

## **CHAPTER 5**



## 5. Network Connection Access, Planning and Expansion

### Part A Introduction

#### 5.1 Introduction to Chapter 5

##### 5.1.1 Structure of this Chapter

- (a) This Chapter deals with matters relating to *networks*.
- (b) It is divided into the following Parts:
  - (1) this Part is introductory;
  - (2) Part B provides a framework for *connection* and access to a *transmission network* or a *distribution network* and to the *national grid*;
  - (3) Part C addresses the *network* related issues following the negotiation of a *connection agreement* under Part B, namely the design of *connected* equipment, inspection and testing, commissioning and *disconnection* and reconnection; and
  - (4) Part D deals with the planning and expansion of *networks* and the *national grid*.

##### 5.1.2 Overview of Part B and connection and access under the Rules

- (a) Rule 5.1A sets out the purpose, application and principles for Part B.
- (b) Rule 5.2 sets out the obligations of *Registered Participants* under Part B and other relevant Parts of this Chapter 5.
- (c) Rule 5.2A sets out obligations and principles relevant to *connection* and access to *transmission networks* and *large dedicated connection assets*. This includes the classification of certain services relating to assets relevant to *connection* as *prescribed transmission services*, *negotiated transmission services* and *non-regulated transmission services*. Rule 5.2A does not apply to the *declared transmission system* of an *adoptive jurisdiction*.
- (d) Rules 5.3, 5.3A and 5.3AA and Chapter 5A set out processes by which *Connection Applicants* can negotiate for connection and access to the *national grid* from a *Network Service Provider*. The process applicable will depend on the nature of the application. The table below sets out an overview of the relevant processes:

| Connection Applicant   | Process  |
|--|--|
| A <i>Registered Participant</i> or a person intending to become a <i>Registered Participant</i> for a <i>generating plant</i> connecting to a <i>transmission network</i>  | Rule 5.3 applies   |
| A <i>Registered Participant</i> or a person intending to become a <i>Registered Participant</i> (or a person pursuant to clause 5.1A.1(c)) for a <i>load</i> connecting to a <i>transmission network</i>   | Rule 5.3 applies   |
| A <i>load</i> connecting to a <i>distribution network</i> where the <i>Connection Applicant</i> is a <i>Registered Participant</i> or a person intending to become a <i>Registered Participant</i> (and is not acting as the agent of a <i>retail customer</i> )   | Rule 5.3 applies   |
| A <i>distribution network</i> (including an <i>embedded network</i> ) connecting to another <i>distribution network</i> or to a <i>transmission network</i> where the <i>Connection Applicant</i> is a <i>Registered Participant</i> , intending to become a <i>Registered Participant</i> or will obtain an exemption from registration | Rule 5.3 applies   |
| A <i>Market Network Service Provider</i> or person intending to register as one seeking connection to a <i>distribution network</i> or a <i>transmission network</i>   | Rule 5.3 applies   |
| An <i>embedded generating unit</i> connecting to a <i>distribution network</i> where the <i>Connection Applicant</i> is a <i>Registered Participant</i> or a person intending to become a <i>Registered Participant</i>  | Rules 5.3 and 5.3A apply (see clause 5.3.1A for the interaction between the two rules) |
| A non-registered embedded generator who makes an election for rule 5.3A to apply instead of Chapter 5A   | Rules 5.3 and 5.3A apply (see clause 5.3.1A for the interaction between the two rules) |
| A <i>Generator</i> wishing to alter a <i>connected generating plant</i> in the circumstances set out in clause 5.3.9   | Clause 5.3.9 applies   |

| Connection Applicant  | Process   |
|---|---|
| A <i>Connection Applicant</i> for <i>prescribed transmission services</i> or <i>negotiated transmission services</i> that do not require the establishment or modification of a <i>connection</i> or alteration of a <i>connected generating plant</i> in the circumstances set out in clause 5.3.9   | Rule 5.3 applies as modified by clause 5.2A.3(c)                    |
| An <i>Embedded Generator</i> or <i>Market Network Service Provider</i> applying for <i>distribution network user access</i>   | Rule 5.3 or 5.3A (as applicable) and rule 5.3AA apply               |
| A <i>load</i> or <i>generating plant</i> connecting to a <i>declared shared network</i>   | Rule 5.3 as modified by clause 5.1A.1(d) to (g) and rule 5.3B apply |
| A <i>load</i> connecting to a <i>distribution network</i> where the <i>Connection Applicant</i> is not a <i>Registered Participant</i> and is not intending to become a <i>Registered Participant</i> (unless it is acting as the agent of a <i>retail customer</i> )<br><br>A non-registered embedded generator who does not make an election for Rule 5.3A to apply instead of Chapter 5A | Chapter 5A applies  |
| A <i>retail customer</i> (or a <i>retailer</i> on behalf of that customer) connecting a micro embedded generator to a <i>distribution network</i>   | Chapter 5A applies  |

- (e) In addition to the rules referred to in paragraph (d), in relation to *connection* and access to a *distribution network*:
- (1) a *Distribution Network Service Provider* must comply with its *negotiating framework* and *Negotiated Distribution Service Criteria* when *negotiating the terms and conditions of access* to *negotiated distribution services*;
  - (2) disputes relating to the *terms and conditions of access* to a *direct control service* or to a *negotiated distribution service*, *access charges* or matters referred to in clause 5.3AA(f) (*negotiated use of system charges*) or 5.3AA(h) (avoided charges for the locational component of *prescribed TUOS services*) may be referred to the AER in accordance with Part L of Chapter 6;

- (3) Part G of Chapter 5A provides for dispute resolution by the *AER* for certain disputes under Chapter 5A; and
  - (4) other disputes relating to *connection* and access may be subject to dispute resolution under rule 8.2.
- (f) In addition to the rules referred to in paragraph (d), in relation to *connection* and access to a *transmission network*:
- (1) schedule 5.11 sets out the negotiating principles which apply to negotiations between a *Transmission Network Service Provider* and a *Connection Applicant* for *negotiated transmission services*;
  - (2) rule 5.4 provides a framework for *Connection Applicants* and *Transmission Network Service Providers* to appoint an *Independent Engineer* to provide advice on certain technical matters; and
  - (3) rule 5.5 provides for commercial arbitration of disputes between a *Transmission Network Service Provider* and a *Connection Applicant* as to *terms and conditions of access* for the provision of *prescribed transmission services* or for the provision of *negotiated transmission services*.
- (g) Part B also provides for a *Dedicated Connection Asset Service Provider* to have an *access policy* for a *large dedicated connection asset* and for *commercial arbitration* under rule 5.5 to apply to a *large DCA services access dispute*.

## **Part B Network Connection and Access**

### **5.1A Introduction to Part B**

#### **5.1A.1 Purpose and Application**

- (a) This Part B:
- (1) **[Deleted]**
  - (2) has the following aims:
    - (i) to detail the principles and guidelines governing *connection* and access to a *network*;
    - (ii) to establish the process to be followed by a *Registered Participant* or a person intending to become a *Registered Participant* for establishing or modifying a *connection* to a *network* or for altering *generating plant connected to a network*;
    - (iii) to address a *Connection Applicant's* reasonable expectations of the level and standard of *power transfer capability* that the relevant *network* should provide; and

- (iv) to establish processes to ensure ongoing compliance with the technical requirements of this Part B to facilitate management of the *national grid*.
- (b) **[Deleted]**.
- (c) If a person who is not a *Registered Participant* or a person intending to become a *Registered Participant* requests *connection* of a *load* to a *transmission network* and agrees to comply with this Part B as if that person was a *Registered Participant*, the relevant *Transmission Network Service Provider* must comply with this Part B as if that person was a *Registered Participant*.
- (d) Subject to paragraphs (e) and (g), the following *Rules* apply in the application of this Part B to *transmission services* provided by means of, or in connection with, the *declared transmission system* of an *adoptive jurisdiction*:
  - (1) a reference to a *Network Service Provider* is, in relation to the provision of *connection services*, to be read as a reference to a *declared transmission system operator*; and
  - (2) a reference to a *Network Service Provider* is, in relation to the provision of *shared transmission services*, to be read as a reference to *AEMO*.
- (e) A reference in any of the following provisions to a *Network Service Provider* will, in relation to the *declared transmission system* of an *adoptive jurisdiction*, be construed as a reference to *AEMO*:
  - (1) clause 5.2.3(b);
  - (2) clause 5.2.6;
  - (3) clause 5.3A.12;
  - (4) clause 5.7.6;
  - (5) clause 5.7.7 (except clause 5.7.7(c));
  - (6) rule 5.11;
  - (7) clause 5.12.1;
  - (8) clause 5.12.2 (except clause 5.12.2(c)(2));
  - (9) clause 5.14.1;
  - (10) schedule 5.1, clause S5.1.2.3;
  - (11) schedule 5.3, clause S5.3.5.
- (f) Subject to clause (f1) a reference in:

- (1) the definition of RIT-T proponent in clause 5.10.2;
- (2) clause 5.14.3;
- (3) clause 5.16.4;
- (4) clause 5.16.5;
- (5) rule 5.18;
- (6) rule 5.19;
- (7) rule 5.20B; and
- (8) rule 5.20C,

to a *Transmission Network Service Provider* will, in relation to the *declared transmission system* of an *adoptive jurisdiction*, be construed as a reference to *AEMO*.

(f1) A reference in:

- (1) the definition of RIT-T proponent in clause 5.10.2;
- (2) clause 5.16.4; and
- (3) clause 5.16.5,

to a *Transmission Network Service Provider* will, in relation to the *declared transmission system* of an *adoptive jurisdiction*, be construed as a reference to the relevant *declared transmission system operator* where:

- (4) the relevant RIT-T project (as defined in clause 5.10.2) is to address an *identified need* that arises from the retirement or de-rating of *network* assets; and
- (5) a credible option (as defined in clause 5.10.2) for that RIT-T project (as defined in clause 5.10.2) is replacement of *network* assets.

(g) A reference in any of the following provisions to a *Network Service Provider* will, in relation to the *declared transmission system* of an *adoptive jurisdiction*, be construed as a reference to the relevant *declared transmission system operator*:

- (1) clause 5.2.3(d)(12), (e) and (e1)(except 5.2.3(e1)(2));
- (2) clause 5.3.4A(c) and (d);
- (3) clause 5.9.3;
- (4) clause 5.9.4;
- (5) clause 5.9.6;



- (6) Schedule 5.1, clause S5.1.10.3(a);
- (7) Schedule 5.2 clause S5.2.3(a)(8).

## 5.1A.2 Principles

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

- (a) all *Registered Participants* should have the opportunity to form a *connection* to a *network* and have access to the *network services* provided by the *networks* forming part of the *national grid*;
- (b) the terms and conditions on which *connection* to a *network* and provision of *network service* is to be granted are to be set out in commercial agreements on reasonable terms entered into between a *Network Service Provider* and other *Registered Participants*;
- (c) the technical terms and conditions of *connection agreements* regarding standards of performance must be established at levels at or above the *minimum access standards* set out in schedules 5.1, 5.2, 5.3 and 5.3a, with the objective of ensuring that the *power system* operates securely and reliably and in accordance with the *system standards* set out in schedule 5.1a;
- (d) **[Deleted]**
- (e) the operation of the *Rules* should result in the achievement of:
  - (1) long term benefits to *Registered Participants* in terms of cost and *reliability* of the *national grid*; and
  - (2) open communication and information flows relating to *connections* between *Registered Participants* themselves, and between *Registered Participants* and AEMO, while ensuring the security of *confidential information* belonging to competitors in the *market*.

## 5.2 Obligations

### 5.2.1 Obligations of Registered Participants

- (a) All *Registered Participants* must maintain and operate (or ensure their authorised *representatives* maintain and operate) all equipment that is part of their *facilities* in accordance with:
  - (1) relevant laws;
  - (2) the requirements of the *Rules*; and
  - (3) *good electricity industry practice* and relevant *Australian Standards*.

- (b) All *Registered Participants* must ensure that the *connection agreements* to which they are a party require the provision and maintenance of all required *facilities* consistent with *good electricity industry practice* and must operate their equipment in a manner:
  - (1) to assist in preventing or controlling instability within the *power system*;
  - (2) to comply with their *performance standards*;
  - (3) to assist in the maintenance of, or restoration to, a *satisfactory operating state* of the *power system*; and
  - (4) to prevent uncontrolled separation of the *power system* into isolated *regions* or partly combined *regions*, *intra-regional transmission break-up*, or *cascading outages*, following any *power system* incident.

### 5.2.2 Connection agreements

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

#### Note

This clause is classified as a 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) The *Rules* apply to:
  - (1) *connection agreements* made after 13 December 1998;
  - (2) deemed *connection agreements* under paragraph (a); and
  - (3) requests to establish *connection* after 13 December 1998.
- (c) This Chapter is neither intended to have, nor is it to be read or construed as having, the effect of:
  - (1) altering any of the terms of a *connection agreement*; or
  - (2) altering the contractual rights or obligations of any of the parties under the *connection agreement* as between those parties; or
  - (3) relieving the parties under any such *connection agreement* of their contractual obligations under such an agreement.
- (d) Notwithstanding the provisions of clause 5.2.2(c), if any obligation imposed or right conferred on a *Registered Participant* by this Chapter is inconsistent

with the terms of a *connection agreement* to which the *Rules* apply and the application of the inconsistent terms of the *connection agreement* would adversely affect the quality or security of *network service* to other *Network Users*, the parties to the *connection agreement* must observe the provisions of this Chapter as if they prevail over the *connection agreement* to the extent of the inconsistency.

### 5.2.3 Obligations of network service providers

- (a) To be registered by *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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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* (including a *Dedicated Connection Asset Service Provider*) must arrange for operation of that part of the *national grid* over which it has control in accordance with instructions given by *AEMO*.

**Note**

This clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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.

### **5.2.3A Obligations of Market Network Service Providers**

- (a) If in *AEMO's* reasonable opinion, there is a risk a *Market 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 *Market Network Service Provider* to provide information of the type described in clause S5.3a.1(a1), and following such a request, the *Market Network Service Provider* must provide the information to *AEMO* and the 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 clause is classified as a 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 in *AEMO's* reasonable opinion, information of the type described in clause S5.3a.1(a1) is required to enable a *Network Service Provider* to conduct the assessment required by clause 5.3.4B, *AEMO* may request a *Market Network Service Provider* to provide the information, and following such a request, the *Market Network Service Provider* must provide the information to *AEMO* and the relevant *Network Service Provider*.



**Note**

This clause is classified as a 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) All information provided to *AEMO* and the relevant *Network Service Provider(s)* under paragraphs (a) and (b) must be treated as *confidential information* by those recipients.

## 5.2.4 Obligations of customers

- (a) Each *Customer* must plan and design its *facilities* and ensure that its *facilities* are operated to comply with:
  - (1) its *connection agreement* with a *Network Service Provider*;
  - (2) subject to clause 5.2.4(a)(1), all applicable *performance standards*; and
  - (3) subject to clause 5.2.4(a)(2), the *system standards*.

**Note**

This clause is classified as a 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 *Customer* must:
  - (1) submit an *application to connect* in respect of new or altered equipment owned, operated or controlled by the *Customer* and enter into a *connection agreement* with a *Network Service Provider* in accordance with 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 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 5.3;
  - (3) provide *load* 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 any intended voluntary permanent *disconnection* in accordance with rule 5.9.
- (c) If in *AEMO*'s reasonable opinion, there is a risk that a *Customer's plant* 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 a *Customer* to which Schedule 5.3 applies to provide information of the type described in clause S5.3.1(a1), and following such a request, the *Customer* must provide the information to *AEMO* and the 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 clause is classified as a 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) If in *AEMO*'s reasonable opinion, information of the type described in clause S5.3.1(a1) is required to enable a *Network Service Provider* to conduct the assessment required by clause 5.3.4B, *AEMO* may request a *Customer* to which Schedule 5.3 applies, to provide the information, and following such a request, the *Customer* must provide the information to *AEMO* and the relevant *Network Service Provider*.

**Note**

This clause is classified as a 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) All information provided to *AEMO* and the relevant *Network Service Provider(s)* under paragraphs (c) and (d) must be treated as *confidential information* by those recipients.

## 5.2.5 Obligations of Generators

- (a) A *Generator* must plan and design its *facilities* and ensure that they are operated to comply with:
  - (1) the *performance standards* applicable to those *facilities*;
  - (2) subject to subparagraph (1), its *connection agreement* applicable to those *facilities*; and
  - (3) subject to subparagraph (2), the *system standards*.

**Note**

This clause is classified as a 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* must:
- (1) submit an *application to connect* in respect of new *generating plant* owned, operated or controlled by the *Generator*, or to be owned, operated or controlled by the *Generator*, and enter into a *connection agreement* with a *Network Service Provider* in accordance with rule 5.3 prior to that *generating plant* being *connected* to the *network* of that provider;
  - (2) comply with the reasonable requirements of the relevant *Network Service Provider* in respect of design requirements of *generating plant* proposed to be *connected* to the *network* of that provider in accordance with rule 5.6 and schedule 5.2;
  - (3) provide *generation* 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) give notice of intended voluntary permanent *disconnection* in accordance with rule 5.9.
- (c) A *Generator* must comply with any terms and conditions of a *connection agreement* for its *generating system* that provide for the implementation, operation, maintenance or performance of a *system strength remediation scheme*.

**Note**

This clause is classified as a 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) If in AEMO's reasonable opinion, there is a risk that a *Generator's plant* 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 a *Generator* to provide information of the type described in clause S5.2.4, and following such a request, the *Generator* must provide the information to *AEMO* and the 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 clause is classified as a 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) If in *AEMO's* reasonable opinion, information of the type described in clause S5.2.4 is required to enable a *Network Service Provider* to conduct the assessment required by clause 5.3.4B, *AEMO* may request a *Generator* to provide the information, and following such a request, the *Generator* must provide the information to *AEMO* and the relevant *Network Service Provider*.

**Note**

This clause is classified as a 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) All information provided to *AEMO* and the relevant *Network Service Provider(s)* under paragraphs (c) and (d) must be treated as *confidential information* by those recipients.

## **5.2.6 Obligations of AEMO**

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

### **5.2.6A AEMO review of technical requirements for connection**

- (a) *AEMO* must conduct a review of some or all of the technical requirements set out in Schedule 5.2, Schedule 5.3 and Schedule 5.3a at least once in every five year period (and may conduct a review more frequently if *AEMO* considers necessary) to assess whether those requirements should be amended, having regard to:
  - (1) the *national electricity objective*;
  - (2) the need to achieve and maintain *power system security*;

- (3) changes in *power system* conditions; and
  - (4) changes in technology and capabilities of *facilities* and *plant*.
- (b) When conducting a review under this clause 5.2.6A, *AEMO* must consult with, among other affected parties, the *Reliability Panel*.
- (c) *AEMO* must commence a review under this clause 5.2.6A with the publication of an approach paper on its website, which must:
  - (1) set out the scope of the review, including the nature and extent of the issues to be reviewed;
  - (2) describe the technical requirements to be consulted on; and
  - (3) state the date by which a draft report will be published.
- (d) *AEMO* must publish a draft report on its website that:
  - (1) sets out *AEMO's* recommendations for any amendments to the technical requirements set out in Schedule 5.2, Schedule 5.3 and Schedule 5.3a and the reasons for those recommendations; and
  - (2) includes an invitation for written submissions to be made to *AEMO* within a period specified in the invitation (which must be at least 30 *business days*) on the technical requirements and recommendations in the draft report and must publish any submissions on its website, subject to obligations in respect of *confidential information*.
- (e) *AEMO* must publish a final report on its website within 12 months of the approach paper's publication under paragraph (c), setting out *AEMO's* recommendations for any amendments to the technical requirements set out in Schedule 5.2, Schedule 5.3 and Schedule 5.3a, having regard to the matters set out in subparagraphs (a)(1) to (4) and any submissions made in response to its invitation under subparagraph (d)(2).
- (f) As soon as practicable following publication of a final report under paragraph (e), *AEMO* must provide written notification to the *AEMC* as to whether *AEMO* will be submitting a *Rule* change proposal that results from the review.

## 5.2.7 Obligations of Dedicated Connection Asset Service Providers

- (a) A *Dedicated Connection Asset Service Provider* must classify its *dedicated connection asset* as a *small dedicated connection asset* or a *large dedicated connection asset* in accordance with Chapter 2.
- (b) A *Dedicated Connection Asset Service Provider* must plan and design its *dedicated connection assets* and ensure that they are operated to comply with:

- (1) the *performance standards* applicable to those *facilities connected* to those *dedicated connection assets*;
- (2) subject to subparagraph (1), its *connection agreement* applicable to those *dedicated connection assets*; and
- (3) subject to subparagraph (2), the *system standards*.

**Note**

This clause is classified as a 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) A *Dedicated Connection Asset Service Provider* for a *large dedicated connection asset* must prepare, maintain and publish an *access policy* in accordance with clause 5.2A.8.
- (d) A *Dedicated Connection Asset Service Provider* must:
  - (1) permit and participate in inspection and testing of *facilities* and equipment in accordance with rule 5.7;
  - (2) 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;
  - (3) give notice of intended voluntary permanent *disconnection* in accordance with rule 5.9; and
  - (4) in relation to a *connection* to an *identified user shared asset*, ensure that there is a *connection agreement* between itself and the *Primary Transmission Network Service Provider*.

## 5.2A Transmission network connection and access

### 5.2A.1 Application

- (a) This rule 5.2A does not apply in relation to *connection* and access to the *declared transmission system* of an *adoptive jurisdiction*.
- (b) In this rule 5.2A, a reference to ownership in relation to an asset includes a leasehold interest.

