible option* to address an *identified need* includes expenditure on a *dual function asset*, the project must be assessed under the *regulatory investment test for distribution* unless the *identified need* was identified through joint planning under [rule 5.14](#) and the project to address the *identified need* is a *RIT-T project*.
- (c) For the purposes of paragraph (a)(1), a *RIT-D project* will be required to address an urgent and unforeseen *network* issue that would otherwise put at risk the *reliability* of the *distribution network* or a significant part of that *network* if:
 - (1) it is necessary that the assets or services to address the issue be operational within six months of the issue being identified;
 - (2) the event or circumstances causing the *identified need* was not reasonably foreseeable by, and was beyond the reasonable control of, the *Network Service Provider(s)* that identified the *identified need*;
 - (3) a failure to address the *identified need* is likely to materially adversely affect the *reliability* and *secure operating state* of the *distribution network* or a significant part of that *network*; and
 - (4) it is not a *contingent project*.
- (d) With the exception of *negotiated distribution services* and *negotiated transmission services*, for each *RIT-D project* to which the *regulatory investment test for distribution* does not apply in accordance with paragraph (a)(1)-(6), the *Network Service Providers* affected by the *RIT-D project* must ensure, acting reasonably, that the investment required to address the *identified need* is planned and developed at least cost over the life of the investment.
- (e) A *RIT-D proponent* must not treat different parts of an integrated solution to an *identified need* as distinct and separate options for the purposes of determining whether the *regulatory investment test for distribution* applies to each of those parts.

CLAUSE
5.17.4

Regulatory investment test for distribution procedures

- (a) If a *RIT-D project* is subject to the *regulatory investment test for distribution* under [clause 5.17.3](#), then the *RIT-D proponent* must

consult with the following persons on the *RIT-D project* in accordance with this clause 5.17.4:

- (1) all *Registered Participants*, *AEMO*, *interested parties* and *non-network providers*; and
- (2) if the *RIT-D proponent* is a *Distribution Network Service Provider*, persons registered on its *industry engagement register*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

Screening for options

- (b) Subject to paragraph (c), a *RIT-D proponent* must prepare and *publish* a an *options screening report* under paragraph (e) if a *RIT-D project* is subject to the *regulatory investment test for distribution* under [clause 5.17.3](#).
- (c) A *RIT-D proponent* is not required to comply with paragraph (b) if it determines on reasonable grounds that there will not be a *non-network option* or a *SAPS option* that is a *potential credible option*, or that forms a significant part of a *potential credible option*, for the *RIT-D project* to address the identified need.
- (d) If a *RIT-D proponent* makes a determination under paragraph (c), then as soon as possible after making the determination it must *publish* a notice setting out the reasons for its determination, including any methodologies and assumptions it used in making its determination.

Options screening report

- (e) An *options screening report* must include:
 - (1) a description of the *identified need*;
 - (2) the assumptions used in identifying the *identified need* (including, in the case of proposed *reliability corrective action*, why the *RIT-D proponent* considers *reliability corrective action* is necessary);
 - (3) if available, the relevant annual deferred *augmentation* charge associated with the *identified need*;

- (4) the technical characteristics of the *identified need* that a *non-network option* or (in relation to a *SAPS enabled network*) a *SAPS option* would be required to deliver, such as:
 - (i) the size of *load* reduction or additional *supply*;
 - (ii) location;
 - (iii) contribution to *power system security* or *reliability*;
 - (iv) contribution to *power system* fault levels as determined under [clause 4.6.1](#); and
 - (v) the operating profile;
 - (5) a summary of *potential credible options* to address the *identified need*, as identified by the *RIT-D proponent*, including *network options*, *non-network options* and (in relation to a *SAPS enabled network*) *SAPS options*.
 - (6) for each *potential credible option*, the *RIT-D proponent* must provide information, to the extent practicable, on:
 - (i) a technical definition or characteristics of the option;
 - (ii) the estimated construction timetable and *commissioning date* (where relevant); and
 - (iii) the total indicative cost (including capital and operating costs); and
 - (7) information to assist *non-network providers* wishing to present alternative *potential credible options* including details of how to submit a proposal for consideration by the *RIT-D proponent*.
- (f) The *options screening report* must be *published* in a timely manner having regard to the ability of parties to identify the scope for, and develop, alternative *potential credible options* or variants to the *potential credible options*.
- (g) At the same time as *publishing* the *options screening report*, the *RIT-D proponent*, if it is a *Distribution Network Service Provider*, must notify persons registered on its *industry engagement register* of the report's *publication*.

- (h) *Registered Participants, AEMO, interested parties, non-network providers* and (if relevant) persons registered on the *Distribution Network Service Provider's industry engagement register* must be provided with not less than three months in which to make submissions on the *options screening report* from the date that the *RIT-D proponent publishes* the report.