### 5.2A.2 Relevant assets

- (a) The assets relevant to *connection* and access to the *transmission network* and the person who is registered for those assets are set out in the following table:

| Asset                                      | Registered Person                   |
|--|-------------------------------------|
| primary <i>transmission network</i> in the | <i>Primary Transmission Network</i> |

| <b>Asset</b>   | <b>Registered Person</b>   |
|--|--|
| <i>participating jurisdictions.</i>  | <i>Service Provider</i>  |
| <i>identified user shared asset owned by the Primary Transmission Network Service Provider</i> | <i>Primary Transmission Network Service Provider</i><br><br>(forms part of that provider's broader <i>transmission network</i> )   |
| <i>third party IUSA</i>  | <i>Primary Transmission Network Service Provider</i> (as controller and operator of the <i>third party IUSA</i> under a <i>network operating agreement</i> )<br><br>(forms part of that provider's broader <i>transmission network</i> ) |
| <i>dedicated connection asset</i>  | <i>Dedicated Connection Asset Service Provider</i>   |
| <i>network connection asset</i>  | <i>Transmission Network Service Provider</i>   |
| <i>facility of a Transmission Network User</i>   | <i>Transmission Network User</i> (if registration required or obtained)  |

- (b) The intention of this rule 5.2A and Chapter 2 is that there is a *Registered Participant* for each asset connecting the *transmission network* to the *facilities* of the *Transmission Network User*, subject to exemptions obtained under Chapter 2.

### 5.2A.3 Connection and access to transmission services

- (a) The following *transmission services* are relevant to *connection* and access to the *transmission network*:

| <b>Service classification</b>           | <b>TNSP obligations</b>  | <b>Assets involved</b>                                    |
|---|--|---|
| <i>prescribed transmission services</i> | Subject to access under Chapter 5 and economic regulation under Chapter 6A | <i>transmission network and network connection assets</i> |
| <i>negotiated transmission services</i> | Subject to access under Chapter 5  | <i>transmission network</i>                               |
| <i>large DCA services</i>               | Subject to access under the <i>access policy</i> established under         | <i>large dedicated connection assets</i>                  |

| Service classification                     | TNSP obligations  | Assets involved            |
|--|---|----------------------------|
|  | clause 5.2A.8   |                            |
| <i>non-regulated transmission services</i> | Not subject to access under Chapter 5 or economic regulation under Chapter 6A | <i>transmission system</i> |

- (b) A *Connection Applicant* may apply to a *Transmission Network Service Provider* for provision of a *prescribed transmission service* or a *negotiated transmission service* in accordance with rule 5.3 and the relevant *Transmission Network Service Provider* must comply with this Chapter 5 in negotiating a *connection agreement* for the requested service.
- (c) If the *prescribed transmission service* or *negotiated transmission service* sought under paragraph (b) does not require the *Connection Applicant* to establish or modify a *connection* or alter a *generating plant* in the circumstances set out in clause 5.3.9, the processes in rules 5.3, 5.4 and 5.5 will apply with such modifications as is appropriate to the nature of the service requested.
- (d) A *Transmission Network Service Provider* must provide *prescribed transmission services* or *negotiated transmission services* on *terms and conditions of access* that are consistent with the requirements of Chapters 4, 5 and 6A of the *Rules* (as applicable).
- (e) A *Transmission Network Service Provider* or a person who is provided *prescribed transmission services* or *negotiated transmission services* must not engage in conduct for the purpose of preventing or hindering access to those services.

**Note**

This clause is classified as a 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 *Connection Applicant* may terminate negotiations with the *Transmission Network Service Provider* at any time during the *connection* process provided under rules 5.3 and 5.3A with at least three *business days'* prior written notice.
- (g) A *Transmission Network Service Provider* may terminate negotiations with the *Connection Applicant* with at least three *business days'* prior written notice if:
  - (1) the *Connection Applicant* becomes insolvent or an equivalent event occurs;



- (2) the *Connection Applicant* has, in the *Transmission Network Service Provider's* reasonable opinion, provided false or misleading information;
- (3) the *Transmission Network Service Provider* has reasonable grounds to believe that the *Connection Applicant* is not negotiating in good faith; or
- (4) the *Transmission Network Service Provider* has formed the reasonable opinion that the *Connection Applicant* does not intend to obtain the service.

#### 5.2A.4 Transmission services related to connection

- (a) If a service related to assets relevant for *connection* in the following table is classified as:
  - (1) *contestable* – then the *Primary Transmission Network Service Provider* may (but is not obliged to) provide that service as a *non-regulated transmission service* on request from a *Connection Applicant*.
  - (2) *non-contestable* – then the *Primary Transmission Network Service Provider* has the exclusive right to provide that service and must negotiate under rule 5.3 to do so as a *negotiated transmission service* on request from a *Connection Applicant*.

| Asset  | Service                                  | Example of service   | Classification  |
|--|--|--|-----------------|
| <i>transmission network including identified user shared asset</i> | Functional specification for <i>IUSA</i> | Specification of: <ul style="list-style-type: none"> <li>• preferred equipment suppliers;</li> <li>• preferred equipment;</li> <li>• land/access requirements;</li> <li>• design specifications;</li> <li>• single line diagrams;</li> <li>• remote monitoring and communication requirements;</li> <li>• protection, control and metering requirements;</li> <li>• minimum operating</li> </ul> | non-contestable |

| Asset                               | Service                         | Example of service   | Classification     |
|-------------------------------------|---------------------------------|--|--------------------|
|                                     |                                 | <p>conditions;</p> <ul style="list-style-type: none"> <li>• supervisory control and data acquisition system interface requirements;</li> <li>• equipment ratings;</li> <li>• equipment protection ratings; and</li> <li>• spare parts itineraries</li> </ul>   |                    |
| <i>identified user shared asset</i> | Detailed design for <i>IUSA</i> | <p>Provision of:</p> <ul style="list-style-type: none"> <li>• site plan;</li> <li>• asset layout and configuration;</li> <li>• the specification for vendor equipment;</li> <li>• civil, structural, mechanical and electrical detailed design;</li> <li>• issued for construction drawings;</li> <li>• as built drawings;</li> <li>• tender specifications;</li> <li>• cable schedules;</li> <li>• protection settings;</li> <li>• applicable technical studies;</li> <li>• earthing design;</li> <li>• the design of lightning protection; and</li> <li>• the design of insulation co-ordination,</li> </ul> <p>consistent with the functional</p> | <i>contestable</i> |

| Asset  | Service   | Example of service   | Classification     |
|--|---|--|--------------------|
|  |   | specification.   |                    |
| <i>transmission network</i>  | Cut-in works  | Interface works which cut into the existing shared <i>transmission network</i> , these may include tower realignment, protection control and communications requirements             | non-contestable    |
| <i>contestable IUSA components</i>   | Construction / ownership  | Construction and/or ownership of a substation  | <i>contestable</i> |
| <i>non-contestable IUSA components</i>   | Construction / ownership  | Installation and ownership of supervisory control and data acquisition systems and cabling forming part of the <i>Primary Transmission Network Service Provider's control system</i> | non-contestable    |
| <i>identified user shared asset owned by the Primary Transmission Network Service Provider</i> | Control, operation and maintenance  | <i>Primary Transmission Network Service Provider</i> provides operation and maintenance services   | non-contestable    |
| <i>third party IUSA</i>  | Control, operation and maintenance under a <i>network operating agreement</i> | See clause 5.2A.7  | non-contestable    |
| <i>dedicated connection assets</i>   | All development aspects   | Design, construction, maintenance and ownership of a power line connecting a <i>facility</i>   | <i>contestable</i> |

- (b) If the capital cost of all the components that make up an *identified user shared asset* is reasonably expected by the *Primary Transmission Network Service Provider* to be \$10 million or less, the *Primary Transmission Network Service Provider* must undertake the detailed design, construction

and ownership of the *identified user shared asset* as a *negotiated transmission service*.

- (c) If the capital cost of all the components that make up an *identified user shared asset* is reasonably expected by the *Primary Transmission Network Service Provider* to exceed \$10 million, the detailed design, construction and ownership of each component of the *identified user shared asset* is a *non-regulated transmission service* to the extent that it satisfies the following criteria:
  - (1) the component being constructed is new or a complete replacement of existing assets (and does not involve the reconfiguration of existing assets); and
  - (2) the detailed design and construction of the relevant component of the *identified user shared asset* is separable in that the new component will be distinct and definable from the existing *transmission network*,  
  
 (“**contestable IUSA components**”).
- (d) To the extent that any components of an *identified user shared asset* do not satisfy the criteria set out in paragraph (c) (“**non-contestable IUSA components**”), the *Primary Transmission Network Service Provider* must negotiate under rule 5.3 to undertake the detailed design, construction and ownership of the *non-contestable IUSA components* as a *negotiated transmission service*.

**Note**

Parties may seek the advice of an *Independent Engineer* under rule 5.4 if the parties cannot agree on whether a component of an *identified user shared asset* based on the criteria under subparagraph (c)(1) and (2) is a *contestable IUSA component* or a *non-contestable IUSA component*.

### 5.2A.5 Publication and provision of information

- (a) A *Primary Transmission Network Service Provider* must publish the information on its website, or provide the information to a *Connection Applicant* on request, as required by schedule 5.10.
- (b) A *Primary Transmission Network Service Provider* may charge a *Connection Applicant* a fee for providing information where specified under schedule 5.10, the amount of which must not be more than necessary to cover the reasonable costs of work required to prepare that information.
- (c) A *Transmission Network Service Provider* and a *Connection Applicant* must provide information (including commercial information) reasonably required by the other party that would facilitate effective negotiation for the provision of a *negotiated transmission service* in a timely manner.
- (d) The *Connection Applicant* must procure that any persons it engages to undertake services which are specified to be *contestable* in the table in

clause 5.2A.4(a) provide information reasonably requested by the *Primary Transmission Network Service Provider*.

- (e) Information required to be provided under paragraphs (c) and (d) that is confidential may be provided subject to a condition that the receiving party must not provide any part of that information to any other person without the consent of the party who provided the information.

#### **5.2A.6 Negotiating principles**

- (a) If a *Connection Applicant* seeks access to *negotiated transmission services*, including in relation to an *identified user shared asset*, the *Transmission Network Service Provider* and the *Connection Applicant* must, in negotiating pursuant to rule 5.3 and other relevant *Rules*, negotiate in accordance with the *negotiating principles*.
- (b) A *Transmission Network Service Provider* must, in accordance with the *negotiating principles*:
  - (1) on request, identify and inform a *Connection Applicant* of the reasonable costs and/or the increase or decrease in costs (as appropriate) of providing a *negotiated transmission service*;
  - (2) on request, demonstrate to a *Connection Applicant* that the charges for providing a *negotiated transmission service* reflect those costs and/or the cost increment or decrement (as appropriate);
  - (3) determine the potential impact on other *Transmission Network Users* of the provision of a *negotiated transmission service*; and
  - (4) notify and consult with any affected *Transmission Network Users* and ensure that the provision of a *negotiated transmission service* does not result in non-compliance with obligations in relation to other *Transmission Network Users* under the *Rules*.
- (c) If an applicant seeks *large DCA services*, the *Dedicated Connection Asset Service Provider* must comply with its *access policy* and the negotiating principles in schedule 5.12.

#### **Note**

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

#### **5.2A.7 Third party IUSAs**

- (a) A person must not commission, or permit the commissioning of, a *third party IUSA* unless there is a *network operating agreement* between the owner of that *third party IUSA* and the *Primary Transmission Network Service Provider*.

**Note**

This clause is classified as a 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) The person who owns or is intending to own a *third party IUSA* and the *Primary Transmission Network Service Provider* must:
  - (1) include terms and conditions in the *network operating agreement* which give effect to the requirements of paragraphs (c) and (d);
  - (2) include terms and conditions in the *network operating agreement* of the kind set out in Part B of schedule 5.6; and
  - (3) negotiate the *network operating agreement* in accordance with the *negotiating principles* (where applicable).
- (c) The term of the *network operating agreement* must be for a period which is at least equal to the term of the longest *connection agreement* of a member of the initial *identified user group* for the *third party IUSA*.
- (d) The *network operating agreement* must provide for the *Primary Transmission Network Service Provider* to:
  - (1) have operation and control of the *third party IUSA* (including the rights and obligations to maintain that asset) for an agreed charge or based on an agreed charging methodology;
  - (2) have an option to purchase the *third party IUSA* at fair market value at the expiry or early termination of the *network operating agreement*;
  - (3) alter, replace or augment the *third party IUSA*;
  - (4) have the right to connect other persons to the *third party IUSA* in accordance with the *Rules*;
  - (5) have unrestricted use of, and access to, the *third party IUSA*; and
  - (6) treat the *third party IUSA* as forming part of the *Primary Transmission Network Service Provider's transmission network* in all material respects and provide *transmission services* to any *Transmission Network User* in accordance with the *Rules*.
- (e) A person who owns a *third party IUSA* must not:
  - (1) own, operate or control a *generating system*;
  - (2) own, operate or control a *facility* utilising electrical *energy*; or
  - (3) be a related entity of a person owning, operating or controlling a *generating system* or *facility* utilising electrical *energy*,

that is *connected* to that *third party IUSA*.

**Note**

This clause is classified as a 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) In paragraph (e):

**related entity** means, in relation to an entity, an entity that controls, or is controlled by, that first mentioned entity;

**entity** has the meaning given in the *Corporations Act 2001* (Cth) subject to section 64A of the *Corporations Act 2001* (Cth) not applying to such meaning; and

**control** has the meaning given in the *Corporations Act 2001* (Cth).

### 5.2A.8 Access framework for large dedicated connection assets

- (a) This clause 5.2A.8 applies only to *large dedicated connection assets*.
- (b) A *Dedicated Connection Asset Service Provider* must prepare, maintain and publish an *access policy* on its website to provide a framework for applicants to obtain access to *large DCA services*. An *access policy* must include, as a minimum, the following information:
- (1) a description of the routes, tenure arrangements and main components of the *large dedicated connection asset* and the *facilities connected* to it;
  - (2) any material regulatory limitations relating to the development and operation of the *large dedicated connection asset*;
  - (3) the pricing principles and the key terms which are proposed to apply to the provision of *large DCA services* where such principles and terms must be consistent with schedule 5.12;
  - (4) the process by which an applicant may seek access to *large DCA services*, which must include a right for an applicant to obtain sufficient information to enable it to prepare a request for the *large DCA services* it requires and contact details for access enquiries; and
  - (5) advice on the availability of commercial arbitration under rule 5.5 in the case of a dispute.
- (c) The *AER* has the function of:
- (1) approving an *access policy* and variations to it; and
  - (2) enforcing compliance with an *access policy*.

- (d) Within 30 days of an asset being classified as a *large dedicated connection asset* under Chapter 2, a *Dedicated Connection Asset Service Provider* must submit an *access policy* for approval by the *AER*.

**Note**

This clause is classified as a 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 *Dedicated Connection Asset Service Provider* may seek approval of a variation to an *access policy* from the *AER* at any time and must do so where required to keep the *access policy* up to date.
- (f) The *AER* must approve an *access policy*, or a variation to an *access policy*, if it is reasonably satisfied that it complies with paragraph (b). If the *AER* does not approve an *access policy* submitted under paragraph (d), the *AER* must notify of the changes required for it to be approved. If an *access policy* is not approved within 6 months of the *AER's* notification of required changes, the *AER* may itself propose an *access policy*.
- (g) The *AER's* proposal for an *access policy* is to be formulated with regard to:
  - (1) the minimum requirements set out in paragraph (b);
  - (2) the *Dedicated Connection Asset Service Provider's* proposed *access policy*; and
  - (3) the *AER's* reasons for refusing to approve the proposed *access policy*.
- (h) The *AER* may (but is not obliged to) consult on its proposal.
- (i) If the *AER* decides to approve an *access policy* proposed by the *AER*, it must:
  - (1) give a copy of the decision to the *Dedicated Connection Asset Service Provider*; and
  - (2) *publish* the decision on the *AER's* website and make it available for inspection, during business hours, at the *AER's* public offices.
- (j) An *access policy*, or a variation to it, takes effect on a date fixed in the *AER's* decision to approve it.
- (k) A *Dedicated Connection Asset Service Provider* must report on requests for *connection* and access to a *large dedicated connection asset* to the *AER* when such requests are made and when an agreement for access is entered into, in the manner and form notified by the *AER*.
- (l) A *Dedicated Connection Asset Service Provider* or a person who is provided *large DCA services* must not engage in conduct for the purpose of preventing or hindering access to *large DCA services*.



**Note**

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

- (m) A *Dedicated Connection Asset Service Provider* may, but is not required to, give access to an applicant for *large DCA services* if doing so would mean the *large dedicated connection asset* would no longer constitute a *dedicated connection asset*.

**Note**

An example of where clause 5.2A.8(m) may apply is where the applicant for access to *large DCA services* is a *Distribution Network Service Provider* or a person not seeking access to those services as part of the *identified user group*. The creation of a new *connection point* could change the nature of the services being provided by the *large dedicated connection asset* and therefore change its regulatory treatment.

## 5.3 Establishing or Modifying Connection

### 5.3.1 Process and procedures

- (a) For the purposes of this rule 5.3:  
  
**establish a connection** includes modify an existing *connection* or alter *plant* but does not include alterations to *generating plant* in the circumstances set out in clause 5.3.9.
- (b) A *Registered Participant* or person intending to become a *Registered Participant* who wishes to establish a *connection* to a *network* must follow the procedures in this rule 5.3.
- (c) A *Generator* wishing to alter *connected generating plant* must comply with clause 5.3.9.
- (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* and *Transmission Network User facilities* in relation to that *connection*.

### 5.3.1A Application of rule to connection of embedded generating units

- (a) For the purposes of this clause 5.3.1A;  
  
**non-registered embedded generator** has the same meaning as in clause 5A.A.1.
- (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 is required to apply to *AEMO* for an exemption from the requirement to register as a *Generator* in respect of an *embedded generating unit*; or
  - (3) non-registered embedded generator who has made an election under clause 5A.A.2(c),

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.

### 5.3.2 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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).

### 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 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 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*;
- (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* to the *transmission network* and of the interface between the *transmission network* and any *contestable IUSA components*;
- (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, 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*;
  - (ii) at the *Primary Transmission Network Service Provider's* option, 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*, 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 clause is classified as a 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 clause is classified as a 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* of a *generating system* or *market network service facility*, 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*; and
  - (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.

**Note**

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

### 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* (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 and how risks of defects will be addressed;
    - (ii) the detailed design of those components; and
    - (iii) if the *Primary Transmission Network Service Provider* will not own the *contestable IUSA components*, 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* 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, including details of the *contestable IUSA components'* construction, instructions for operation and maintenance and health safety and asset management manuals.
- (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* 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*.

#### **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), be no less onerous than the *performance standard* that corresponds to the technical requirement that is affected by the alteration to the *generating system*;
  - (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) 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) 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 clause is classified as a 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) 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) 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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.

### 5.3.4B System strength remediation for new connections

- (a) A *Network Service Provider* must, in accordance with the *system strength impact assessment guidelines*, undertake a *system strength impact assessment* for each proposed new *connection* of a *generating system* or *market network service facility* and any proposed alteration to a *generating system* to which clause 5.3.9 applies. A *Network Service Provider* must make:
  - (1) a preliminary assessment if it is in receipt of a *connection* enquiry or a request by a *Generator* under clause 5.3.9(c1); and
  - (2) a full assessment if it is in receipt of an *application to connect* or submission from a *Generator* under clause 5.3.9, unless the preliminary assessment indicates that the full assessment is not needed.

#### Note

This clause is classified as a 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) The *Network Service Provider* must give the results of the preliminary assessment and the full assessment to the *Connection Applicant* or *Generator* concerned following consultation with *AEMO*.
- (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 (a); and
  - (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 (a),may be determined under rule 8.2.
- (d) Paragraph (c) applies to any dispute relating to the assessment of an *adverse 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* or *Generator* (as applicable) if the full assessment undertaken in accordance with the *system strength impact assessment guidelines* indicates that the *Connection Applicant's* proposed new *connection* of a *generating facility* or *market network service facility* or the *Generator's* proposed alteration to a *generating system* to which clause 5.3.9 applies will have an *adverse system strength impact*.

**Note**

This clause is classified as a 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) to the extent that the *adverse 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 *Registered Participant* in accordance with its *connection agreement*; or
  - (3) to the extent that the impact is below any threshold specified in the *system strength impact assessment guidelines* for this purpose.
- (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).
- (h) A *Connection Applicant* proposing to install *plant* as part of a *system strength remediation scheme* must include a description of the *plant*, the ratings of the proposed *plant* (in MVA) 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 clause is classified as a 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 clause is classified as a 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) 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 clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

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

**5.3.6 Offer to connect**

- (a) 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 clause is classified as a 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*.
- (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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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 clause is classified as a 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]**

**5.3.7 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 S5.4.A(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*, *Dedicated Connection Asset Service Provider* 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 clause is classified as a 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.

### 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 clause 3.13.3 or 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.
- (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 clause is classified as a 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 clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

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

- (a) 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 an *adverse 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*.
- (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 clause is classified as a 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) where relevant, the *Generator's* proposed *system strength remediation scheme*.
- (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<br>(altered equipment)  | Column 2<br>(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            |
| 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                              |
| <i>governor control system</i>   | S5.2.5.7, S5.2.5.11, S5.2.5.14  |
| <i>power 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 |
| auxiliary supplies               | S5.2.5.1, S5.2.5.2, S5.2.7  |
| remote control and monitoring    | S5.2.5.14, S5.2.6.1, S5.2.6.2   |

| Column 1<br>(altered equipment) | Column 2<br>(clause) |
|---------------------------------|----------------------|
| system                          |                      |

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

### 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 clause is classified as a 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).

### 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.

## 5.3A Establishing or modifying connection - embedded generation

### 5.3A.1 Application of rule 5.3A

- (a) For the purposes of this rule 5.3A:
  - non-registered embedded generator** has the same meaning as in clause 5A.A.1
- (b) Where a *Connection Applicant* wishes to connect an *embedded generating unit*, this rule 5.3A applies.
- (c) For the purposes of this rule 5.3A and Schedules 5.4A and 5.4B:
  - (1) a reference to a *Connection Applicant* is to a:
    - (i) person who intends to be an *Embedded Generator*;
    - (ii) person who is required to apply to *AEMO* for an exemption from the requirement to register as a *Generator* in respect of an *embedded generating unit*; or

- (iii) non-registered embedded generator who has made an election under clause 5A.A.2(c),

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.

- (2) the *Distribution Network Service Provider* is the *Distribution Network Service Provider* required under clause 5.3A.5 to process and respond to a *connection* enquiry or required under clause 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 a *network service*.

### 5.3A.2 Definitions and miscellaneous

- (a) In this rule 5.3A and Schedules 5.4A and 5.4B:

**detailed response** means the response to a *connection* enquiry prepared under clause 5.3A.8.

**establish a connection** has the same meaning as in clause 5.3.1.

**information pack** means information relevant to the making of an *application to connect* specified in clause 5.3A.3(b).

**preliminary response** means the response to a *connection* enquiry prepared under clause 5.3A.7.

**sub-transmission line** has the same meaning as in clause 5.10.2.

**zone substation** has the same meaning as in clause 5.10.2.

- (b) To the extent a *Distribution Network Service Provider* has provided information required to be provided under this clause 5.3A by the inclusion of that information in:

- (1) its demand side engagement document under clause 5.13.1(g); or
- (2) a *Distribution Annual Planning Report*,

it will comply with the relevant information provision requirements of rule 5.3A by including hyperlinks to the relevant information in information provided to a *Connection Applicant*.

- (c) Where this rule 5.3A fixes a time limit for the provision of information or a response then, for the purposes of calculating elapsed time, the period that:

- (1) commences on the day when a dispute is initiated under clause 8.2.4(a); and

- (2) ends on the day on which the dispute is withdrawn or is resolved in accordance with clauses 8.2.6D or 8.2.9(a),

is to be disregarded.

### 5.3A.3 Publication of Information

- (a) A *Distribution Network Service Provider* must *publish* the following in the same location on its website:
  - (1) an enquiry form for *connection* of an *embedded generating unit*;
  - (2) a register of completed embedded generation projects under rule 5.18B; and
  - (3) an information pack.
- (b) An information pack must include:
  - (1) a description of the process for lodging an *application to connect* for an *embedded generating unit*, including:
    - (i) the purpose of each stage of the *connection* enquiry and application processes;
    - (ii) the steps a *Connection Applicant* will need to follow at each stage of the *connection* enquiry and application processes;
    - (iii) the information that is to be included by the *Connection Applicant* with a *connection* enquiry and the information that will be made available to the *Connection Applicant* by the *Distribution Network Service Provider* at each stage of the *connection* enquiry;
    - (iv) the information that is to be included with an *application to connect* and the type of information that will be made available to the *Connection Applicant* by the *Distribution Network Service Provider* after lodgement of the application;
    - (v) the factors taken into account by the *Distribution Network Service Provider*, at each stage of the *connection* enquiry and application, when assessing an *application to connect* for an *embedded generating unit*;
    - (vi) the process for negotiating *negotiated access standards* under clause 5.3.4A and any *system strength remediation scheme* under clause 5.3.4B and a summary of the factors the *Distribution Network Service Provider* takes into account when considering proposed *negotiated access standards* and *system strength remediation schemes*; and

- (vii) a list of services, if any, relevant to the *connection* that are *contestable* in the relevant *participating jurisdiction*;
- (2) single line diagrams of the *Distribution Network Service Provider's* preferred *connection* arrangements, and a range of other possible *connection* arrangements for integration of an *embedded generating unit*, showing the *connection point*, the point of common coupling, the *embedded generating unit(s)*, *load(s)*, *meter(s)*, circuit breaker(s) and isolator(s);
- (3) a sample schematic diagram of the *protection system* and *control system* relevant to the *connection* of an *embedded generating unit* to the *distribution network*, showing the *protection system* and *control system*, including all relevant current circuits, relay potential circuits, alarm and monitoring circuits, back-up systems and parameters of protection and *control system* elements;
- (4) worked examples of *connection service* charges, enquiry and application fees for the *connection* of *embedded generating units*, based on the preferred and possible *connection* arrangements set out in paragraph (b)(2);
- (5) details of any *minimum access standards* or *plant standards* the *Distribution Network Service Provider* considers are applicable to *embedded generating units* and *generating plant*;
- (6) technical requirements relevant to the processing of a *connection* enquiry or an *application to connect*, including information of the type, but not limited to:
  - (i) *protection systems* and protection schemes;
  - (ii) fault level management principles;
  - (iii) *reactive power capability* and *power factor* correction;
  - (iv) power quality and how limits are allocated;
  - (v) responses to *frequency* and *voltage* disturbances;
  - (vi) *voltage* control and regulation;
  - (vii) *remote monitoring equipment*, control and communication requirements;
  - (viii) earthing requirements and other relevant safety requirements;
  - (ix) circumstances in which *augmentation* may be required to facilitate integration of an *embedded generating unit* into the *network*;
  - (x) commissioning and testing requirements; and

- (xi) circumstances in which a *system strength remediation scheme* or *system strength connection works* will be required as a condition of *connection*; and
- (7) *model connection agreements* used by that *Distribution Network Service Provider*.

#### 5.3A.4 Fees

- (a) A *Distribution 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 prepare a detailed response to the enquiry.
- (b) The *Distribution Network Service Provider* may specify that an enquiry fee is payable in components.
- (c) The enquiry fee, or such component of it identified by the *Distribution Network Service Provider*, is payable either:
  - (1) on lodgement of the further information identified in S5.4A(o); or
  - (2) on receipt of advice from the *Distribution Network Service Provider* provided pursuant to clause 5.3A.7(b).
- (d) A *Distribution Network Service Provider* must not charge a fee for the provision of a preliminary response.
- (e) A *Distribution Network Service Provider* may charge an application fee, payable on lodgement of an *application to connect*, provided that the fee must not:
  - (1) include an amount for work that was completed in preparing the detailed response to the enquiry; and
  - (2) be more than necessary to:
    - (i) cover the costs of work and expenses reasonably incurred by the *Distribution Network Service Provider* in assessing the *application to connect* and making an offer to *connect*; and
    - (ii) 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.

#### 5.3A.5 Enquiry

- (a) A *Connection Applicant* who wishes to make an *application to connect* must first make a *connection enquiry* with the *Local Network Service Provider*.
- (b) Subject to paragraph (c), an enquiry must be in the form determined by the *Local Network Service Provider*.

- (c) An enquiry form under paragraph (b) must require the *Connection Applicant* to provide:
  - (1) a qualitative description of the objectives of the project proposal the subject of the *application to connect*;
  - (2) the information specified in Schedule 5.4; and
  - (3) a list of the information required from the *Local Network Service Provider* in relation to its *application to connect* and supporting reasons for its requests.
- (d) A *Local Network Service Provider* must, within 5 *business days* after receiving an enquiry, provide written acknowledgment of receipt of the *connection enquiry*.
- (e) If the *Local Network Service Provider* considers that the *connection enquiry* should be jointly examined by more than one *Distribution Network Service Provider*, then, with the agreement of the *Connection Applicant*, one of those *Distribution Network Service Providers* may be allocated the task of liaising with the *Connection Applicant* and the other *Distribution Network Service Providers* to process and respond to the enquiry.
- (f) If the enquiry is incomplete in a material respect, or the *Connection Applicant* has lodged an enquiry other than in accordance with the form determined by a *Local Network Service Provider*, that *Local Network Service Provider* must, within 5 *business days* after receipt of the enquiry, advise the *Connection Applicant* of the deficiency, and may require the *Connection Applicant* to provide the necessary information.
- (g) A *Connection Applicant* may request in a *connection enquiry* made under paragraph (a), that the *Local Network Service Provider* provide only a detailed response under clause 5.3A.8(c) to its enquiry. The *Local Network Service Provider* must, within 5 *business days* after receipt of the enquiry and all such additional information (if any) requested under paragraph (f), advise the *Connection Applicant* if it agrees to the request.

### 5.3A.6 Response to Enquiry

- (a) In response to a *connection enquiry*, the *Distribution Network Service Provider* must provide:
  - (1) subject to clause 5.3A.5(g) or receiving any further information requested under clause 5.3A.5(f), a preliminary response; and
  - (2) subject to receiving the enquiry fee and the further information requested under clause 5.3A.8(b), if relevant, a detailed response.
- (b) In preparing either the detailed response or preliminary response, the *Distribution Network Service Provider* must liaise with other *Network Service Providers* with whom it has *connection agreements*, if the *Distribution Network Service Provider* believes, in its reasonable opinion,



that compliance with the terms and conditions of those *connection agreements* will be affected. The *Distribution Network Service Provider* responding to the *connection* enquiry may include in its preliminary response or detailed response, the reasonable requirements of any such other *Network Service Providers* for information to be provided by the *Connection Applicant*.

### 5.3A.7 Preliminary Response to Enquiry

- (a) Unless agreed otherwise, a preliminary response must:
  - (1) be provided within 15 *business days* of receipt of a *connection* enquiry and all such additional information (if any) requested under clause 5.3A.5(f); and
  - (2) include the information specified in Schedule 5.4A.
- (b) If the *Distribution Network Service Provider* has agreed under clause 5.3A.5(g) to not provide a preliminary response, it must advise the *Connection Applicant* of the:
  - (1) estimate of the enquiry fee payable by the *Connection Applicant* for the detailed response, including details of how components of the fee were calculated; and
  - (2) the component of the estimate of the enquiry fee payable by the *Connection Applicant* to request the detailed response,within 15 *business days* of receipt of a *connection* enquiry and all such additional information (if any) requested under clause 5.3A.5(f), unless agreed otherwise.
- (c) A *Distribution Network Service Provider* may seek an extension of a time period specified in paragraphs (a) or (b) by giving notice, in writing to the *Connection Applicant*, specifying the reasons required for the extension. The *Connection Applicant* may not unreasonably withhold consent to that extension.
- (d) Nothing in paragraph (a) or Schedule 5.4A is to be read or construed as requiring the *Distribution Network Service Provider* to undertake detailed design or to perform detailed technical studies or analysis to prepare a preliminary response.

### 5.3A.8 Detailed Response to Enquiry

- (a) Subject to clause 5.3A.5(g), a *Distribution Network Service Provider* must within 5 *business days* after receiving the further information identified in clause 5.4A(o) provide written acknowledgment of receipt of it.
- (b) If the further information provided under paragraph (a) is incomplete in a material respect the *Distribution Network Service Provider* must within 10

*business days* after receipt of it, advise the *Connection Applicant* of the deficiency and what is required to address it.

- (c) Unless:
  - (1) agreed otherwise; or
  - (2) the proposed *connection* requires the application of the *regulatory investment test for distribution*,

the *Distribution Network Service Provider* must provide a detailed response within 30 *business days* of the date specified under paragraph (d).
- (d) For the purposes of paragraph (c), the relevant date is the date on which the *Distribution Network Service Provider* has received all of the following:
  - (1) the enquiry fee, or any component of the enquiry fee requested by the *Distribution Network Service Provider*;
  - (2) if the *Connection Applicant* was required to remedy a deficiency in further information provided under paragraph (b), that further information; and
  - (3) if the *Connection Applicant* was required under clause S5.4A(o) to provide further information, that information.
- (e) A *Distribution Network Service Provider* may seek an extension of the time period specified in paragraph (c) by giving notice, in writing to the *Connection Applicant*, specifying the reasons required for the extension. The *Connection Applicant* may not unreasonably withhold consent to that extension.
- (f) Where the proposed *connection* requires the application of the *regulatory investment test for distribution*, the *Distribution Network Service Provider* and the *Connection Applicant* are to agree a timeframe for the provision of a detailed response, taking into account the status of the relevant RIT-D project (as defined in clause 5.10.2).
- (g) A detailed response must include the information specified in:
  - (1) paragraphs (f), (g) and (m) of Schedule 5.4B;
  - (2) paragraphs (a) - (e1), (h) - (l) and (n)-(o) of Schedule 5.4B.

**Note**

Clause 5.3A.8(g) requires that a detailed response include all information specified in Schedule 5.4B. The above division may be of relevance for enforcement purposes only.

- (h) A *Connection Applicant* that is a *Registered Participant*, AEMO or an *interested party* may make a request in relation to technical requirements for access to the *Reliability Panel* in accordance with clause 5.3.3(b2)-(b4).

### 5.3A.9 Application for connection

- (a) Following receipt of a detailed response under clause 5.3A.8, a *Connection Applicant* may make an *application to connect* in accordance with this clause 5.3A.9, 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 the information specified in the detailed response provided under clause 5.3A.8(c) and the application fee specified under clause S5.4B(m) to the *Distribution Network Service Provider*.
- (c) The *Connection Applicant* may submit an *application to connect* to more than one *Distribution Network Service Provider* in order to receive additional offers to *connect* in respect of *facilities* to be provided that are *contestable*.
- (d) If the *application to connect* is incomplete in a material respect the *Distribution Network Service Provider* must, within 10 *business days* after receipt of it, advise the *Connection Applicant* of the deficiency, and the steps required to address it.
- (e) 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 *Distribution 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.
- (f) For each technical requirement where the proposed arrangement will not meet the *automatic access standards* nominated by the *Distribution Network Service Provider* pursuant to clause S5.4B(b), 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.
- (g) The *Connection Applicant* may:
  - (1) lodge separate *applications to connect* and separately liaise with the other *Network Service Providers* identified in clause 5.3A.5(e) who may require a form of agreement; or
  - (2) lodge one *application to connect* with the *Distribution 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*.
- (h) A *Connection Applicant* who proposes a *system strength remediation scheme* under clause 5.3.4B must submit its proposal with the *application to connect*.

### 5.3A.10 Preparation of offer to connect

- (a) The *Distribution Network Service Provider* to whom the *application to connect* is submitted under clause 5.3A.9(a):
  - (1) at the *automatic access standard*; 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) So as to maintain levels of service and quality of *supply* to existing *Registered Participants* in accordance with the *Rules*, the *Distribution 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 *Distribution 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*.
- (c) If the *application to connect* involves the *connection* of *embedded generating units* having a nameplate rating of 10 MW or greater, the *Distribution Network Service Provider* must consult the relevant *Transmission Network Service Provider* regarding the impact of the *connection* contemplated by the *application to connect* on fault levels, line reclosure protocols, and stability aspects.
- (d) The *Transmission Network Service Provider* consulted under paragraph (c) must determine the reasonable costs of addressing those matters for inclusion in the offer to *connect* and the *Distribution Network Service Provider* must make it a condition of the offer to *connect* that the *Connection Applicant* pay these costs.
- (e) The *Distribution 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 these costs.

- (f) The *Distribution Network Service Provider* preparing the offer to *connect* must specify in reasonable detail any *system strength connection works* to be undertaken by the *Distribution Network Service Provider*.

### 5.3A.11 Technical Dispute

- (a) Rule 8.2 applies to any dispute between a *Distribution Network Service Provider* and a *Connection Applicant* as to the technical requirements to establish or modify a *connection* sought by a *Connection Applicant* in a *connection* enquiry made under clause 5.3A.5 or an *application to connect* under clause 5.3A.9.

### 5.3A.12 Network support payments and functions

- (a) When negotiating the amount of a *network support payment* with an *Embedded Generator*, the *Transmission Network Service Provider* must take into account the:
  - (1) nature of the *network* support services being provided by the *Embedded Generator*; and
  - (2) extent to which the *Embedded Generator* is being, or will be, compensated for providing those *network* support services by receiving *avoided Customer TUOS charges*.
- (b) Where the relevant *Transmission Network Service Provider* or *Distribution Network Service Provider* decides to implement a *generation* option as an alternative to *network augmentation*, the *Network Service Provider* must:
  - (1) register the *generating unit* with AEMO and specify that the *generating unit* may be periodically used to provide a *network* support function and will not be eligible to set *spot prices* when *constrained* on in accordance with clause 3.9.7; and
  - (2) include the cost of this *network* support service in the calculation of *transmission service* and *distribution service* prices determined in accordance with Chapter 6 or Chapter 6A, as the case may be.

#### Note

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

### 5.3AA 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 an *Embedded Generator* or *Market Network Service Provider* 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 *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 power input* 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 clause is classified as a 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 clause is classified as a 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 *transmission use of system service charges* which is deemed by the relevant *Transmission Network Service Provider* to represent the marginal cost of *transmission*, less an allowance for locational signals present in the *spot market*, to determine the relevant amount for the purposes of paragraph (h).

### 5.3B Application for connection to declared shared network

- (a) In relation to a *declared transmission system*, the powers, functions and responsibilities of the *Network Service Provider* are divided between *AEMO* and the *declared transmission system operator* as follows:
  - (1) *AEMO* is the *Network Service Provider* in respect of the provision of *shared transmission services*; and
  - (2) the relevant *declared transmission system operator* is the *Network Service Provider* in respect of the provision of *connection services*.
- (b) If:
  - (1) a *declared transmission system operator* receives a *connection inquiry* or an *application to connect to a declared shared network*; and
  - (2) the inquiry or application relates in whole or part to the provision of *shared transmission services*;

the *declared transmission system operator* must pass on to *AEMO* the information provided by the applicant in connection with the inquiry or application.

- (c) Clauses 5.3.1(e), 5.3.2(g), 5.3.3(b)(5A), (7) to (11), 5.3.3(c)(5)(ii), 5.3.4(b)(3) and (4), 5.3.4(b1), 5.3.4(f)(3), 5.3.6(b4) and (b5), 5.3.7(a2), 5.3.7(f1) and (f2) and 5.3.8(a2) do not apply in respect of a *declared transmission system*.

## 5.4 Independent Engineer

### 5.4.1 Application

- (a) This rule 5.4 does not apply to the *declared transmission system* of an *adoptive jurisdiction*.
- (b) This rule 5.4 applies only if a relevant *Transmission Network Service Provider* or a *Connection Applicant* requires independent advice in order to reach agreement on or resolve:
  - (1) a technical issue in relation to *negotiated transmission services* related to a *connection* sought by the *Connection Applicant*;
  - (2) whether assets or components form part of a *dedicated connection asset* or form part of an *identified user shared asset*;
  - (3) whether or not a component of an *identified user shared asset* is a *contestable IUSA component* pursuant to clause 5.2A.4(c)(1) and (2); or
  - (4) whether the detailed design of a *contestable IUSA component* is consistent with the functional specification for the relevant *identified user shared asset*,

(“**technical matter**”).
- (c) A technical matter does not include issues relating to:
  - (1) the cost or commercial terms of;
  - (2) the process relating to; or
  - (3) the timing of,

the *connection*.

### 5.4.2 Establishment of a pool

- (a) The *Adviser* must establish and maintain a pool of persons (who may be individuals or firms) from whom the *Independent Engineer* may be selected in accordance with clauses 5.4.3(d)(2) or 5.4.4(a)(4).
- (b) In selecting persons for the pool, the *Adviser* must have regard to the need for the person to have sufficient experience and expertise in technical matters involved in *connections* to the *transmission network*.

- (c) The *Adviser* must review the composition of the pool at least every two years.

### 5.4.3 Initiating the Independent Engineer process

- (a) If a technical matter arises that requires independent advice in order to reach an agreement or resolution, a *Transmission Network Service Provider* or a *Connection Applicant* may serve a notice on the other party that:
  - (1) requires the parties to engage an *Independent Engineer*;
  - (2) includes a statement setting out the technical matter; and
  - (3) may request the receiving party to provide information about the technical matter.
- (b) If another *Transmission Network Service Provider*:
  - (1) has the task of liaising with the *Connection Applicant* under clause 5.3.2(e); or
  - (2) has been identified as a party with whom the *Connection Applicant* must enter into an agreement with under clause 5.3.3(b)(4),and has an interest in the technical issue under clause 5.4.1(b)(1), that *Transmission Network Service Provider* must also be served with a copy of the notice under paragraph (a) and must participate in the *Independent Engineer* process.
- (c) If the technical matter involves a matter that relates to an *AEMO advisory matter*, then *AEMO* must also be served with a copy of the notice under paragraph (a) and may participate in the *Independent Engineer* process.
- (d) Within 10 *business days* of service of a notice under paragraph (a), a party may:
  - (1) agree that the technical matter be resolved through an alternative means as agreed by the parties on the terms agreed between the parties; or
  - (2) agree to appoint an *Independent Engineer* from the pool and the scope of work the *Independent Engineer* is to undertake.
- (e) If the parties appoint an *Independent Engineer* in accordance with subparagraph (d)(2), the parties are not required to notify the *Adviser* of the agreed selection in which case clauses 5.4.5 and 5.4.6 apply.

### 5.4.4 Referral to the Adviser

- (a) If the parties do not reach an agreement under clause 5.4.3(d) within 10 *business days* of service of a notice under clause 5.4.3(a), any party may

refer the technical matter to the *Adviser* by serving on the *Adviser* a notice, which must:

- (1) be in a form approved and published by the *Adviser*;
  - (2) contain the names of the parties who seek advice on the technical matter;
  - (3) contain a statement setting out the technical matter;
  - (4) if the parties have agreed on an *Independent Engineer*, the name of that *Independent Engineer* or in the absence of such agreement, contain a request for the *Adviser* to select an *Independent Engineer*;
  - (5) contain the scope of advice required in respect of the technical matter, as agreed by the parties and in the absence of such agreement, request the *Adviser* to assist in determining the scope (which the *Adviser* may do in consultation with the parties and the *Independent Engineer* once appointed); and
  - (6) specify a time frame by which the advice from the *Independent Engineer* is required so as to allow the *Adviser* to consider the availability of potential *Independent Engineers*.
- (b) If the *Adviser* is requested to select an *Independent Engineer* from the pool under clause 5.4.2, it must:
- (1) use reasonable endeavours to ensure the cost, availability, independence and expertise and experience of the selected *Independent Engineer* is appropriate to the technical matter;
  - (2) consult with the parties prior to appointment, and
  - (3) unless the parties otherwise agree, make the appointment within 15 *business days* of the notice under paragraph (a).
- (c) Despite the requirement to consult set out in subparagraph (b)(3), a selection of the *Adviser* is final and binding upon all parties.