Draft project assessment report

- (i) If one or more *Network Service Providers* wishes to proceed with a *RIT-D project* following a determination under paragraph (c) or the publication of a *options screening report* then the *RIT-D proponent*, having regard, where relevant, to any submissions received on the *options screening report*, must prepare and *publish* a *draft project assessment report* within:
- (1) 12 months of:
 - (i) the end of the consultation period on an *options screening report*; or
 - (ii) where an *options screening report* is not required, the publication of a notice under paragraph (d); or
 - (2) any longer time period as agreed to in writing by the *AER*.
- (j) The *draft project assessment report* must include the following:
- (1) a description of the *identified need* for the investment;
 - (2) the assumptions used in identifying the *identified need* (including, in the case of proposed *reliability corrective action*, reasons that the *RIT-D proponent* considers *reliability corrective action* is necessary);
 - (3) if applicable, a summary of, and commentary on, the submissions on the *options screening report*;
 - (4) a description of each *credible option* assessed;
 - (5) where a *Distribution Network Service Provider* has quantified market benefits in accordance with [clause 5.17.1\(d\)](#), a quantification of each applicable market benefit for each *credible option*;

- (6) a quantification of each applicable cost for each *credible option*, including a breakdown of operating and capital expenditure;
 - (7) a detailed description of the methodologies used in quantifying each class of cost and market benefit;
 - (8) where relevant, the reasons why the *RIT-D proponent* has determined that a class or classes of market benefits or costs do not apply to a *credible option*;
 - (9) the results of a net present value analysis of each *credible option* and accompanying explanatory statements regarding the results;
 - (10) the identification of the proposed *preferred option*;
 - (11) for the proposed *preferred option*, the *RIT-D proponent* must provide:
 - (i) details of the technical characteristics;
 - (ii) the estimated construction timetable and *commissioning date* (where relevant);
 - (iii) the indicative capital and operating cost (where relevant);
 - (iv) a statement and accompanying detailed analysis that the proposed *preferred option* satisfies the *regulatory investment test for distribution*; and
 - (v) if the proposed *preferred option* is for *reliability corrective action* and that option has a proponent, the name of the proponent; and
 - (12) contact details for a suitably qualified staff member of the *RIT-D proponent* to whom queries on the draft report may be directed.
- (k) The *RIT-D proponent* must *publish* a request for submissions on the matters set out in the *draft project assessment report*, including the proposed *preferred option*, from:
- (1) *Registered Participants, AEMO, non-network providers* and *interested parties*; and
 - (2) if the *RIT-D proponent* is a *Distribution Network Service Provider*, persons on its *industry engagement register*.

- (l) If the proposed *preferred option* has the potential to, or is likely to, have an adverse impact on the quality of service experienced by consumers of electricity, including:
 - (1) anticipated changes in voluntary *load* curtailment by consumers of electricity; or
 - (2) anticipated changes in involuntary *load shedding* and customer interruptions caused by *network* outages,

then the *RIT-D proponent* must consult directly with those affected customers in accordance with a process reasonably determined by the *RIT-D proponent*.

- (m) The consultation period on the *draft project assessment report* must not be less than six weeks from the *publication* of the report.

Exemption from the draft project assessment report

- (n) A *RIT-D proponent* is not required to prepare and *publish* a *draft project assessment report* under paragraph (i) if:
 - (1) the *RIT-D proponent* made a determination under paragraph (c) and has *published* a notice under paragraph (d); and
 - (2) the estimated capital cost to the *Network Service Providers* affected by the *RIT-D project* of the proposed *preferred option* is less than \$10 million (varied in accordance with a *cost threshold determination*).

Final project assessment report

- (o) As soon as practicable after the end of the consultation period on the *draft project assessment report*, the *RIT-D proponent* must, having regard to any submissions received on the *draft project assessment report*, *publish* a *final project assessment report*.
- (p) If the *RIT-D project* is exempt from the *draft project assessment report* stage under paragraph (n), the *RIT-D proponent* must *publish* the *final project assessment report* as soon as practicable after the publication of the notice under paragraph (d).
- (q) At the same time as *publishing* the *final project assessment report*, a *RIT-D proponent* that is a *Distribution Network Service Provider* must notify persons on its *industry engagement register* of the report's *publication*.

- (r) The *final project assessment report* must set out:
- (1) if a *draft project assessment report* was prepared:
 - (i) the matters detailed in that report as required under paragraph (j); and
 - (ii) a summary of any submissions received on the *draft project assessment report* and the *RIT-D proponent's* response to each such submission; and
 - (2) if no *draft project assessment report* was prepared, the matters specified in paragraph (j).
- (s) If the *preferred option* outlined in the *final project assessment report* has an estimated capital cost to the *Network Service Providers* affected by the *RIT-D project* of less than \$20 million (varied in accordance with a *cost threshold determination*), the *RIT-D proponent* may discharge its obligations to *publish* its *final project assessment report* under paragraphs (o) and (p) by including the *final project assessment report* as part of its *Distribution Annual Planning Report* (where the *RIT-D proponent* is a *Distribution Network Service Provider*) or its *Transmission Annual Planning Report* (where the *RIT-D proponent* is a *Transmission Network Service Provider*).