#### **5.4.5 Proceedings and decisions of the Independent Engineer**

- (a) The *Independent Engineer* may request documents and information from the parties that it reasonably considers is required to provide advice on the technical matter and a party must comply with such a request.
- (b) As a condition of providing documents and information, a party may require the *Independent Engineer* to agree to be bound to the confidentiality obligations under rule 8.6 as if the *Independent Engineer* was a *Registered Participant*.

- (c) The *Independent Engineer* must provide its written advice on a technical matter promptly, and in any case must do so within 30 *business days* after the *Independent Engineer* is appointed unless the parties otherwise agree.
- (d) The *Transmission Network Service Provider* may amend the time period referred to in any stage of the *connection* process under the *preliminary program* to allow for the additional time reasonably required for the *Independent Engineer* process under this rule 5.4.
- (e) The *Independent Engineer* must have regard to the following matters in forming their advice:
  - (1) the technical requirements of the *connection* proposed by either of the parties;
  - (2) the requirement under clause 5.3.4(b1)(2) that the technical requirements of the *connection* must not unreasonably inhibit the capacity for future expansion of an *identified user shared asset* or preclude the possibility of future *connections*;
  - (3) the technical requirements of the *connection* should be consistent with *good electricity industry practice* and contribute to a safe, reliable and secure *transmission system*;
  - (4) any submissions made by *AEMO* on an *AEMO advisory matter*; and
  - (5) any relevant requirements and obligations under the applicable *jurisdictional electricity legislation*.
- (f) The *Independent Engineer* is not bound by the rules of evidence and may inform itself in any manner it thinks fit.
- (g) The *Independent Engineer* is a person who facilitates the resolution of disputes on technical matters, and is a protected person for the purposes of section 120B of the *National Electricity Law* in relation to the exercise of its powers and functions carried out under this clause 5.4.5.
- (h) The *Independent Engineer's* advice is not binding on the parties.

#### **5.4.6 Costs of the Independent Engineer**

The costs of any *Independent Engineer*, including any costs incurred by the *Adviser* in performing the functions of the *Adviser* in clause 5.4.4 are to be borne equally by the parties, unless otherwise agreed by the parties.

#### **5.4A [Deleted]**

##### **Note**

In the transitional rules, rule 5.4A and its associated definitions will be preserved in relation to the *declared transmission system* of an *adoptive jurisdiction*.

## 5.4AA [Deleted]

## 5.5 Commercial arbitration for prescribed and negotiated transmission services and large DCA services

### 5.5.1 Application

- (a) This rule 5.5 does not apply to the *declared transmission system* of an *adoptive jurisdiction*.
- (b) This rule 5.5 applies to any dispute which may arise between a *Transmission Network Service Provider* (including a *Dedicated Connection Asset Service Provider* for a *large dedicated connection asset*) (a **provider**) and a *Connection Applicant* or a person seeking *large DCA services* (an **applicant**) as to *terms and conditions of access*, for the provision of *prescribed transmission services*, the provision of *negotiated transmission services* (each a *transmission services access dispute*); or the provision of *large DCA services* (a *large DCA services access dispute*) (as applicable).
- (c) For the purposes of *prescribed transmission services*, *negotiated transmission services* and *large DCA services*, the *terms and conditions of access*:
  - (1) in relation to *negotiated transmission services*, are:
    - (i) the price of those services; and
    - (ii) other terms and conditions for the provision of those *negotiated transmission services*,  
  
under Chapters 4 and 5 of the *Rules*;
  - (2) in relation to *prescribed transmission services*, are:
    - (i) the price of those services as determined under the *pricing methodology* of the relevant *Transmission Network Service Provider*; and
    - (ii) other terms and conditions for the provision of those *prescribed transmission services*,  
  
under Chapters 4, 5 and 6A of the *Rules*; and
  - (3) in relation to *large DCA services*, are the price of, and the other terms and conditions for, the provision of those *large DCA services*, as determined under the *access policy*.

### 5.5.2 Notification of dispute

- (a) A provider or an applicant may notify the AER in writing that a *transmission services access dispute* or *large DCA services access dispute* exists.

- (b) On receiving a notification under paragraph (a), the *AER* must give notice in writing of the dispute to the other party to the dispute.
- (c) A provider or an applicant who has given notice of a dispute under paragraph (a) may withdraw notification of the dispute at any time by written notice to the *AER* and the other party to the dispute.
- (d) If the notification of a dispute is withdrawn under paragraph (c), it is taken for the purposes of this clause 5.5.2 to never have been given.

### 5.5.3 Appointment of commercial arbitrator

- (a) On receiving a notification under clause 5.5.2(a), the *AER* must request the provider and the applicant, by a time specified by the *AER*, to nominate to the *AER* two persons each for appointment as the *commercial arbitrator* to determine the *transmission services access dispute* or *large DCA services access dispute*. The provider and applicant may make the nominations.
- (b) As soon as practicable after the expiry of the time specified by the *AER* under paragraph (a), the *AER* must appoint:
  - (1) one of the persons (if any) nominated to the *AER* by the provider or the applicant under paragraph (a); or
  - (2) if neither the provider or the applicant nominate any such person within the time specified by the *AER* under paragraph (a) or all of the persons so nominated do not qualify for appointment under paragraph (d) or (e), a person determined by the *AER*,  
  
as the *commercial arbitrator* to determine the dispute, and must refer the dispute to that *commercial arbitrator*.
- (c) A decision of the *AER* as to the appointment of the *commercial arbitrator* is final and binding on the provider and the applicant.
- (d) The *AER* may only appoint a person as the *commercial arbitrator* if that person is experienced or trained in dispute resolution techniques.
- (e) A person is not eligible for appointment as the *commercial arbitrator* if that person has any interest that may conflict with, or which may be seen to conflict with, the impartial resolution of the dispute. Where the person who is appointed as the *commercial arbitrator* becomes aware of such conflict after that person commences the hearing of the dispute, the person must advise the parties to that effect.
- (f) Where:
  - (1) the provider or the applicant believes that the person appointed as the *commercial arbitrator* has an interest which may conflict with the impartial resolution of the dispute; or

- (2) the person appointed as the *commercial arbitrator* discloses the existence of such an interest,

the person must not continue to hear and determine the dispute, except with the written consent of the provider and the applicant.

#### **5.5.4 Procedures of commercial arbitrator**

- (a) The *commercial arbitrator* may give to the parties such directions as it considers necessary:
  - (1) for the proper conduct of the proceedings, including in relation to the provision of documents and information to the other party and the making of oral and written submissions;
  - (2) relating to the use and disclosure of information obtained from the other party to the dispute (including a direction to keep information confidential); and
  - (3) in relation to the participation (if any) of legal representatives of the parties in the proceedings.
- (b) The *commercial arbitrator* must observe the rules of procedural fairness, but is not bound by the rules of evidence and may inform itself in any manner it thinks fit.

#### **5.5.5 Powers of commercial arbitrator in determining disputes**

- (a) In determining a *transmission services access dispute* in relation to the *terms and conditions of access* for the provision of *prescribed transmission services* the *commercial arbitrator* must apply:
  - (1) in relation to price, the *pricing methodology* of the relevant *Transmission Network Service Provider* approved by the AER under Part E and Part J of Chapter 6A of the *Rules*;
  - (2) in relation to other terms and conditions, Chapters 4, 5 and 6A of the *Rules*; and
  - (3) in relation to all *terms and conditions of access* (including price) the decision of AEMO or the AER where those decisions relate to those terms and conditions and are made under Chapters 4, 5 and 6A of the *Rules*.
- (b) In determining a *transmission services access dispute* in relation to the *terms and conditions of access* for the provision of a *negotiated transmission service* the *commercial arbitrator* must apply:
  - (1) in relation to price for the provision of that service by the provider, the *negotiating principles* that are applicable to that dispute;



- (2) in relation to other terms and conditions, the *negotiating principles* that are applicable to that dispute and Chapters 4 and 5 of the *Rules*;
  - (3) in relation to all *terms and conditions of access* (including price) the decision of *AEMO* or the *AER* where those decisions relate to those terms and conditions and are made under Chapters 4 and 5 of the *Rules*.
- (c) In determining a *large DCA services access dispute* in relation to the *terms and conditions of access* for the provision of *large DCA services*, the *commercial arbitrator* must:
  - (1) apply the *access policy* of the *Dedicated Connection Asset Service Provider*;
  - (2) apply the relevant negotiating principles in schedule 5.12;
  - (3) have regard to the legitimate business interests of the *Dedicated Connection Asset Service Provider*;
  - (4) have regard to the interests of all persons who have rights to use the *large DCA services*; and
  - (5) have regard to the operational and technical requirements necessary for the safe and reliable operation of the *large dedicated connection asset* and any *facility connected* to it.
- (d) In determining a *transmission services access dispute* in relation to the *terms and conditions of access* for the provision of *negotiated transmission services* a *commercial arbitrator* may:
  - (1) have regard to other matters which the *commercial arbitrator* considers relevant.
  - (2) hear evidence or receive submissions from *AEMO* and *Transmission Network Users* who may be adversely affected.
- (e) In determining a *transmission services access dispute* in relation to the *terms and conditions of access* for the provision of *prescribed transmission services* a *commercial arbitrator* may:
  - (1) have regard to other matters which the *commercial arbitrator* considers relevant.
  - (2) hear evidence or receive submissions from *AEMO* in relation to *power system security* matters and from *Transmission Network Users* who may be adversely affected.

### 5.5.6 Determination of disputes

- (a) Subject to paragraph (c), the *commercial arbitrator* must determine the dispute as quickly as possible, and in any case it must do so within 30 *business days* after the dispute is referred to the *commercial arbitrator*.
- (b) The determination of the *commercial arbitrator*:
  - (1) may direct the provision of *prescribed transmissions services* and *negotiated transmission services* in accordance with Chapters 4, 5 and 6A of the *Rules*;
  - (2) may specify, for a *negotiated transmission service* or a *large DCA service*, a price or charge in such a way that it is or is to be adjusted over time;
  - (3) may direct the provision of *large DCA services* in accordance with the access policy of the *Dedicated Connection Asset Service Provider*; and
  - (4) only where the dispute is a *large DCA services access dispute*, may require the enlargement or increase in capacity of, or alterations to, a *large dedicated connection asset*.

#### Note

An adjustment as referred to in subparagraph (2) may, for example, be appropriate where the cost of providing the *negotiated transmission service* to a *Connection Applicant* or person seeking *large DCA services* changes because the assets used to provide that service are subsequently used to provide a service to another person and the payment for the service by that other person enables the *Transmission Network Service Provider* or *Dedicated Connection Asset Service Provider* to recoup some of those costs from that other person.

- (c) The *commercial arbitrator* may extend the period referred to in paragraph (a) if the provider and the applicant so agree in writing.
- (d) The *commercial arbitrator* may at any time terminate the proceedings without making a decision if it considers that:
  - (1) the dispute is misconceived or lacking in substance;
  - (2) the notification of the dispute to the *AER* under clause 5.5.2(a) was vexatious; or
  - (3) the party who notified the dispute to the *AER* under clause 5.5.2(a) has not negotiated in good faith or has notified the dispute prematurely or unreasonably.
- (e) The *commercial arbitrator* must terminate the proceedings without making a decision if at any time, whether on application by the provider or the applicant or otherwise, the arbitrator determines that the *transmission service* or *large DCA service* is capable of being provided on a genuinely

competitive basis by a person other than the provider or an entity which is associated with the provider.

#### **5.5.7 Costs of dispute**

- (a) The fees and costs of the *commercial arbitrator* must be borne equally by the provider and the applicant unless:
  - (1) paragraph (b) applies; or
  - (2) otherwise agreed between the provider and the applicant.
- (b) The costs of determining the dispute (including the legal costs of either of the parties) may be allocated by the *commercial arbitrator* for payment as between the parties as part of any determination.
- (c) In deciding to allocate costs against one of the parties to the dispute, the *commercial arbitrator* may have regard to any relevant matters including (but not limited to) whether the conduct of that party unreasonably prolonged or escalated the dispute or otherwise increased the costs of resolving the dispute.

#### **5.5.8 Enforcement of agreement or determination and requirement for reasons**

- (a) Where the provider and the applicant reach agreement (whether or not the matter is before a *commercial arbitrator*), the parties may execute a written agreement recording their resolution of that dispute.
- (b) The *commercial arbitrator* must give its decision determining the dispute, together with its reasons for that decision, in writing and must provide a copy of its determination:
  - (1) to the provider and to the applicant; and
  - (2) (except to the extent that it contains confidential information) to the *AER* for publication.
- (c) An agreement that is executed under paragraph (a) and a determination of the *commercial arbitrator* under paragraph (b) are binding on the provider and the applicant, and any failure to comply with such an agreement or determination is a breach of the *Rules* in respect of which the *AER* may take action in accordance with the *National Electricity Law*.

#### **5.5.9 Miscellaneous**

- (a) To the extent permitted by law, a person who is appointed as a *commercial arbitrator* is not liable for any loss, damage or liability suffered or incurred by any person as a consequence of any act or omission of that person which was done in good faith in connection with the dispute

- (b) A person who is appointed as a *commercial arbitrator* may, before acting in relation to the dispute, require the parties to the dispute (and any one of them) to execute a release and indemnity in relation to any loss, damage or liability that that person would, but for the release or indemnity, suffer or incur as a consequence of any act or omission done in good faith in connection with the dispute.

## **5.5A [Deleted]**

## **Part C Post-Connection Agreement matters**

### **5.6 Design of Connected Equipment**

#### **5.6.1 Application**

This rule 5.6 applies to new installations and modifications to existing installations that include alterations to existing *generating plant*, after:

- (a) 13 December 1998, in the case of installations located in *participating jurisdictions* other than Tasmania; and
- (b) 29 May 2005, in the case of installations located in Tasmania.

#### **5.6.2 Advice of inconsistencies**

- (a) At any stage prior to commissioning the *facility* in respect of a *connection* if there is an inconsistency between the proposed equipment and the *connection agreement* including the *performance standards*, the *Registered Participant* or the person intending to be registered as a *Generator* must:
  - (1) advise the relevant *Network Service Provider* and, if the inconsistency relates to *performance standards*, AEMO, in writing of the inconsistency; and
  - (2) if necessary, negotiate in good faith with the *Network Service Provider* any necessary changes to the *connection agreement*.

#### **Note**

This clause is classified as a 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 an inconsistency in a *connection agreement* including a *performance standard* is identified under paragraph (a), the *Registered Participant* or the person intending to be registered as a *Generator* and the *Network Service Provider* must not commission the *facility* in respect of a *connection* unless the *facility* or the *connection agreement* or *performance standard* has been varied to remove the inconsistency.

**Note**

This clause is classified as a 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) **[Deleted]**

**5.6.3 Additional information**

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

**5.6.4 Advice on possible non-compliance**

- (a) If the relevant *Network Service Provider* reasonably believes that the design of a proposed *facility* has potential to adversely and materially affect the performance of the *power system*, the *Network Service Provider* may require the *Registered Participant* to submit to it specified design information and drawings to enable the *Network Service Provider* to assess the performance of the *facility* in respect of its interaction with the *power system*:
- (1) after the *Registered Participant* has entered into an agreement for the supply of *plant* or associated equipment to be connected; and
  - (2) when the relevant contractor's designs have progressed to a point where preliminary designs are available but prior to manufacture of equipment.
- (b) The *Network Service Provider* must, within 40 *business days* of receipt of such information, use its reasonable endeavours to advise the *Registered Participant* in writing of any design deficiencies which the *Network Service Provider* believes would cause the design to be inconsistent with the *connection agreement* or the *Rules*.
- (c) Notwithstanding paragraph (b), it is the *Registered Participant's* sole responsibility to ensure that all *plant* and equipment associated with the *connection* complies with the *connection agreement* and the *Rules*.

**5.6A [Deleted]**

**5.7 Inspection and Testing**

**5.7.1 Right of entry and inspection**

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

the *connection point* of the other *Registered Participant* in order to assess compliance by the other *Registered Participant* with its technical obligations under the *Rules*.

- (b) A *Registered Participant* who wishes to inspect the *facilities* of another *Registered Participant* under clause 5.7.1(a) must give that other *Registered Participant* at least 2 *business days* notice of its intention to carry out an inspection.
- (c) A notice given under clause 5.7.1(b) must include the following information:
  - (1) the name of the *representative* who will be conducting the inspection on behalf of the *Registered Participant*;
  - (2) the time when the inspection will commence and the expected time when the inspection will conclude; and
  - (3) the nature of the suspected non-compliance with the *Rules*.
- (d) Neither a *Registered Participant* nor *AEMO* may carry out an inspection under this rule 5.7 within 6 *months* of any previous inspection except for the purpose of verifying the performance of corrective action claimed to have been carried out in respect of a non-conformance observed and documented on the previous inspection or (in the case of *AEMO*) for the purpose of reviewing an operating incident in accordance with clause 4.8.15.
- (e) At any time when the *representative* of a *Registered Participant* is in another *Registered Participant's facility*, that *representative* must:
  - (1) cause no damage to the *facility*;
  - (2) only interfere with the operation of the *facility* to the extent reasonably necessary and approved by the relevant *Registered Participant* (such approval not to be unreasonably withheld or delayed); and
  - (3) observe “permit to test” access to sites and clearance protocols of the operator of the *facility*, provided that these are not used by the operator of the *facility* solely to delay the granting of access to site and inspection.
- (f) Any *representative* of a *Registered Participant* conducting an inspection under this clause 5.7.1 must be appropriately qualified to perform the relevant inspection.
- (g) The costs of inspections under this clause 5.7.1 must be borne by the *Registered Participant* requesting the inspection.
- (h) *AEMO* or any of its *representatives* may, in accordance with this rule 5.7, inspect a *facility* of a *Registered Participant* and the operation and maintenance of that *facility* in order to:

- (1) assess compliance by the relevant *Registered Participant* with its operational obligations under Chapter 3 or 4, or an *ancillary services agreement*;
  - (2) investigate any possible past or potential threat to *power system security*; or
  - (3) conduct any periodic familiarisation or training associated with the operational requirements of the *facility*.
- (i) Any inspection under clause 5.7.1(a) or (h) must only be for so long as is reasonably necessary.
  - (j) Any equipment or goods installed or left on land or in premises of a *Registered Participant* after an inspection conducted under clause 5.7.1 do not become the property of the relevant *Registered Participant* (notwithstanding that they may be annexed or affixed to the relevant land or premises).
  - (k) In respect of any equipment or goods left on land or premises of a *Registered Participant* during or after an inspection, a *Registered Participant*:
    - (1) must not use any such equipment or goods for a purpose other than as contemplated in the *Rules* without the prior written approval of the owner of the equipment or goods;
    - (2) must allow the owner of any such equipment or goods to remove any such equipment or goods in whole or in part at a time agreed with the relevant *Registered Participant*, such agreement not to be unreasonably withheld or delayed; and
    - (3) must not create or cause to be created any mortgage, charge or lien over any such equipment or goods.
  - (l) A *Registered Participant* (in the case of an inspection carried out under clause 5.7.1(a)) or *AEMO* (in the case of an inspection carried out under clause 5.7.1(h)) must provide the results of that inspection to the *Registered Participant* whose *facilities* have been inspected, any other *Registered Participant* which is likely to be materially affected by the results of the test or inspection and *AEMO* (in the case of an inspection carried out under clause 5.7.1(a)).

**Note**

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

## 5.7.2 Right of testing

- (a) A *Registered Participant*, who has reasonable grounds to believe that equipment owned or operated by a *Registered Participant* with whom it has

a *connection agreement* (which equipment is associated with the *connection agreement*) may not comply with the *Rules* or the *connection agreement*, may request testing of the relevant equipment by giving notice in writing to the other *Registered Participant*.

- (b) If a notice is given under clause 5.7.2(a) the relevant test is to be conducted at a time agreed by *AEMO*.
- (c) The *Registered Participant* who receives a notice under clause 5.7.2(a) must co-operate in relation to conducting tests requested under clause 5.7.2(a).
- (d) The cost of tests requested under clause 5.7.2(a) must be borne by the *Registered Participant* requesting the test, unless the equipment is determined by the tests not to comply with the relevant *connection agreement* and the *Rules*, in which case all reasonable costs of such tests must be borne by the owner of that equipment.
- (e) Tests conducted in respect of a *connection point* under clause 5.7.2 must be conducted using test procedures agreed between the relevant *Registered Participants*, which agreement is not to be unreasonably withheld or delayed.
- (f) Tests under clause 5.7.2 must be conducted only by persons with the relevant skills and experience.
- (g) A *Transmission Network Service Provider* must give *AEMO* adequate prior notice of intention to conduct a test in respect of a *connection point* to that *Network Service Provider's network*.
- (h) The *Registered Participant* who requests a test under this clause 5.7.2 may appoint a *representative* to witness a test and the relevant *Registered Participant* must permit a *representative* appointed under this clause 5.7.2(h) to be present while the test is being conducted.

**Note**

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

**Note**

This clause is classified as a 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) A *Network Service Provider* may attach test equipment or *monitoring equipment* to *plant* owned by a *Registered Participant* or require a *Registered Participant* to attach such test equipment or *monitoring equipment*, subject to the provisions of clause 5.7.1 regarding entry and inspection.
- (k) In carrying out monitoring under clause 5.7.2(j) the *Network Service Provider* must not cause the performance of the monitored *plant* to be *constrained* in any way.

### 5.7.3 Tests to demonstrate compliance with connection requirements for generators

- (a) Each *Generator* must, in accordance with the time frames specified in rule 4.15, provide evidence to any relevant *Network Service Provider* with which that *Generator* has a *connection agreement* and to AEMO, that its *generating system* complies with:
  - (1) the applicable technical requirements of clause S5.2.5; and
  - (2) the relevant *connection agreement* including the *performance standards*.

#### Note

This clause is classified as a 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) **[Deleted]**
- (c) If a test required by clause 5.7.3(a) demonstrates that a *generating system* is not complying with one or more technical requirements of clause S5.2.5 or the relevant *connection agreement* or one or more of the *performance standards* then the *Generator* must:
  - (1) promptly notify the relevant *Network Service Provider* and AEMO of that fact; and
  - (2) promptly notify the *Network Service Provider* and AEMO of the remedial steps it proposes to take and the timetable for such remedial work; and
  - (3) diligently undertake such remedial work and report at monthly intervals to the *Network Service Provider* on progress in implementing the remedial action; and
  - (4) conduct further tests or monitoring on completion of the remedial work to confirm compliance with the relevant technical requirements or *performance standards* (as the case may be).

**Note**

This clause is classified as a 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) If *AEMO* reasonably believes that a *generating system* is not complying with one or more applicable *performance standards* or one or more applicable technical requirements of clause S5.2.5 or the relevant *connection agreement*, *AEMO* may instruct the *Generator* to conduct tests within 25 *business days* to demonstrate that the relevant *generating system* complies with those *performance standards* or technical requirements.

**Note**

This clause is classified as a 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) If the tests undertaken in accordance with paragraph (d) provide evidence that the *generating system* continues to comply with those requirements *AEMO* must reimburse the *Generator* for the reasonable expenses incurred as a direct result of conducting the tests.
- (f) If *AEMO*:
  - (1) is satisfied that:
    - (i) a *generating system* is not complying with the relevant *performance standards* for that system in respect of one or more of the technical requirements contained in S5.2.5, S5.2.6, S5.2.7 or S5.2.8 and the relevant *connection agreement*; or
    - (ii) a *generating system's* performance is not adequately represented by the applicable analytical model provided under clause 5.7.6(h) or clause S5.2.4; and
  - (2) holds the reasonable opinion that the performance of the *generating system*, or inadequacy of the applicable analytical model of the *generating system* is or will impede *AEMO's* ability to carry out its role in relation to *power system security*,

*AEMO* may direct the relevant *Generator* to operate the *generating system* at a particular *generated* output or in a particular mode until the relevant *Generator* submits evidence reasonably satisfactory to *AEMO* that the *generating system* is complying with the relevant *performance standard* and performing substantially in accordance with the applicable analytical model.

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

### 5.7.3A Tests to demonstrate compliance with system strength remediation schemes

- (a) Each *Registered Participant* required under a *connection agreement* to implement a *system strength remediation scheme* by means of *facilities* owned, operated or controlled by the *Registered Participant* must at the request of *AEMO* or the relevant *Network Service Provider* made not more than once in a calendar year provide evidence that those *facilities* satisfy the requirements of the *system strength remediation scheme* set out in the *connection agreement*.

#### Note

This clause is classified as a 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 at any time the *facilities* do not satisfy the requirements of the *system strength remediation scheme* set out in the *connection agreement*, the *Registered Participant* must:
- (1) promptly notify the relevant *Network Service Provider* and *AEMO* of that fact;
  - (2) promptly notify the *Network Service Provider* and *AEMO* of the remedial steps it proposes to take and the timetable for such remedial work;
  - (3) diligently undertake such remedial work and report at monthly intervals to the *Network Service Provider* on progress in implementing the remedial action; and
  - (4) conduct further tests or monitoring on completion of the remedial work to confirm compliance with the requirements of the *system strength remediation scheme*.

#### Note

This clause is classified as a 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) If *AEMO* reasonably believes the requirements of a *system strength remediation scheme* are not being complied with, *AEMO* may instruct the *Registered Participant* to conduct tests within 25 *business days* to demonstrate that the requirements are being met.

#### Note

This clause is classified as a 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) If the tests undertaken in accordance with paragraph (c) provide evidence that the requirements of a *system strength remediation scheme* are being

complied with, *AEMO* must reimburse the *Registered Participant* for the reasonable expenses incurred as a direct result of conducting the tests.

(e) If *AEMO*:

- (1) is satisfied that the requirements of a *system strength remediation scheme* are not being complied with; and
- (2) holds the reasonable opinion that the failure is impeding or will impede *AEMO's* ability to carry out its role in relation to *power system security*,

*AEMO* may direct the relevant *Registered Participant* to operate its *facility* at a particular output or *power transfer capability* or in a particular mode until the relevant *Registered Participant* submits evidence reasonably satisfactory to *AEMO* that the requirements of the *system strength remediation scheme* are being complied with.

- (f) Each *Registered Participant* referred to in paragraph (a) must maintain records for 7 years for each of its relevant *facilities* setting out details of the results of monitoring and testing conducted under this clause 5.7.3A and make these records available to *AEMO* on request.

#### 5.7.4 Routine testing of protection equipment

- (a) A *Registered Participant* must co-operate with any relevant *Network Service Provider* to test the operation of equipment forming part of a *protection system* relating to a *connection point* at which that *Registered Participant* is connected to a *network* and the *Registered Participant* must conduct these tests:
- (1) prior to the *plant* at the relevant *connection point* being placed in service; and
  - (2) at intervals specified in the *connection agreement* or in accordance with an asset management plan agreed between the *Network Service Provider* and the *Registered Participant*.
- (a1) A *Network Service Provider* must institute and maintain a compliance program to ensure that its *facilities* of the following types, to the extent that the proper operation of a *facility* listed in this clause may affect *power system security*, operate reliably and in accordance with their performance requirements under schedule 5.1:
- (1) *protection systems*;
  - (2) *control systems* for maintaining or enhancing *power system* stability;
  - (3) *control systems* for controlling *voltage* or *reactive power*; and
  - (4) *control systems* for *load shedding*.

**Note**

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

- (a2) A compliance program under clause 5.7.4(a1) must:
- (1) include monitoring of the performance of the *facilities*;
  - (2) to the extent reasonably necessary, include provision for periodic testing of the performance of those *facilities* upon which *power system security* depends;
  - (3) provide reasonable assurance of ongoing compliance of the *facilities* with the relevant performance requirements of schedule 5.1; and
  - (4) be in accordance with *good electricity industry practice*.
- (a3) A *Network Service Provider* must immediately notify *AEMO* if it reasonably believes that a *facility* of a type listed in clause 5.7.4(a1) does not comply with, or is likely not to comply with, its performance requirements.

**Note**

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

- (a4) A notice issued under clause 5.7.4(a3) must:
- (1) identify the *facility* and the requirement with which the *facility* does not comply;
  - (2) give an explanation of the reason why the *facility* failed to comply with its performance requirement;
  - (3) give the date and time when the *facility* failed to comply with its performance requirement;
  - (4) give the date and time when the *facility* is expected to again comply with its performance requirement; and
  - (5) describe the expected impact of the failure on the performance of the *Network Service Provider's transmission system or distribution system*.
- (b) Each *Registered Participant* must bear its own costs of conducting tests under this clause 5.7.4.

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

- (a) A *Registered Participant* proposing to conduct a test on equipment related to a *connection point*, which requires a change to the normal operation of that equipment, must give notice in writing to the relevant *Network Service Provider* of at least 15 *business days* except:
- (1) in an emergency; or
  - (2) where *AEMO* has notified the relevant *Network Service Provider* of the proposed date and time of a test of the *Registered Participant's* equipment to be conducted in accordance with the requirements of the *SRAS Guideline*, under an *ancillary services agreement* between *AEMO* and the *Registered Participant*.

#### Note

This clause is classified as a 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) The notice to be provided under clause 5.7.5(a) must include:
- (1) the nature of the proposed test;
  - (2) the estimated start and finish time for the proposed test;
  - (3) the identity of the equipment to be tested;
  - (4) the *power system* conditions required for the conduct of the proposed test;
  - (5) details of any potential adverse consequences of the proposed test on the equipment to be tested;
  - (6) details of any potential adverse consequences of the proposed test on the *power system*; and
  - (7) the name of the person responsible for the co-ordination of the proposed test on behalf of the *Registered Participant*.

#### Note

This clause is classified as a 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 *Network Service Provider* must review the proposed test described in a notice provided under clause 5.7.5(a) to determine whether the test:
- (1) could adversely affect the normal operation of the *power system*;
  - (2) could cause a threat to *power system security*;

- (3) requires the *power system* to be operated in a particular way which differs from the way in which the *power system* is normally operated; or
- (4) could affect the normal *metering of energy* at a *connection point*.

**Note**

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

**Note**

This clause is classified as a 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) If, in *AEMO's* reasonable opinion, a test could threaten public safety, damage or threaten to damage equipment or adversely affect the operation of the *power system*, *AEMO* may direct that the proposed test procedure be modified or that the test not be conducted at the time proposed.
- (f) *AEMO* must advise *Network Service Providers* of any test which may have a possible effect on normal *metering of energy* at a *connection point*.
- (g) *AEMO* must advise any other *Registered Participants* who might be adversely affected by a proposed test and consider any reasonable requirements of those *Registered Participants* when approving the proposed test.
- (h) The *Registered Participant* who conducts a test under this clause 5.7.5 must ensure that the person responsible for the co-ordination of a test promptly advises *AEMO* when the test is complete.

**Note**

This clause is classified as a 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) If *AEMO* approves a proposed test, *AEMO* must use its reasonable endeavours to ensure that *power system* conditions reasonably required for that test are provided as close as is reasonably practicable to the proposed start time of the test and continue for the proposed duration of the test.
- (j) Within a reasonable period after any such test has been conducted, the *Registered Participant* who has conducted a test under this clause 5.7.5

must provide the *Network Service Provider* with a report in relation to that test including test results where appropriate.

### 5.7.6 Tests of generating units requiring changes to normal operation

- (a) A *Network Service Provider* may, at intervals of not less than 12 months per *generating system*, require the testing by a *Generator* of any *generating unit connected* to the *network* of that provider in order to determine analytic parameters for modelling purposes or to assess the performance of the relevant *generating unit* or *generating system* for the purposes of a *connection agreement*, and that provider is entitled to witness such tests.
- (b) If *AEMO* reasonably considers that:
  - (1) the analytic parameters for modelling of a *generating unit* or *generating system* are inadequate; or
  - (2) available information, including results from a previous test of a *generating unit* or *generating system*, are inadequate to determine parameters for an applicable model developed in accordance with the *Power System Model Guidelines*, or otherwise agreed with *AEMO* under clause S5.2.4(c)(2),

*AEMO* may direct a *Network Service Provider* to require a *Generator* to conduct a test under paragraph (a), and *AEMO* may witness such a test.

- (c) Adequate notice of not less than 15 *business days* must be given by the *Network Service Provider* to the *Generator* before the proposed date of a test under paragraph (a).
- (d) The *Network Service Provider* must use its best endeavours to ensure that tests permitted under this clause 5.7.6 are conducted at a time which will minimise the departure from the *commitment* and *dispatch* that are due to take place at that time.
- (e) If not possible beforehand, a *Generator* must conduct a test under this clause 5.7.6 at the next scheduled *outage* of the relevant *generating unit* and in any event within 9 months of the request.

#### Note

This clause is classified as a 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 *Generator* must provide any reasonable assistance requested by the *Network Service Provider* in relation to the conduct of tests.
- (f1) If requested by a *Network Service Provider* who required the test under clause 5.7.6(a), a *Generator* must provide to the *Network Service Provider* any relevant information relating to the *plant* which is the subject of a test carried out under this clause 5.7.6, including model source code provided to *AEMO* under clause S5.2.4(b)(6).



- (g) Tests conducted under this clause 5.7.6 must be conducted in accordance with test procedures agreed between the *Network Service Provider* and the relevant *Generator* and a *Generator* must not unreasonably withhold its agreement to test procedures proposed for this purpose by the *Network Service Provider*.
- (h) A *Generator* must provide the test records obtained from a test under paragraph (a) to the *Network Service Provider*, who must derive the analytical parameters for the applicable model developed in accordance with the *Power System Model Guidelines*, or otherwise agreed with AEMO under clause S5.2.4(c)(2) and provide them and any new or revised model source code to the relevant *Generator*.
- (i) The *Generator*, the *Network Service Provider* and AEMO must each bear its own costs associated with tests conducted under this clause 5.7.6 and no compensation is to be payable for financial losses incurred as a result of these tests or associated activities.

### 5.7.7 Inter-network power system tests

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

Chart 1

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

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

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

- (c) Where, in this clause 5.7.7, there is a reference to a *Proponent* that reference includes a *Relevant TNSP* required in accordance with clause 5.7.7(b) to undertake the obligations of another *Registered Participant*.
- (d) If a *Relevant TNSP* is required by a *Registered Participant* in respect of a *scheduled generating unit*, a *semi-scheduled generating unit*, a *scheduled load* or a *market network service*, any of which have a *nameplate rating* in excess of 30 MW, to act as a *Proponent* in accordance with clause 5.7.7(b), that *Relevant TNSP* is entitled to recover all reasonable costs incurred from the *Registered Participant* that required the *Relevant TNSP* to act as the *Proponent*.
- (e) A *Registered Participant* wishing to undertake a development or conduct an activity listed in item 1, 2, 3 or 4 of chart 1 must notify *AEMO* not less than 80 *business days* before the *transmission line*, *generating unit*, *facility* or *network* development is planned to be commissioned, modified or replaced, giving details of the development or activity.
- (f) If *AEMO* receives a notice under clause 5.7.7(e), then it must provide a copy of the notice to each *jurisdictional planning representative* and consult with each *jurisdictional planning representative* about the potential impact of the development or activity.
- (g) *AEMO* or the *Relevant TNSP* for a development or activity may notify the *Proponent* of the development or activity that *AEMO* or the *Relevant TNSP* believes an *inter-network test* is required for that development or activity.
- (h) *AEMO* or the *Relevant TNSP* may only give a notice under clause 5.7.7(g) if:
  - (1) *AEMO* or the *Relevant TNSP* considers that the development or activity may have a material impact on the magnitude of the *power transfer capability* of more than one *transmission network* and, in the circumstances, an *inter-network test* is required; or
  - (2) an *inter-network test* is required having regard to guidelines *published* under clause 5.7.7(k) and the surrounding circumstances.
- (i) If the *Relevant TNSP* gives a notice under clause 5.7.7(g), then it must also promptly give a copy of the notice to *AEMO*.
- (j) A *Registered Participant* undertaking a development or activity listed in chart 1 must provide information reasonably requested by *AEMO* or the *Relevant TNSP* for making an assessment under this clause.

**Note**

This clause is classified as a 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) *AEMO* may develop, *publish* and amend from time to time, in accordance with the *Rules consultation procedures*, a set of guidelines to assist

*Registered Participants* to determine when an *inter-network test* may be required.

- (l) *AEMO* and the *Relevant TNSP* must consider any relevant guidelines in determining whether an *inter-network test* is required.
- (m) If *AEMO* or the *Relevant TNSP* gives notice under clause 5.7.7(g), then the *Proponent* must, in consultation with *AEMO*, prepare a draft *test program* for the *inter-network test* and provide it to *AEMO*, each *jurisdictional planning representative* and the *Relevant TNSP* (if the *Relevant TNSP* gave the notice).

**Note**

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

- (n) However, if *AEMO* determines that an *inter-network test* is required for a reason contemplated in item 5 or 6 of chart 1, then it must prepare a draft *test program* for the *inter-network test* in consultation with the *jurisdictional planning representatives* and provide that draft *test program* to each *jurisdictional planning representative*.
- (o) If a *jurisdictional planning representative* considers that any changes should be made to a draft *test program*, the *jurisdictional planning representative* must, within 10 *business days* after being provided with the draft *test program*, make a recommendation to *AEMO* that identifies the changes it proposes should be made to the draft *test program*.
- (p) *AEMO* must:
  - (1) *publish* a copy of the draft *test program* and any relevant changes recommended by any *jurisdictional planning representative* and invite interested *Registered Participants* to make written submissions; and
  - (2) only accept as valid submissions received not later than the closing date for submissions specified in the notice *publishing* the copy of the draft *test program* (not to be less than 14 days after the date of *publication*); and
  - (3) provide the *jurisdictional planning representatives* with copies of all valid submissions and seek any further recommendations they may have.
- (q) *AEMO* must determine and *publish* in accordance with clause 3.13.13 the *test program* for an *inter-network test* after taking into account the recommendations of the *jurisdictional planning representatives* and any valid submissions received from *Registered Participants*.
- (r) In determining the *test program*, *AEMO* must so far as practicable have regard to the following principles:

- (1) *power system security* must be maintained in accordance with Chapter 4; and
  - (2) the variation from the *central dispatch* outcomes that would otherwise occur if there were no *inter-network test* should be minimised; and
  - (3) the duration of the tests should be as short as possible consistently with test requirements and *power system security*; and
  - (4) the test facilitation costs to be borne by the *Proponent* under paragraph (aa) should be kept to the minimum consistent with this paragraph.
- (s) **[Deleted]**
- (t) An *inter-regional* test must not be conducted within 20 *business days* after *AEMO publishes* the *test program* for the *inter-network test* determined by *AEMO* under clause 5.7.7(r).
- (u) The *Proponent* in respect of an *inter-network test* must seek to enter into agreements with other *Registered Participants* to provide the test facilitation services identified in the *test program* in order to ensure that the *power system* conditions required by the *test program* are achieved.

**Note**

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

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

**Note**

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

- (w) If:
- (1) a *Proponent* approaches another *Registered Participant* as described in clause 5.7.7(v); and
  - (2) the *Proponent* and the other *Registered Participant* have not agreed the terms and conditions to be included in the agreement under which the *Registered Participant* will provide the test facilitation service requested within 15 *business days* of the approach,

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

- (x) If the dispute concerns the price which the *Proponent* is to pay for a test facilitation service, then it must be resolved applying the following principles:
  - (1) the other *Registered Participant* is entitled to recover the costs it incurs, and a reasonable rate of return on the capital it employs, in providing the test facilitation service, determined taking into account the additional costs associated with:
    - (i) maintaining the equipment necessary to provide the test facilitation service;
    - (ii) any labour required to operate and maintain the equipment used to provide the test facilitation service; and
    - (iii) any materials consumed when the test facilitation service is utilised; and
  - (2) the other *Registered Participant* is entitled to be compensated for any commercial opportunities foregone by providing the test facilitation service.
- (y) When the terms and conditions are determined in accordance with rule 8.2 under this clause 5.7.7, then the *Proponent* and the other *Registered Participant* must enter into an agreement setting out those terms and conditions.

**Note**

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

- (z) If *AEMO* is not the *Proponent* in respect of an *inter-network test*, the *Proponent* must:
  - (1) prior to the scheduled date of the *inter-network test*, confirm to *AEMO* that the test facilitation services identified in the *test program* will be available to be utilised, who will be providing them and the operational arrangements for utilising them;
  - (2) provide sufficient information to enable *AEMO* to utilise the test facilitation services in conducting the *inter-network test*; and
  - (3) respond promptly to any queries *AEMO* raises with the *Proponent* concerning the availability of the test facilitation services and *AEMO's* ability to utilise those services in conducting the *inter-network tests*.

**Note**

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

- (aa) The *Proponent* in respect of an *inter-network test* must bear all of the following costs associated with that *inter-network test*:
- (1) any amounts payable under an agreement under which test facilitation services are provided;
  - (2) the *Proponent's* own costs associated with the *inter-network test* and in negotiating and administering the agreements referred to in clause 5.7.7(u); and
  - (3) if the *Proponent* is not *AEMO* and the amount of *settlements residue* on any *directional interconnector* for a *trading interval* during which there is an impact on *central dispatch* outcomes as a result of the *inter-network test* is negative, then the *Proponent* must enter into an agreement with *AEMO* to pay that amount to *AEMO*.

**Note**

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

- (ab) If the *Proponent* is *AEMO* and the amount of *settlements residue* on any *directional interconnector* for a *trading interval* during which there is an impact on *central dispatch* outcomes as a result of the *inter-network test* is negative, then *AEMO* must adjust that residue to be zero and must recover the amount as provided for in clause 2.11.3(b)(2A).
- (ac) *AEMO* must establish operational conditions to achieve the particular *power transfer* levels for each stage of the *inter-network test* as contemplated by the *test program*:
- (1) utilizing where practicable and economic to do so the test facilitation services identified in the *test program*; and
  - (2) otherwise, by applying to the minimum extent necessary to fulfil the test requirements, *inter-network testing constraints*.
- (ad) An *inter-network test* must be coordinated by an officer nominated by *AEMO* who has authority to stop the test or any part of it or vary the procedure within pre-approved guidelines determined by *AEMO* if that officer considers any of these actions to be reasonably necessary.
- (ae) Each *Registered Participant* must:
- (1) cooperate with *AEMO* in planning, preparing for and conducting *inter-regional tests*;
  - (2) act in good faith in respect of, and not unreasonably delay, an *inter-network test*; and
  - (3) comply with any instructions given to it by *AEMO* under clause 5.7.7(af).

**Note**

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

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

### 5.7.8 Contestable IUSA components

- (a) Before commissioning, the *Primary Transmission Network Service Provider* must ensure that *contestable IUSA components* are built to the standards specified in the functional specification provided under clause 5.3.3(b)(9) and the *Connection Applicant* for the *identified user shared asset* must provide access to the *Primary Transmission Network Service Provider* to make inspections, and agree to such tests, as is reasonably required for that purpose.
- (b) The *Connection Applicant* for the *identified user shared asset* must pay the reasonable costs of inspections and tests which are reasonably required by the *Transmission Network Service Provider* under paragraph (a).