Reapplication of regulatory investment test for distribution

- (t) If:
- (1) a *RIT-D proponent* has *published* a *final project assessment report* in respect of a *RIT-D project*;
 - (2) a *Network Service Provider* still wishes to undertake the *RIT-D project* to address the *identified need*; and
 - (3) there has been a material change in circumstances which, in the reasonable opinion of the *RIT-D proponent* means that the *preferred option* identified in the *final project assessment report* is no longer the *preferred option*,

then the *RIT-D proponent* must reapply the *regulatory investment test for distribution* to the *RIT-D project*, unless otherwise determined by the *AER*.

- (u) For the purposes of paragraph (t), a material change in circumstances may include, but is not limited to, a change to the key assumptions

used in identifying:

- (1) the *identified need* described in the *final project assessment report*; or,
 - (2) the *credible options* assessed in, the *final project assessment report*.
- (v) When making a determination under paragraph (t) the *AER* must have regard to:
- (1) the *credible options* (other than the *preferred option*) identified in the *final project assessment report*;
 - (2) the change in circumstances identified by the *RIT-D proponent*; and
 - (3) whether a failure to promptly undertake the *RIT-D project* is likely to materially affect the *reliability* and *secure operating state* of the *distribution network* or a significant part of that *network*.

CLAUSE
5.17.5

Disputes in relation to application of regulatory investment test for distribution

- (a) *Registered Participants*, the *AEMC*, *Connection Applicants*, *Intending Participants*, *AEMO*, *interested parties*, and *non-network providers* may, by notice to the *AER*, dispute conclusions made by the *RIT-D proponent* in the *final project assessment report* on the grounds that:
- (1) the *RIT-D proponent* has not applied the *regulatory investment test for distribution* in accordance with the *Rules*; or
 - (2) there was a manifest error in the calculations performed by the *RIT-D proponent* in applying the *regulatory investment test for distribution*.
- (b) A dispute under this clause 5.17.5 may not be raised in relation to any matters set out in the *final project assessment report* which:
- (1) are treated as externalities by the *regulatory investment test for distribution*; or
 - (2) relate to an individual's personal detriment or property rights.
- (c) Within 30 days of the date of *publication* of the *final project assessment report* under clause 5.17.4(o), (p) or (s) (as the case may

be), the party disputing matters in the *final project assessment report* (a *disputing party*) must:

- (1) give notice of the dispute in writing setting out the grounds for the dispute (the *dispute notice*) to the *AER*; and
 - (2) at the same time, give a copy of the *dispute notice* to the *RIT-D proponent*.
- (d) Subject to paragraph (h), within 40 days of receipt of the *dispute notice* or within an additional period of up to 60 days where the *AER* notifies a relevant party that the additional time is required to make a determination because of the complexity or difficulty of the issues involved, the *AER* must either:
- (1) reject any dispute by written notice to the person who initiated the dispute if the *AER* considers that the grounds for the dispute are invalid, misconceived or lacking in substance; and
 - (2) notify the *RIT-D proponent* that the dispute has been rejected; or
 - (3) subject to paragraph (f) and (g), make and *publish* a determination:
 - (i) directing the *RIT-D proponent* to amend the matters set out in the *final project assessment report*; or
 - (ii) stating that, based on the grounds of the dispute, the *RIT-D proponent* will not be required to amend the *final project assessment report*.
- (e) A *RIT-D proponent* must comply with an *AER* determination made under subparagraph (d)(3)(i) within a timeframe specified by the *AER* in its determination.
- (f) In making a determination under paragraph (d)(3), the *AER*:
- (1) must only take into account information and analysis that the *RIT-D proponent* could reasonably be expected to have considered or undertaken at the time that it performed the *regulatory investment test for distribution*;
 - (2) must *publish* its reasons for making a determination;
 - (3) may disregard any matter raised by the *disputing party* or the *RIT-D proponent* that is misconceived or lacking in substance; and

- (4) where making a determination under subparagraph (d)(3)(i), must specify a reasonable timeframe for the *RIT-D proponent* to comply with the *AER's* direction to amend the matters set out in the *final project assessment report*.
- (g) The *AER* may only make a determination under subparagraph (d)(3)(i) if it determines that:
- (1) the *RIT-D proponent* has not correctly applied the *regulatory investment test for distribution* in accordance with the *Rules*; or
 - (2) there was a manifest error in the calculations performed by the *RIT-D proponent* in applying the *regulatory investment test for distribution*.
- (h) The *AER* may request additional information regarding the dispute from the *disputing party* or the *RIT-D proponent* in which case the period of time for rejecting a dispute under paragraph (d)(1) or making a determination under paragraph (d)(3) is automatically extended by the time it takes the relevant party to provide the additional information to the *AER* provided:
- (1) the *AER* makes the request for additional information at least seven days prior to the expiry of the relevant period; and
 - (2) the *RIT-D proponent* or *disputing party* provides the additional information within 14 days of receipt of the request under subparagraph (1).
- (i) A *disputing party* or the *RIT-D proponent* (as the case may be) must as soon as reasonably practicable provide any information requested under paragraph (h) to the *AER*.