## 5.8 Commissioning

### 5.8.1 Requirement to inspect and test equipment

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

**Note**

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

**Note**

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



## 5.8.2 Co-ordination during commissioning

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

- (a) does not adversely affect other *Registered Participants* or affect power system security or quality of supply of the power system; and
- (b) minimises the threat of damage to any other *Registered Participant's* equipment.

## 5.8.3 Control and protection settings for equipment

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

### Note

This clause is classified as a 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) The *Network Service Provider* must:
  - (1) consult with other *Registered Participants* and *AEMO* as appropriate; and
  - (2) within 20 business days of receipt of the design information under clause 5.8.3(a), notify the *Registered Participant* and *AEMO* of any comments on the proposed parameter settings for the new or replacement equipment.

### Note

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

- (d) The *Network Service Provider* and the *Registered Participant* must negotiate parameter settings that are acceptable to them both and if there is any unresolved disagreement between them, the matter must be referred to *AEMO* whose decision must be given within 20 *business days* of referral of the dispute and, once a decision is given, it is to be final.
- (e) The *Registered Participant* and the *Network Service Provider* must co-operate with each other to ensure that adequate grading of protection is achieved so that faults within the *Registered Participant's facility* are cleared without adverse effects on the *power system*.

#### 5.8.4 Commissioning program

- (a) Prior to the proposed commencement of commissioning by a *Registered Participant* of any new or replacement equipment that could reasonably be expected to alter performance of the *power system*, the *Registered Participant* must advise the relevant *Network Service Provider* and *AEMO* in writing of the commissioning program including test procedures and proposed test equipment to be used in the commissioning.
- (b) Notice under clause 5.8.4(a) must be given not less than 3 months prior to commencement of commissioning for a *connection* to a *transmission network* and not less than 1 month prior to commencement of commissioning for a *connection* to a *distribution network*.
- (c) The relevant *Network Service Provider* and *AEMO* must, within 15 *business days* of receipt of such advice under clause 5.8.4(a), notify the *Registered Participant* either that they:
  - (1) agree with the proposed commissioning program; or
  - (2) require changes to it in the interest of maintaining *power system security*, safety or quality of *supply*.
- (d) If the relevant *Network Service Provider* or *AEMO* require changes to the proposed commissioning program, then the parties must co-operate to reach agreement and finalise the commissioning program within a reasonable period.
- (e) A *Registered Participant* must not commence the commissioning until the commissioning program has been finalised and the relevant *Network Service Provider* and *AEMO* must not unreasonably delay finalising a commissioning program.

#### 5.8.5 Commissioning tests

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

- (b) The relevant *Network Service Provider* must, within a reasonable period of receiving advice of commissioning tests, notify the *Registered Participant* whose new or replacement equipment is to be tested under this clause 5.8.5 whether or not it:
  - (1) wishes to witness the commissioning tests; and
  - (2) agrees with the proposed commissioning times.
- (c) A *Registered Participant* whose new or replacement equipment is tested under this clause 5.8.5 must submit to the relevant *Network Service Provider* the commissioning test results demonstrating that a new or replacement item of equipment complies with the *Rules* or the relevant *connection agreement* or both to the satisfaction of the relevant *Network Service Provider*.

**Note**

This clause is classified as a 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) If the commissioning tests conducted in relation to a new or replacement item of equipment demonstrates non-compliance with one or more requirements of the *Rules* or the relevant *connection agreement* then the *Registered Participant* whose new or replacement equipment was tested under this clause 5.8.5 must promptly meet with the *Network Service Provider* to agree on a process aimed at achievement of compliance of the relevant item with the *Rules*.
- (e) On request by a *Network Service Provider*, *AEMO* may direct that the commissioning and subsequent *connection* of the *Registered Participant's* equipment must not proceed if the relevant equipment does not comply with the requirements described in clause 5.8.1(a).

## 5.9 Disconnection and Reconnection

### 5.9.1 Voluntary disconnection

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

**Note**

This clause is classified as a 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 *Registered Participant* is entitled, subject to the terms of the relevant *connection agreement*, to require voluntary permanent *disconnection* of its equipment from a *network* in which case appropriate operating procedures

necessary to ensure that the *disconnection* will not threaten *power system security* must be implemented in accordance with clause 5.9.2.

**Note**

This clause is classified as a 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 *Registered Participant* must pay all costs directly attributable to the voluntary *disconnection* and *decommissioning*.

## 5.9.2 Decommissioning procedures

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

**Note**

This clause is classified as a 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) The *Network Service Provider* must notify *AEMO* and any *Registered Participants* with whom it has a *connection agreement* if it believes, in its reasonable opinion, the terms and conditions of such a *connection agreement* will be affected by procedures for *disconnection* or proposed procedures agreed with any other *Registered Participant*. The parties must negotiate any amendments to the procedures for *disconnection* or the *connection agreement* that may be required.
- (c) Any *disconnection* procedures agreed to or determined under clause 5.9.2(a) must be followed by all relevant *Network Service Providers* and *Registered Participants*.

## 5.9.3 Involuntary disconnection

- (a) *AEMO* may direct a *Network Service Provider* to, or a *Network Service Provider* may (either on its own initiative or in accordance with a direction from *AEMO*), *disconnect* a *Registered Participant's facilities* from a *network*, or a *Registered Participant's market loads*, in the following circumstances:
  - (1) pursuant to a direction for a disconnection made by a court under:
    - (a) section 62 or 63 of the *National Electricity Law*;
    - (b) section 44AAG of the *Competition and Consumer Act 2010* (Cth); or

- (c) section 44AAGA of the *Competition and Consumer Act 2010* (Cth).
  - (2) during an emergency in accordance with clause 5.9.5;
  - (3) in accordance with the *National Electricity Law*; or
  - (4) in accordance with the provisions of the *Registered Participant's connection agreement*.
- (b) In all cases of *disconnection* by a *Network Service Provider* at AEMO's direction during an emergency in accordance with clause 5.9.5, AEMO must undertake a review under clause 4.8.15 and AEMO must then provide a report to the *Registered Participant*, the AEMC and the AER advising of the circumstances requiring such action.
- (c) A *Network Service Provider* that has received a direction from AEMO under this clause 5.9.3 must comply with that direction promptly

**Note**

This clause is classified as a 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 *Registered Participant's facilities* or *market loads* may be *disconnected* from a *network* by automatic operation of an *emergency frequency control scheme*.

#### **5.9.4 Direction to disconnect**

- (a) Where a *disconnection* is made pursuant to clause 5.9.3(a)(1), neither AEMO nor the relevant *Network Service Provider* is liable in any way for any loss or damage suffered or incurred by the *Registered Participant* by reason of the *disconnection* and neither AEMO nor the relevant *Network Service Provider* is obliged for the duration of the *disconnection* to fulfil any agreement to convey electricity to or from the *Registered Participant's facility*.
- (b) A *Registered Participant* must not bring proceedings against AEMO or a *Network Service Provider* to seek to recover any amount for any loss or damage described in clause 5.9.4(a).
- (c) *Transmission service* charges and *distribution service* charges must be paid by a *Registered Participant* whose *facilities* have been *disconnected* under clause 5.9.3 as if any *disconnection* had not occurred.
- (d) A *Network Service Provider* that has received a direction from AEMO to *disconnect* a *Registered Participant's facilities* in the circumstances described in clause 5.9.3(a)(1) must comply with that direction promptly.

**Note**

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

**5.9.4A Notification of disconnection**

If the AER applies to a court for a direction, under section 62 or 63 of the *National Electricity Law* or pursuant to regulations made under section 44AAG of the *Competition and Consumer Act 2010* (Cth), that a *Registered Participant's* market loads be disconnected, the AER must promptly notify AEMO and the participating jurisdictions which the AER considers may be affected.

**5.9.5 Disconnection during an emergency**

- (a) Where AEMO may direct a *Network Service Provider* to disconnect a *Registered Participant's* facilities during an emergency under the Rules or otherwise, then AEMO may:
  - (1) require the relevant *Registered Participant* to reduce the power transfer at the proposed point of disconnection to zero in an orderly manner and then direct a *Network Service Provider* to disconnect the *Registered Participant's* facility by automatic or manual means; or
  - (2) direct a *Network Service Provider* to immediately disconnect the *Registered Participant's* facilities by automatic or manual means where, in AEMO's reasonable opinion, it is not appropriate to follow the procedure set out in clause 5.9.5(a)(1) because action is urgently required as a result of a threat to safety of persons, hazard to equipment or a threat to power system security.
- (b) A *Network Service Provider* that has received a direction from AEMO under this clause 5.9.5 must comply with that direction promptly.

**Note**

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

**5.9.6 Obligation to reconnect**

- (a) Either AEMO (by directing the *Network Service Provider*) or the relevant *Network Service Provider* (either on its own initiative or in accordance with a direction from AEMO) must reconnect a *Registered Participant's* facilities to a transmission network or distribution network at a reasonable cost to the *Registered Participant* as soon as practicable if:
  - (1) AEMO is reasonably satisfied that there no longer exists an emergency due to which the *Registered Participant's* facilities were disconnected under clause 5.9.5;

- (2) *AEMO* is reasonably satisfied that there no longer exists a reason for the *disconnection* under the *National Electricity Law* or the *Registered Participant's connection agreement*;
- (3) one of the following occurs:
  - (i) a breach of the *Rules* giving rise to the *disconnection* has been remedied;
  - (ii) where the breach is not capable of remedy, compensation has been agreed and paid by the *Registered Participant* to the affected parties or, failing agreement, the amount of compensation payable has been determined in accordance with the dispute resolution procedure in rule 8.2 and that amount has been paid;
  - (iii) where the breach is not capable of remedy and the amount of compensation has not been agreed or determined, assurances for the payment of reasonable compensation have been given to the satisfaction of *AEMO*, the *Network Service Provider* and the parties affected; or
  - (iv) the *Registered Participant* has taken all necessary steps to prevent the re-occurrence of the breach and has delivered binding undertakings to *AEMO* or the *Network Service Provider* that the breach will not re-occur.
- (4) *AEMO* is reasonably satisfied that there no longer exists the *power system* conditions due to which the *Registered Participant's facilities* or *loads* were *disconnected* by operation of an *emergency frequency control scheme*.
- (b) In carrying out its obligations under clause 5.9.6(a), *AEMO* must, to the extent practicable, arrange for the implementation of an equitable sharing of the reconnection of *facilities* across *interconnected regions* up to the *power transfer capability* of the *network* and, in performing these obligations within a *region*, both *AEMO* and the relevant *Network Service Provider* must, to the extent practicable, give priority to reconnection of a *region's sensitive loads*.
- (c) A *Network Service Provider* that has received a direction from *AEMO* under this clause 5.9.6 must comply with that direction promptly.

**Note**

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

## Part D Network Planning and Expansion

### Note:

Parts B and C will be inserted by Schedule 2 of the National Electricity Amendment (Transmission Connection and Planning Arrangements) Rule 2017 No. 4 which commences on 1 July 2018.

## 5.10 Network development generally

### 5.10.1 Content of Part D

- (a) Clause 5.10.2 sets out local definitions used in Part D.
- (b) Clause 5.11.1 sets out obligations regarding forecasts for connection points to the *transmission network*.
- (c) Clause 5.11.2 sets out the obligations of *Network Service Providers* relating to the identification of network limitations.
- (d) Clause 5.12 sets out planning and reporting obligations for *Transmission Network Service Providers*.
- (e) Clause 5.13 sets out planning and reporting obligations for *Distribution Network Service Providers*.
- (e1) Clause 5.13A sets out the obligations to provide distribution zone substation information.
- (f) Clause 5.14 sets out joint planning obligations of *Network Service Providers*.
- (f1) Rule 5.14B relates to guidelines for *Transmission Annual Planning Reports*.
- (g) Clause 5.15 relates to regulatory investment tests generally.
- (h) Clause 5.16 relates to the *regulatory investment test for transmission*.
- (i) Clause 5.17 relates the *regulatory investment test for distribution*.
- (j) Clause 5.18 relates to the construction of *funded augmentations*.
- (j1) Rule 5.18A sets out the obligations of *Transmission Network Service Providers* in relation to a register of large generator connections.
- (j2) Rule 5.18B sets out obligations of *Distribution Network Service Providers* in relation to completed embedded generation projects.

### Note:

Rule 5.18B commences operation on 1 July 2018 when clause 5.4.5 is renumbered as rule 5.18B under the National Electricity Amendment (Transmission Connection and Planning Arrangements) Rule 2017 No. 4



- (k) Clause 5.19 relates to Scale Efficient Network Extensions.
- (l) Clause 5.20 relates to *AEMO's* National Transmission Planning responsibilities.
- (m) Clause 5.20A relates to *power system frequency* management planning.
- (m1) Clause 5.20B sets out the process for identifying and providing the *inertia requirements* for *inertia sub-networks*.
- (m2) Clause 5.20C sets out the process for identifying and providing the *system strength requirements* for each *region*.
- (n) Clause 5.21 sets out *AEMO's* obligations to *publish* information and guidelines and provide advice regarding network development.
- (o) Clause 5.22 relates to the *AEMC's last resort planning powers*.

### 5.10.2 Definitions

In this Part D and schedules 5.8, 5.9 and 5.4A:

**asset management** means the development and implementation of plans and processes, encompassing management, financial, consumer, engineering, information technology and other business inputs to ensure assets achieve the expected level of performance and minimise costs to consumers over the expected life cycle of the assets.

**cost threshold** means a cost threshold specified in clause 5.15.3(b) or 5.15.3(d) (as relevant).

**cost threshold determination** means a final determination under clause 5.15.3(i).

**cost threshold review** means a review conducted under clause 5.15.3(e).

**credible option** has the meaning given to it in clause 5.15.2(a).

**demand side engagement document** means the document *published* by the *Distribution Network Service Provider* under clause 5.13.1(g).

**demand side engagement register** means a facility by which a person can register with a *Distribution Network Service Provider* their interest in being notified of developments relating to *distribution network* planning and expansion.

**demand side engagement strategy** means the strategy developed by a *Distribution Network Service Provider* under clause 5.13.1(e) and described in its demand side engagement document.

**de-rate** means, in respect of a *Network Service Provider*, a reduction in the *network capability* of a *network element* in the *network* of that *Network Service Provider*.

**design fault level** means the maximum level of fault current that a *facility* can sustain while maintaining operation at an acceptable *performance standard*.

**dispute notice** has the meaning given in clause 5.16.5(c)(1) and 5.17.5(c)(1).

**disputing party** has the meaning given in clause 5.16.5(c) and 5.17.5(c).

**distribution asset** means the apparatus, equipment and plant, including *distribution lines*, *substations* and sub-transmission lines, of a *distribution system*.

**draft project assessment report** means the report prepared under clause 5.17.4(i).

**final project assessment report** means the report prepared under clauses 5.17.4(o) or (p).

**firm delivery capacity** means the maximum allowable output or load of a *network* or *facility* under *single contingency* conditions, including any short term overload capacity having regard to external factors, such as ambient temperature, that may affect the capacity of the *network* or *facility*.

**forward planning period** means the period determined by the *Distribution Network Service Provider* under clause 5.13.1(a)(1).

**joint planning project** means a project the purpose of which is to address a need identified under clause 5.14.1(d)(3) or clause 5.14.2(a) or clause 5.14.3(a).

**load transfer capacity** means meeting the *load* requirements for a *connection point* by the reduction of *load* or group of *loads* at the *connection point* and increasing the *load* or group of *loads* at a different *connection point*.

**non-network options report** means the report prepared under clause 5.17.4(b).

**non-network provider** means a person who provides *non-network options*.

**normal cyclic rating** means the normal level of allowable *load* on a primary distribution feeder having regard to external factors, such as ambient temperature and wind speed, that may affect the capacity of the primary distribution feeder.

**potential credible option** means an option which a RIT-D proponent or RIT-T proponent (as the case may be) reasonably considers has the potential to be a credible option based on its initial assessment of the *identified need*.

**potential transmission project** means investment in a transmission asset of a *Transmission Network Service Provider* which:

- (a) is an *augmentation*; and
- (b) has an estimated capital cost in excess of \$5 million (as varied in accordance with a cost threshold determination); and

- (c) the person who identifies the project considers is likely, if constructed, to relieve forecast constraints in respect of *national transmission flow paths* between *regional reference nodes*.

**preferred option** has the meaning given in clause 5.16.1(b) and 5.17.1(b).

**primary distribution feeder** means a *distribution line* connecting a sub-transmission asset to either other *distribution lines* that are not sub-transmission lines, or to distribution assets that are not sub-transmission assets.

**project assessment conclusions report** means the report prepared under clause 5.16.4(t) or (u).

**project assessment draft report** means the report prepared under clause 5.16.4(j).

**project specification consultation report** means the report prepared under clause 5.16.4(b).

**protected event EFCS investment** means investment by a *Transmission Network Service Provider* or a *Distribution Network Service Provider* for the purposes of installing or modifying an *emergency frequency control scheme* applicable in respect of the *Network Service Provider's transmission or distribution system* in accordance with a *protected event EFCS standard*.

**reconfiguration investment** has the meaning given to it in clause 5.16.3(a)(5).

**regulatory investment test for distribution application guidelines** means the guidelines developed and *published* by the *AER* in accordance with clause 5.17.2 as in force from time to time, and include amendments made in accordance with clause 5.17.2(e).

**regulatory investment test for transmission application guidelines** means the guidelines developed and *published* by the *AER* in accordance with clause 5.16.2 as in force from time to time, and include amendments made in accordance with clause 5.16.2(e).

**reliability corrective action** means investment by a *Transmission Network Service Provider* or a *Distribution Network Service Provider* in respect of its *transmission network* or *distribution network* for the purpose of meeting the service standards linked to the technical requirements of schedule 5.1 or in *applicable regulatory instruments* and which may consist of *network options* or *non-network options*.

**RIT-D project** means:

- (a) a project the purpose of which is to address an *identified need* identified by a *Distribution Network Service Provider*; or
- (b) a joint planning project that is not a RIT-T project.

**RIT-D proponent** means the *Network Service Provider* applying the *regulatory investment test for distribution* to a RIT-D project to address an *identified need*. The RIT-D proponent may be:

- (a) if the *identified need* is identified during joint planning under clause 5.14.1(d)(3), a *Distribution Network Service Provider* or a *Transmission Network Service Provider*; or
- (b) in any other case, a *Distribution Network Service Provider*.

**RIT-T project** means:

- (a) a project the purpose of which is to address an *identified need* identified by a *Transmission Network Service Provider*; or
- (b) a joint planning project if:
  - (1) at least one potential credible option to address the *identified need* includes investment in a *network* or *non-network option* on a *transmission network* (other than *dual function assets*) with an estimated capital cost greater than the cost threshold that applies under clause 5.16.3(a)(2); or
  - (2) the *Network Service Providers* affected by the joint planning project have agreed that the *regulatory investment test for transmission* should be applied to the project.

**RIT-T proponent** means the *Network Service Provider* applying the *regulatory investment test for transmission* to a RIT-T project to address an *identified need*. The RIT-T proponent may be:

- (a) if the *identified need* is identified during joint planning under clause 5.14.1(d)(3), a *Distribution Network Service Provider* or a *Transmission Network Service Provider*; or
- (b) in any other case (including under clause 5.14.3(a)), a *Transmission Network Service Provider*.

**sub-transmission** means any part of the *power system* which operates to deliver electricity from the *transmission system* to the *distribution network* and which may form part of the *distribution network*, including zone substations.

**sub-transmission line** means a power line connecting a sub-transmission asset to either the *transmission system* or another sub-transmission asset.

**system limitation** means a limitation identified by a *Distribution Network Service Provider* under clause 5.13.1(d)(2).

**system limitation template** means a template developed and *published* by the *AER* under clause 5.13.3(a).

**TAPR Guidelines** means the guidelines *published* by the AER under clause 5.14B.1.

**total capacity** means the theoretical maximum allowable output or *load* of a *network* or *facility* with all network components and equipment intact.

**transmission asset** means the apparatus, equipment and plant, including *transmission lines* and *substations* of a *transmission system*.

**transmission-distribution connection point** means:

- (a) subject to paragraph (b), the agreed point of supply established between a *transmission network* and a *distribution network*;
- (b) in relation to the *declared transmission system* of an *adoptive jurisdiction*, the agreed point of supply between the transmission assets of the *declared transmission system operator* and a *distribution network*.

**zone substation** means a *substation* for the purpose of connecting a *distribution network* to a sub-transmission *network*.

### 5.10.3 Interpretation

The terms *Network Service Provider*, *Transmission Network Service Provider* and *Distribution Network Service Provider* when used in rules 5.11 to 5.17 and schedules 5.8 and 5.9 are not intended to refer to, and are not to be read or construed as referring to, any *Network Service Provider* in its capacity as a *Market Network Service Provider*.

## 5.11 Forecasts of connection to transmission network and identification of system limitations

### 5.11.1 Forecasts for connection to transmission network

- (a) The relevant *Network Service Provider* must give at least 40 *business days* written notice to each relevant *Registered Participant* of the annual date by which the *Registered Participant* must provide the relevant *Network Service Provider* with the short and long term electricity *generation*, *market network service* and *load* forecast information listed in schedule 5.7 in relation to each *connection point* which *connects* the *Registered Participant* to a *transmission network* of that *Network Service Provider* and any other relevant information as reasonably required by the *Network Service Provider*.
- (b) Details of planned future *generating units*, *market network services* and *loads*, being details regarding the proposed commencing date, *active power capability* and *reactive power capability*, *power transfer capability*, operating times/seasons and special operating requirements, must be given by each relevant *Registered Participant* to the relevant *Network Service Provider* on reasonable request.

- (c) Each relevant *Registered Participant* must use reasonable endeavours to provide accurate information under paragraph (a) which must include details of any factors which may impact on *load* forecasts or proposed *facilities* for *generation* or *market network services*.
- (d) If the *Network Service Provider* reasonably believes any forecast information to be inaccurate, the *Network Service Provider* may modify that forecast information and must advise the relevant *Registered Participant* and *AEMO* in writing of this action and the reason for the modification. The *Network Service Provider* is not responsible for any adverse consequences of this action or for failing to modify forecast information under this paragraph (d).

### 5.11.2 Identification of network limitations

Each *Network Service Provider* must:

- (a) extrapolate the forecasts provided to it by *Registered Participants* for the purpose of planning;
- (b) if the analysis required by paragraph (a) indicates that any relevant technical limits of the *transmission or distribution systems* will be exceeded, either in normal conditions or following the contingencies specified in schedule 5.1, notify any affected *Registered Participants* and *AEMO* of these limitations; and
- (c) notify any affected *Registered Participants* and *AEMO* of the expected time for undertaking proposed corrective action which may consist of:
  - (1) *dual function assets* or an investment in a *transmission network* designed to address limitations in respect of a *distribution network* notified under paragraph (b); and
  - (2) *network options* or *non-network options* or modifications to *connection facilities*, designed to address the limitations notified under paragraph (b).

## 5.12 Transmission annual planning process

### 5.12.1 Transmission annual planning review

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

- (1) incorporate the forecast *loads* as submitted or modified in accordance with clause 5.11.1; and
  - (2) include a review of the adequacy of existing *connection points* and relevant parts of the *transmission system* and planning proposals for future *connection points*; and
  - (3) take into account the most recent *NTNDP* and *power system frequency risk review*; and
  - (4) consider the potential for *augmentations*, or non-*network* alternatives to *augmentations*, that are likely to provide a net economic benefit to all those who produce, consume and transport electricity in the *market*;
  - (5) consider the condition of *network* assets; and
  - (6) consider the potential for replacements of *network* assets, or non-*network options* to replacements of *network* assets, that are likely to provide a net economic benefit to all those who produce, consume and transport electricity in the *market*.
- (c) The minimum planning period for the purposes of the annual planning review is 10 years for *transmission networks*.

### 5.12.2 Transmission Annual Planning Report

- (a) Subject to paragraph (b), by 30 June 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 *NTNDP* and the development strategies for current or potential *national transmission flow paths* that are specified in that *NTNDP*;
- (6A) for proposed new or modified *emergency frequency control schemes*, the manner in which the project relates to the most recent *power system frequency risk review*;
- (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) clause 5.16.3(c) 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 provide *inertia network services*, *inertia support activities* or *system strength services*.
  - (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;
  - (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; and
  - (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.
- (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).

## **5.13 Distribution annual planning process**

### **5.13.1 Distribution annual planning review**

#### **Scope**

- (a) A *Distribution Network Service Provider* must:
  - (1) subject to paragraph (b), determine an appropriate forward planning period for its distribution assets; and
  - (2) analyse the expected future operation of its *network* over the forward planning period in accordance with this clause 5.13.1.
- (b) The minimum forward planning period for the purposes of the *distribution* annual planning review is 5 years.
- (c) The *distribution* annual planning review must include all assets that would be expected to have a material impact on the *Distribution Network Service Provider's network* over the forward planning period.

#### **Requirements**

- (d) Each *Distribution Network Service Provider* must, in respect of its *network*:
  - (1) prepare forecasts covering the forward planning period of *maximum demands* for:
    - (i) sub-transmission lines;
    - (ii) zone substations; and
    - (iii) to the extent practicable, primary distribution feeders,having regard to:
    - (iv) the number of customer *connections*;
    - (v) *energy* consumption; and
    - (vi) estimated total output of known *embedded generating units*;
  - (2) identify, based on the outcomes of the forecasts in subparagraph (1), limitations on its *network*, including limitations caused by one or more of the following factors:
    - (i) forecast *load* exceeding total capacity;
    - (ii) the requirement for asset refurbishment or replacement;
    - (iii) the requirement for *power system security* or *reliability* improvement;

- (iv) design fault levels being exceeded;
  - (v) the requirement for *voltage* regulation and other aspects of quality of supply to other *Network Users*; and
  - (vi) the requirement to meet any *regulatory obligation or requirement*;
- (3) identify whether corrective action is required to address any system limitations identified in subparagraph (2) and, if so, identify whether the *Distribution Network Service Provider* is required to:
  - (i) carry out the requirements of the *regulatory investment test for distribution*; and
  - (ii) carry out demand side engagement obligations as required under paragraph (f); and
- (4) take into account any *jurisdictional electricity legislation*.

**Demand side engagement obligations**

- (e) Each *Distribution Network Service Provider* must develop a strategy for:
  - (1) engaging with non-network providers; and
  - (2) considering *non-network options*.
- (f) A *Distribution Network Service Provider* must engage with non-network providers and consider *non-network options* for addressing system limitations in accordance with its demand side engagement strategy.
- (g) A *Distribution Network Service Provider* must document its demand side engagement strategy in a demand side engagement document which must be *published* by no later than 31 August 2013.
- (h) A *Distribution Network Service Provider* must include the information specified in schedule 5.9 in its demand side engagement document.
- (i) A *Distribution Network Service Provider* must review and *publish* a revised demand side engagement document at least once every three years.
- (j) A *Distribution Network Service Provider* must establish and maintain a facility by which parties can register their interest in being notified of developments relating to *distribution network* planning and expansion. A *Distribution Network Service Provider* must have in place a facility under this paragraph (j) no later than the date of publication of the *Distribution Network Service Provider's* demand side engagement document under paragraph (g).

### 5.13.2 Distribution Annual Planning Report

- (a) For the purposes of this clause 5.13.2:

**DAPR date** means for a *Distribution Network Service Provider*:

- (1) the date by which it is required to *publish* a *Distribution Annual Planning Report* under *jurisdictional electricity legislation*; or
- (2) if no such date is specified in *jurisdictional electricity legislation*, 31 December.

- (b) By the DAPR date each year, a *Distribution Network Service Provider* must *publish* the *Distribution Annual Planning Report* setting out the results of the *distribution* annual planning review for the forward planning period.

**Note**

Under clause 5.12.2(b), if a person 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* under this clause 5.13.2.

- (c) A *Distribution Network Service Provider* must include the information specified in schedule 5.8 in its *Distribution Annual Planning Report*.
- (d) Despite paragraph (c), a *Distribution Network Service Provider* is not required to include in its *Distribution Annual Planning Report* information required in relation to transmission-distribution connection points if it is required to do so under *jurisdictional electricity legislation*.
- (e) As soon as practicable after it *publishes* a *Distribution Annual Planning Report* under paragraph (b), a *Distribution Network Service Provider* must *publish* on its website the contact details for a suitably qualified staff member of the *Distribution Network Service Provider* to whom queries on the report may be directed.

### 5.13.3 Distribution system limitation template

- (a) The *AER* must develop and *publish* a system limitation template in accordance with paragraph (c) and having regard to paragraph (b). The system limitation template must be developed by the *AER* in consultation with *Distribution Network Service Providers* and any persons who have identified themselves to the *AER* as having an interest in the form or contents of the system limitation template.
- (b) The purpose of the system limitation template is to facilitate the publication by *Distribution Network Service Providers* of information on system limitations referred to in their *Distribution Annual Planning Reports* in a useable, consistent, accessible format to assist third parties to propose alternative options to address system limitations.
- (c) The system limitation template must:

- (1) provide a template for the reporting of the following information:
  - (i) the name (or identifier) and location of *substations*, sub-transmission lines, zone substations and, where appropriate, primary feeders, where there is a system limitation or a projected system limitation during the forward planning period that has been identified in a *Distribution Network Service Provider's Distribution Annual Planning Report*;
  - (ii) the estimated timing (months(s) and year) of the system limitation or projected system limitation identified in subparagraph (i);
  - (iii) the *Distribution Network Service Provider's* proposed option to address the system limitation;
  - (iv) the estimated capital or operating cost of the proposed option; and
  - (v) the amount by which peak demand at the location of the system limitation or projected system limitation would need to be reduced in order to defer the proposed solution, and the dollar value to the *Distribution Network Service Provider* of each year of deferral; and
- (2) include a statement that any information provided using the system limitation template must be read in conjunction with the reporting *Distribution Network Service Provider's Distribution Annual Planning Report*.
- (d) At the same time as it *publishes* its *Distribution Annual Planning Report* each year, a *Distribution Network Service Provider* must *publish* a report which contains the information specified in paragraph (c) in the form required by the system limitation template.

## 5.13A Distribution zone substation information

### Definitions

- (a) In this rule:

**annual zone substation report** means a report containing historical zone substation information for a reporting year (other than a reporting year covered by the ten year zone substation report).

**reporting year** for a *Distribution Network Service Provider* means a period of one year that ends on the same date in each reporting year (e.g. a period of one year ending on 30 June).

**ten year zone substation report** means a report containing historical zone substation information that is available for the ten reporting years prior to the commencement of this rule 5.13A.

**zone substation information** means the information specified in paragraph (b).

**Zone substation information**

- (b) Zone substation information means the following information for each zone substation on the *Distribution Network Service Provider's distribution network*:
- (1) the name or other identifier for the zone substation that corresponds to that used by the *Distribution Network Service Provider* in the regional development plan referred to in clause S5.8(n);
  - (2) if the *Distribution Network Service Provider* has determined under paragraph (g) that the *load* for the zone substation should not be disclosed, a statement to the effect that the information has not been provided for that zone substation for reasons of confidentiality;
  - (3) each date and time interval for which *load* data is available for the zone substation;
  - (4) for each date and time interval specified under subparagraph (b)(3), *load* (in kW or MW); and
  - (5) any additional information relating to *load* at the zone substation that the *Distribution Network Service Provider* wishes to provide.

**Note**

The following are examples of additional information that may be provided by a *Distribution Network Service Provider* under clause 5.13A(b)(5):

- (a) apparent power measured in kVA or MVA;
  - (b) reactive power measured in kVAr or MVAr; or
  - (c) power factor.
- (c) The *Distribution Network Service Provider's* obligation to provide zone substation information under subparagraphs (b)(4) and (5) is to provide raw data. A *Distribution Network Service Provider* is not required to analyse, assess or validate the quality or accuracy of that data before it is provided to a person who requests it under this rule 5.13A.

**Requests for zone substation information**

- (d) A *Distribution Network Service Provider* must publish on its website:
- (1) information on how a person may request a ten year zone substation report and/or annual zone substation reports;
  - (2) the electronic format (and any other format) in which the *Distribution Network Service Provider* can make zone substation information available;



- (3) the end date of the *Distribution Network Service Provider's* reporting year;
  - (4) the start and end dates of the period to which the ten year zone substation report relates;
  - (5) details of the annual zone substation reports that are available on request;
  - (6) information on when the next annual zone substation report will be available on request; and
  - (7) the amount of the fee payable to the *Distribution Network Service Provider* for provision of the ten year zone substation report and each annual zone substation report. Any fee specified must be no more than that required to meet the reasonable costs anticipated to be incurred by the *Distribution Network Service Provider* in providing the relevant zone substation reports.
- (e) Any person may request a *Distribution Network Service Provider* to provide zone substation information. A request for zone substation information must:
- (1) specify whether the person requires:
    - (i) a ten year zone substation report; and/or
    - (ii) one or more annual zone substation reports;
  - (2) specify the format in which the person wishes to receive the reports under subparagraph (e)(1), which must be a format specified by the *Distribution Network Service Provider* under paragraph (d)(2);
  - (3) include an acknowledgment that:
    - (i) any zone substation information provided by the *Distribution Network Service Provider* under subparagraphs (b)(4) and (5) is raw data and the *Distribution Network Service Provider* has not analysed, assessed or validated the quality or accuracy of that data; and
    - (ii) the *Distribution Network Service Provider* makes no warranty or guarantee as to the quality, accuracy or suitability for any particular purpose of the zone substation information;
  - (4) be accompanied by any applicable fees specified on the *Distribution Network Service Provider's* website; and
  - (5) otherwise be in the format reasonably required by the *Distribution Network Service Provider* and as specified on its website.

**Obligations of Distribution Network Service Providers to provide zone substation information**

- (f) If a *Distribution Network Service Provider* receives a request in accordance with paragraph (e) it:
  - (1) must provide the report(s) requested as soon as practicable but, in any event, within 30 *business days* of the date of the request; and
  - (2) must not require the person who requested the report(s) to meet any further conditions or make any further acknowledgments or undertakings to the *Distribution Network Service Provider* before providing the report(s).
- (g) A *Distribution Network Service Provider* is not required to provide information under subparagraphs (b)(3) and (4) for a zone substation if, in the reasonable opinion of the *Distribution Network Service Provider*, that information is confidential or commercially-sensitive to a third party.

**5.14 Joint planning**

**5.14.1 Joint planning obligations of Transmission Network Service Providers and Distribution Network Service Providers**

- (a) Subject to paragraphs (b) and (c):
  - (1) each *Distribution Network Service Provider* must conduct joint planning with each *Transmission Network Service Provider* of the *transmission networks* to which the *Distribution Network Service Provider's networks* are connected; and
  - (2) each *Transmission Network Service Provider* must conduct joint planning with each *Distribution Network Service Provider* of the *distribution networks* to which the *Transmission Network Service Provider's networks* are connected.
- (b) In the case of the *declared shared network* of an *adoptive jurisdiction*, the relevant *declared transmission system operator*, the relevant *Distribution Network Service Provider*, AEMO and any *interested party* that has informed AEMO of its interest in the relevant plans, shall conduct joint planning.
- (c) For the purposes of this clause 5.14.1, a *Transmission Network Service Provider* does not include a *Network Service Provider* that is a *Transmission Network Service Provider* only because it owns, controls or operates *dual function assets*.
- (d) The relevant *Distribution Network Service Provider* and *Transmission Network Service Provider* must:
  - (1) assess the adequacy of existing *transmission* and *distribution networks* and the assets associated with transmission-distribution connection

points over the next five years and to undertake joint planning of projects which relate to both *networks* (including, where relevant, *dual function assets*);

- (2) use best endeavours to work together to ensure efficient planning outcomes and to identify the most efficient options to address the needs identified in accordance with subparagraph (4);
- (3) identify any limitations or constraints:
  - (i) that will affect both the *Transmission Network Service Provider's* and *Distribution Network Service Provider's network*; or
  - (ii) which can only be addressed by corrective action that will require coordination by the *Transmission Network Service Provider* and the *Distribution Network Service Provider*; and
- (4) where the need for a joint planning project is identified under subparagraph (3):
  - (i) jointly determine plans that can be considered by relevant *Registered Participants*, *AEMO*, *interested parties*, and parties registered on the demand side engagement register of each *Distribution Network Service Provider* involved in joint planning;
  - (ii) determine whether the joint planning project is a RIT-T project or a RIT-D project; and
  - (iii) may agree on a lead party to be responsible for carrying out the *regulatory investment test for transmission* or the *regulatory investment test for distribution* (as the case may be) in respect of the joint planning project.
- (e) If a *Network Service Provider*, as the lead party for one or more *Network Service Providers*, undertakes the *regulatory investment test for transmission* or the *regulatory investment test for distribution* (as the case may be) in respect of a joint planning project, the other *Network Service Providers* will be taken to have discharged their obligation to undertake the relevant test in respect of that project.

#### **5.14.2 Joint planning obligations of Distribution Network Service Providers and Distribution Network Service Providers**

- (a) *Distribution Network Service Providers* must undertake joint planning with other *Distribution Network Service Providers* where there is a requirement to consider the need for any *augmentation* or *non-network options* that affect more than one *Distribution Network Service Provider's network*.

- (b) *Distribution Network Service Providers* involved in joint planning may agree on a lead party to be responsible for carrying out the *regulatory investment test for distribution* in respect of the joint planning project.
- (c) If a *Distribution Network Service Provider*, as the lead party for one or more *Distribution Network Service Providers*, undertakes the *regulatory investment test for distribution* in respect of a joint planning project, the other *Distribution Network Service Providers* will be taken to have discharged their obligation to undertake the *regulatory investment test for distribution* in respect of that project.

### **5.14.3 Joint planning obligations of Transmission Network Service Providers**

*Transmission Network Service Providers* must undertake joint planning if:

- (a) a possible credible option to address a *constraint* in a *transmission network* is an *augmentation* to the *transmission network* of another *Transmission Network Service Provider*; and
- (b) that *constraint* is not already being considered under other processes under the *Rules*.

### **5.14A Joint planning in relation to retirement or de-ratings of network assets forming part of the Declared Shared Network**

- (a) In the case of a proposed retirement or de-rating of a *network* asset that forms part of the *declared shared network* of an *adoptive jurisdiction*, *AEMO* and the relevant *declared transmission system operator* must conduct joint planning in respect of that proposed retirement or de-rating if an *identified need* arises from that proposed retirement or de-rating.
- (b) In conducting joint planning under paragraph (a), *AEMO* and the *declared transmission system operator* must use best endeavours to work together to identify the most efficient options to address the relevant *identified need*.

### **5.14B TAPR Guidelines**

#### **5.14B.1 Development of TAPR Guidelines**

- (a) The *AER* must, in accordance with the *transmission consultation procedures*, make and *publish* TAPR Guidelines that set out the required format of *Transmission Annual Planning Reports*.
- (b) The *AER* must develop and *publish* the first TAPR Guidelines under the *Rules* by the date specified in the *Rules* and there must be TAPR Guidelines in force at all times after that date.
- (c) Subject to paragraph (d), the *AER* may, from time to time and in accordance with the *transmission consultation procedures*, amend or replace the TAPR Guidelines.

- (d) The *AER* may make administrative or minor amendments to the TAPR Guidelines without complying with the *transmission consultation procedures*.

## **5.15 Regulatory investment tests generally**

### **5.15.1 Interested parties**

In clauses 5.16.4, 5.16.5, 5.17.4 and 5.17.5, *interested party* means a person including an end user or its *representative* who, in the *AER*'s opinion, has the potential to suffer a material and adverse *National Electricity Market* impact from the investment identified as the preferred option in the project assessment conclusions report or the final project assessment report (as the case may be).

### **5.15.2 Identification of a credible option**

- (a) A credible option is an option (or group of options) that:
  - (1) addresses the *identified need*;
  - (2) is (or are) commercially and technically feasible; and
  - (3) can be implemented in sufficient time to meet the *identified need*,and is (or are) identified as a credible option in accordance with paragraphs (b) or (d) (as relevant).
- (b) In applying the *regulatory investment test for transmission*, the RIT-T proponent must consider, in relation to a RIT-T project other than those described in clauses 5.16.3(a)(1)-(8), all options that could reasonably be classified as credible options taking into account:
  - (1) energy source;
  - (2) technology;
  - (3) ownership;
  - (4) the extent to which the credible option enables *intra-regional* or *inter-regional* trading of electricity;
  - (5) whether it is a *network option* or a *non-network option*;
  - (6) whether the credible option is intended to be regulated;
  - (7) whether the credible option has a proponent; and
  - (8) any other factor which the RIT-T proponent reasonably considers should be taken into account.
- (c) In applying the *regulatory investment test for distribution*, the RIT-D proponent must consider, in relation to a RIT-D project other than those

described in clauses 5.17.3(a)(1)-(7), all options that could reasonably be classified as credible options, without bias as to:

- (1) energy source;
  - (2) technology;
  - (3) ownership; and
  - (4) whether it is a *network option* or a *non-network option*.
- (d) The absence of a proponent does not exclude an option from being considered a credible option.

### 5.15.3 Review of costs thresholds

#### Regulatory investment test for transmission thresholds

- (a) Every 3 years the *AER* must undertake a review of the changes in the input costs used to calculate the estimated capital costs in relation to *transmission* investment as referred to in paragraph (b), for the purposes of determining whether the cost thresholds specified in paragraph (b) need to be changed to maintain the appropriateness of the cost thresholds over time by adjusting those cost thresholds to reflect any increase or decrease in the input costs since:
- (1) July 2009 in respect of the first cost threshold review; and
  - (2) the date of the previous review in respect of every subsequent cost threshold review.

#### Note

The cost thresholds are regularly reviewed by the *AER* under paragraph (b). The current thresholds are specified in the latest cost threshold determination available on the *AER*'s website [www.aer.gov.au](http://www.aer.gov.au).

- (b) For the purposes of paragraph (a), the cost thresholds for review are the following amounts:
- (1) **[Deleted]**
  - (1A) of less than \$200,000 referred to in clause 5.12.2(c)(1B)(iv);
  - (2) of less than \$5 million referred to in clause 5.16.3(a)(2);
  - (3) **[Deleted]**
  - (4) of less than \$5 million referred to in clause 5.16.3(a)(5);
  - (5) of less than \$35 million referred to in clause 5.16.4(z1)(1); and

- (6) in excess of \$5 million in relation to investment in transmission assets of the type referred to in the definition of potential transmission project in clause 5.10.2.

**Regulatory investment test for distribution costs thresholds**

- (c) Subject to paragraph (f)(2), every 3 years, and at the same time as it undertakes its review of the cost thresholds for *regulatory investment test for transmission* under paragraph (a), the AER must undertake a review of the changes in the input costs used to calculate the estimated capital costs in relation to:

- (1) projects subject to the *regulatory investment test for distribution*; and
- (2) the cost threshold for committed investments that are to address an urgent and unforeseen *network* need subject to the *Distribution Annual Planning Report*,

for the purposes of determining whether the costs thresholds specified in paragraph (d) need to be changed to maintain the appropriateness of the cost thresholds over time by adjusting those cost thresholds to reflect any increase or decrease in the input costs since:

- (3) 1 January 2013 in respect of the first cost threshold review; and
  - (4) the date of the previous review in respect of every subsequent cost threshold review.
- (d) For the purposes of paragraph (c), the cost thresholds for review are the following amounts:
    - (1) \$5 million referred to in clause 5.17.3(a)(2);
    - (2) **[Deleted]**;
    - (3) \$10 million referred to in clause 5.17.4(n)(2);
    - (4) \$20 million referred to in clause 5.17.4(s);
    - (4A) of less than \$200,000 referred to in S5.8(b2)(4);
    - (5) \$2 million referred to in S5.8(g).

**Note**

The cost thresholds are regularly reviewed by the AER under paragraph (b). The current thresholds are specified in the latest cost threshold determination available on the AER's website [www.aer.gov.au](http://www.aer.gov.au).

**Cost threshold reviews**

- (e) Each cost threshold review is to be commenced by the AER by 31 July of the relevant year.

- (f) The first review of the cost thresholds for: :
  - (1) the *regulatory investment test for transmission* under paragraph (a) must be initiated in 2012; and
  - (2) the *regulatory investment test for distribution* under paragraph (c) must be initiated in 2015.
- (g) Within six weeks following the commencement of a cost threshold review, the *AER* must *publish* a draft determination outlining:
  - (1) whether the *AER* has formed the view that any of the cost thresholds need to be amended to reflect increases or decreases in the input costs to ensure that the appropriateness of the cost thresholds is maintained over time;
  - (2) its reasons for determining whether the cost thresholds need to be varied to reflect increases or decreases in the input costs;
  - (3) if there is to be a variation in a cost threshold, the amount of the new cost threshold and the date the new cost threshold will take effect; and
  - (4) its reasons for determining the amount of the new cost threshold.
- (h) At the same time as it *publishes* the draft determination under paragraph (f), the *AER* must *publish* a notice seeking submissions on the draft determination. The notice must specify the period within which written submissions can be made (the cost threshold consultation period) which must be no less than 5 weeks from the date of the notice.
- (i) The *AER* must consider any written submissions received during the cost threshold consultation period in making its final determination in respect of the matters outlined in paragraph (g).
- (j) The final determination on cost thresholds must be made and *published* by the *AER* within 5 weeks following the end of the cost threshold consultation period.
- (k) The *AER* may *publish* a draft determination under paragraph (g), a notice under paragraph (h), or a final determination under paragraph (j) for any cost threshold reviews under paragraphs (a) and (c) as a single document.

#### **5.15.4 Costs determinations**

- (a) Where the *AER* engages a consultant to assist in making a determination under clauses 5.16.5, 5.16.6 or 5.17.5 the *AER* may make a costs determination.
- (b) Where a costs determination is made, the *AER* may:
  - (1) render the RIT-T proponent or the RIT-D proponent (as the case may be) an invoice for the costs; or



- (2) determine that the costs should:
  - (i) be shared by all the parties to the dispute, whether in the same proportion or differing proportions; or
  - (ii) be borne by a party or parties to the dispute other than the RIT-T proponent or the RIT-D proponent (as the case may be) whether in the same proportion or differing proportions; and
  - (iii) the *AER* may render invoices accordingly.
- (c) If an invoice is rendered under subparagraph (b)(2)(iii), the *AER* must specify a time period for the payment of the invoice that is no later than 30 *business days* from the date the *AER* makes a determination under paragraph (a).

## 5.16 Regulatory investment test for transmission

### 5.16.1 Principles

- (a) The *AER* must develop and *publish* the *regulatory investment test for transmission* in accordance with the *transmission consultation procedures* and this rule 5.16.1.
- (b) The purpose of the *regulatory investment test for transmission* is to identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the *market* (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 or the provision of *inertia network services* required under clause 5.20B.4 or the provision of *system strength services* required under clause 5.20C.3.
- (c) The *regulatory investment test for transmission* must:
  - (1) be based on a cost-benefit analysis that is to include an assessment of reasonable scenarios of future supply and demand if each credible option were implemented compared to the situation where no option is implemented;
  - (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-T proponent to consider the following classes of market benefits that could be delivered by the credible option:
    - (i) changes in fuel consumption arising through different patterns of *generation dispatch*;

- (ii) changes in voluntary *load* curtailment;
  - (iii) changes in involuntary *load shedding*, with the market benefit to be considered using a reasonable forecast of the value of electricity to consumers;
  - (iv) changes in costs for parties, other than the RIT-T proponent, due to:
    - (A) differences in the timing of new *plant*;
    - (B) differences in capital costs; and
    - (C) differences in the operating and maintenance costs;
  - (v) differences in the timing of expenditure;
  - (vi) changes in *network* losses;
  - (vii) changes in *ancillary services* costs;
  - (viii) competition benefits;
  - (ix) any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing that credible option with respect to the likely future investment needs of the *market*; and
  - (x) other classes of market benefits that are:
    - (A) determined to be relevant by the RIT-T proponent and agreed to by the *AER* in writing before the date the relevant project specification consultation report is made available to other parties under clause 5.16.4; or
    - (B) specified as a class of market benefit in the *regulatory investment test for transmission*;
- (5) require a RIT-T proponent to include a quantification of all classes of market benefits which are determined to be material in the RIT-T proponent's reasonable opinion;
- (6) require a RIT-T proponent to consider all classes of market benefits as material unless it can, in the project assessment draft report, or in respect of a proposed preferred option which is subject to the exemption contained in clause 5.16.4(z1), in the project specification consultation report, provide reasons why:
- (i) a particular class of market benefit is likely not to affect materially the outcome of the assessment of the credible options under the *regulatory investment test for transmission*; or

- (ii) the estimated cost of undertaking the analysis to quantify the market benefit is likely to be disproportionate to the scale, size and potential benefits of each credible option being considered in the report;
- (7) with respect to the classes of market benefits set out in subparagraphs (4)(ii) and (iii), ensure that, if the credible option is for reliability corrective action, the quantification assessment required by paragraph (5) will only apply insofar as the market benefit delivered by the credible option exceeds the minimum standard required for reliability corrective action;
- (8) require the RIT-T proponent to quantify the following classes of costs:
  - (i) costs incurred in constructing or providing the credible option;
  - (ii) operating and maintenance costs in respect of the credible option;
  - (iii) the 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 class of costs that are:
    - (A) determined to be relevant by the RIT-T proponent and agreed to by the AER in writing before the date the relevant project specification consultation report is made available to other parties under clause 5.16.4; or
    - (B) specified as a class of cost in the *regulatory investment test for transmission*;
- (9) provide that any cost or market benefit which cannot be measured as a cost or market benefit to *Generators, Distribution Network Service Providers, Transmission Network Service Providers* or consumers of electricity may not be included in any analysis under the *regulatory investment test for transmission*;
- (10) 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 method or methods permitted for estimating market benefits which may occur outside the region in which the *networks* affected by the RIT-T project are located; and

- (iv) the appropriate method and value for specific inputs, where relevant, for determining the discount rate or rates to be applied;
- (11) specify that a sensitivity analysis is required of any modelling relating to the cost-benefit analysis; and
- (12) reflect that the credible option that maximises the present value of net economic benefit to all those who produce, consume or transport electricity in the market may, in some circumstances, have a negative net economic benefit (that is, a net economic cost) where the *identified need* is for reliability corrective action.

## 5.16.2 Regulatory investment test for transmission application guidelines

- (a) At the same time as the *AER* develops and *publishes* a proposed *regulatory investment test for transmission* under the *transmission consultation procedure*, the *AER* must also develop and *publish* guidelines for the operation and application of the *regulatory investment test for transmission* (the regulatory investment test for transmission application guidelines) in accordance with the *transmission consultation procedures* and this rule 5.16.
- (b) The regulatory investment test for transmission application guidelines must:
  - (1) give effect to and be consistent with this clause 5.16.2 and clauses 5.15.2, 5.16.3, 5.16.4 and 5.16.5; and
  - (2) provide guidance on:
    - (i) the operation and application of the *regulatory investment test for transmission*;
    - (ii) the process to be followed in applying the *regulatory investment test for transmission*; and
    - (iii) how disputes raised in relation to the *regulatory investment test for transmission* and its application will be addressed and resolved.
- (c) The regulatory investment test for transmission application guidelines must provide guidance and worked examples as to:
  - (1) what constitutes a credible option;
  - (2) acceptable methodologies for valuing the costs of a credible option;
  - (3) what may constitute an externality under the *regulatory investment test for transmission*;
  - (4) the classes of market benefits to be considered for the purposes of clause 5.16.1(c)(4);

- (5) the suitable modelling periods and approaches to scenario development;
  - (6) the acceptable methodologies for valuing the market benefits of a credible option referred to clause 5.16.1(c)(4), including the option value, competition benefits and market benefits that accrue across regions;
  - (7) the appropriate approach to undertaking a sensitivity analysis for the purposes of clause 5.16.1(c)(11);
  - (8) the appropriate approaches to assessing uncertainty and risks; and
  - (9) when a person is sufficiently committed to a credible option for reliability corrective action to be characterised as a proponent for the purposes of clause 5.15.2(b)(7).
- (d) The *AER* must ensure that there is a *regulatory investment test for transmission* and regulatory investment test for transmission application guidelines in force at all times.
  - (e) The *AER* may, from time to time, amend or replace the *regulatory investment test for transmission* and regulatory investment test for transmission application guidelines in accordance with the *transmission consultation procedures*, provided the *AER publishes* any amendments to, or replacements of, the *regulatory investment test for transmission* or regulatory investment test for transmission 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 transmission* and the regulatory investment test for transmission application guidelines under the *Rules* by RIT-T 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 transmission* and/or the regulatory investment test for transmission application guidelines and is not completed at the date of the relevant amendment to the *regulatory investment test for transmission* and/or the regulatory investment test for transmission application guidelines.

### **5.16.3 Investments subject to the regulatory investment test for transmission**

- (a) A RIT-T proponent must apply the *regulatory investment test for transmission* to a RIT-T project except in circumstances where:
  - (1) the RIT-T project is required to address an urgent and unforeseen *network* issue that would otherwise put at risk the *reliability* of the *transmission network* as described in paragraph (b);

- (2) the estimated capital cost of the most expensive option to address the *identified need* which is technically and economically feasible is less than \$5 million (as varied in accordance with a cost threshold determination);
- (3) the proposed expenditure relates to maintenance and is not intended to *augment* the *transmission network* or replace *network* assets;
- (4) **[Deleted]**;
- (5) the proposed relevant *network* investment is an investment undertaken by a *Transmission Network Service Provider* which:
  - (i) re-routes one or more paths of a *network* for the long term; and
  - (ii) has a substantial primary purpose other than the need to *augment* a *network*,(a reconfiguration investment) and which the RIT-T proponent reasonably estimates to have an estimated capital cost of less than \$5 million (as varied in accordance with a cost threshold determination) or which has, or is likely to have, no material impact on *network* users;
- (6) the *identified need* can only be addressed by expenditure on a *connection asset* which provides services other than *prescribed transmission services* or *standard control services*;
- (7) the cost of addressing the *identified need* is to be fully recovered through charges other than charges in respect of *prescribed transmission services* or *standard control services*;
- (8) the proposed expenditure relates to protected event EFCS investment and is not intended to *augment* the *transmission network*; or
- (9) the proposed expenditure is an *inertia service payment* or a *system strength service payment*;
- (10) the proposed expenditure is for *network* investment undertaken by the *Transmission Network Service Provider* to satisfy its obligation as an *Inertia Service Provider* under clause 5.20B.4 to make available *inertia network services* in relation to an *inertia shortfall* for an *inertia sub-network* and:
  - (i) immediately prior to the notice of the *inertia shortfall* being given by AEMO under clause 5.20B.3(c), the *Inertia Service Provider* is not under an obligation to provide *inertia network services* for that *inertia sub-network* (including under rule 11.100); and

- (ii) the time by which the *Inertia Service Provider* must make the *inertia network services* available is less than 18 months after the notice is given by *AEMO* under clause 5.20B.3(c); or
- (11) the proposed expenditure is for *network* investment undertaken by the *Transmission Network Service Provider* to satisfy its obligation as a *System Strength Service Provider* under clause 5.20C.3 to make available *system strength services* in relation to a *fault level shortfall* for a *fault level node* and:
  - (i) immediately prior to the notice of the *fault level shortfall* being given by *AEMO* under clause 5.20C.2(c), the *System Strength Service Provider* is not under an obligation to provide *system strength services* for that *fault level node* (including under rule 11.101); and
  - (ii) the time by which the *System Strength Service Provider* must make the *system strength services* available is less than 18 months after the notice is given by *AEMO* under clause 5.20C.2(c).
- (b) For the purposes of paragraph (a)(1), a RIT-T project will be required to address an urgent and unforeseen *network* issue that would otherwise put at risk the *reliability* of the *transmission network* if:
  - (1) it is necessary that the assets or services to address the issue be operational within 6 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 *transmission network*; and
  - (4) it is not a *contingent project*.
- (c) If a proposed relevant *network* investment is determined to be required to address an urgent and unforeseen *network* issue as described in paragraph (b), and the *Network Service Provider* making the investment is a *Transmission Network Service Provider*, then the *Transmission Network Service Provider* must provide the following information in its next *Transmission Annual Planning Report* following the identification of the need for the relevant *network* investment:
  - (1) the date when the proposed relevant *network* investment became or will become operational;
  - (2) the purpose of the proposed relevant *network* investment; and
  - (3) the total cost of the proposed relevant *network* investment.

- (d) With the exception of *funded augmentations*, for each RIT-T project to which the *regulatory investment test for transmission* does not apply in accordance with paragraphs (a)-, the *Network Service Providers* affected by the RIT-T 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-T 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 transmission* applies to each of those parts.

#### **5.16.4 Regulatory investment test for transmission procedures**

- (a) If a RIT-T project is subject to the *regulatory investment test for transmission* under clause 5.16.3, then the RIT-T proponent must consult all *Registered Participants*, *AEMO* and *interested parties* on the RIT-T project in accordance with this clause 5.16.4.

##### **Project specification consultation report**

- (b) A RIT-T proponent must prepare a report (the project specification consultation report), which 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-T proponent considers reliability corrective action is necessary);
  - (3) the technical characteristics of the *identified need* that a non-network option would be required to deliver, such as:
    - (i) the size of *load* reduction or additional supply;
    - (ii) location; and
    - (iii) operating profile;
  - (4) if applicable, reference to any discussion on the description of the identified need or the credible options in respect of that *identified need* in the most recent *NTNDP*;
  - (5) a description of all credible options of which the RIT-T proponent is aware that address the *identified need*, which may include, without limitation, alternative *transmission* options, *interconnectors*, *generation*, demand side management, *market network services* or other *network options*;
  - (6) for each credible option identified in accordance with subparagraph (5), information about:



- (i) the technical characteristics of the credible option;
  - (ii) whether the credible option is reasonably likely to have a *material inter-network impact*;
  - (iii) the classes of market benefits that the RIT-T proponent considers are likely not to be material in accordance with clause 5.16.1(c)(6), together with reasons of why the RIT-T proponent considers that these classes of market benefits are not likely to be material;
  - (iv) the estimated construction timetable and commissioning date; and
  - (v) to the extent practicable, the total indicative capital and operating and maintenance costs.
- (c) The RIT-T proponent must make the project specification consultation report available to all *Registered Participants*, *AEMO* and other *interested parties*.
- (d) The RIT-T proponent must:
  - (1) provide a summary of the project specification consultation report to *AEMO* within 5 *business days* of making the project specification consultation report; and
  - (2) upon request by an *interested party*, provide a copy of the project specification consultation report to that person within 3 *business days* of the request.
- (e) Within 3 *business days* of receipt of the summary, *AEMO* must *publish* the summary of the project specification consultation report on its website.
- (f) The RIT-T proponent must seek submissions from *Registered Participants*, *AEMO* and *interested parties* on the credible options presented, and the issues addressed, in the project specification consultation report.
- (g) The period for consultation referred to in paragraph (f) must be not less than 12 weeks from the date that *AEMO publishes* the summary of the project specification consultation report on its website.
- (h) A RIT-T proponent that is a *Transmission Network Service Provider* may discharge its obligation under paragraph (c) to make the project specification consultation report available by including the project specification consultation report as part of its *Transmission Annual Planning Report*.
- (i) A RIT-T proponent that is a *Distribution Network Service Provider* may discharge its obligation under paragraph (c) to make the project specification consultation report available by including the project

specification consultation report as part of its *Distribution Annual Planning Report*.

**Project assessment draft report**

- (j) If one or more *Network Service Providers* wishes to proceed with a RIT-T project, within 12 months of the end date of the consultation period referred to in paragraph (g), or such longer time period as is agreed in writing by the *AER*, the RIT-T proponent for the relevant RIT-T project must prepare a report (the project assessment draft report), having regard to the submissions received, if any, under paragraph (f) and make that report available to all *Registered Participants*, *AEMO* and *interested parties*.
- (k) The project assessment draft report must include:
  - (1) a description of each credible option assessed;
  - (2) a summary of, and commentary on, the submissions to the project specification consultation report;
  - (3) a quantification of the costs, including a breakdown of operating and capital expenditure, and classes of material market benefit for each credible option;
  - (4) a detailed description of the methodologies used in quantifying each class of material market benefit and cost;
  - (5) reasons why the RIT-T proponent has determined that a class or classes of market benefit are not material;
  - (6) the identification of any class of market benefit estimated to arise outside the *region* of the *Transmission Network Service Provider* affected by the RIT-T project, and quantification of the value of such market benefits (in aggregate across all regions);
  - (7) the results of a net present value analysis of each credible option and accompanying explanatory statements regarding the results;
  - (8) the identification of the proposed preferred option;
  - (9) for the proposed preferred option identified under subparagraph (8), the RIT-T proponent must provide:
    - (i) details of the technical characteristics;
    - (ii) the estimated construction timetable and commissioning date;
    - (iii) if the proposed preferred option is likely to have a *material inter-network impact* and if the *Transmission Network Service Provider* affected by the RIT-T project has received an *augmentation technical report*, that report; and

- (iv) a statement and the accompanying detailed analysis that the preferred option satisfies the *regulatory investment test for transmission*.
- (l) If a *Network Service Provider* affected by a RIT-T project elects to proceed with a project which is for reliability corrective action, it can only do so where the proposed preferred option has a proponent. The RIT-T proponent must identify that proponent in the project assessment draft report.
- (m) A RIT-T proponent that is a *Transmission Network Service Provider* may discharge its obligation under paragraph (j) to make the project assessment draft report available by including the project assessment draft report as part of its *Transmission Annual Planning Report* provided that report is *published* within 12 months of the end date of the consultation period required under paragraph (g) or within 12 months of the end of such longer time period as is agreed by the *AER* in writing under paragraph (j).
- (n) A RIT-T proponent that is a *Distribution Network Service Provider* may discharge its obligation under paragraph (j) to make the project assessment draft report available by including the project assessment draft report as part of its *Distribution Annual Planning Report* provided that report is *published* within 12 months of the end date of the consultation period required under paragraph (g) or within 12 months of the end of such longer time period as is agreed by the *AER* in writing under paragraph (j).
- (o) The RIT-T proponent must:
  - (1) provide a summary of the project assessment draft report to *AEMO* within 5 *business days* of making the project assessment draft report; and
  - (2) upon request by an *interested party*, provide a copy of the project assessment draft report to that person within 3 *business days* of the request.
- (p) Within 3 *business days* of receipt of the summary, *AEMO* must *publish* the summary of the project assessment draft report on its website.
- (q) The RIT-T proponent must seek submissions from *Registered Participants*, *AEMO* and *interested parties* on the preferred option presented, and the issues addressed, in the project assessment draft report.
- (r) The period for consultation referred to in paragraph (q) must be not less than 6 weeks from the date that *AEMO publishes* the summary of the report on its website.
- (s) Within 4 weeks after the end of the consultation period required under paragraph (r), at the request of an *interested party*, a *Registered Participant* or *AEMO* (each being a relevant party for the purposes of this paragraph), the relevant *Network Service Provider* must meet with the relevant party if a meeting is requested by two or more relevant parties and may meet with a relevant party if after having considered all submissions, the relevant

*Network Service Provider*, acting reasonably, considers that the meeting is necessary.

**Project assessment conclusions report**

- (t) As soon as practicable after the end of the consultation period on the project assessment draft report referred to in paragraph (r), the RIT-T proponent must, having regard to the submissions received, if any, under paragraph (q) and the matters discussed at any meetings held, if any, under paragraph (s), prepare and make available to all *Registered Participants*, *AEMO* and *interested parties* and *publish* a report (the project assessment conclusions report).
- (u) If:
  - (1) the RIT-T proponent is exempt from making a project assessment draft report under paragraph (z1); and
  - (2) a *Network Service Provider* affected by a RIT-T project, within 12 months of the end date of the period for consultation referred to in paragraph (g), or within 12 months of the end date of such longer time period as is agreed in writing by the *AER* elects to proceed with the proposed *transmission investment*,the relevant *Network Service Provider* must, having regard to the submissions received, if any, under paragraph (g) as soon as practicable prepare and make available to all *Registered Participants*, *AEMO* and *interested parties* and *publish* a report (the project assessment conclusions report).
- (v) The project assessment conclusions report must set out:
  - (1) the matters detailed in the project assessment draft report as required under paragraph (k); and
  - (2) a summary of, and the RIT-T proponent's response to, submissions received, if any, from *interested parties* sought under paragraph (q).
- (w) The RIT-T proponent must:
  - (1) provide a summary of the project assessment conclusions report to *AEMO* within 5 *business days* of making the project assessment conclusions report; and
  - (2) upon request by an *interested party*, provide a copy of the project assessment conclusions report to that person within 3 *business days* of the request.
- (x) Within 3 *business days* of receipt of the summary, *AEMO* must *publish* the summary of the project assessment conclusions report on its website.

- (y) A RIT-T proponent that is a *Transmission Network Service Provider* may discharge its obligation under paragraph (t) and (u) to make the project assessment conclusions report available by including the project assessment conclusions report as part of its *Transmission Annual Planning Report* provided that the report is *published* within 4 weeks from the date of making available the project assessment conclusions report under paragraph (t) or (u), as the case may be.
- (z) A RIT-T proponent that is a *Distribution Network Service Provider* may discharge its obligation under paragraph (t) and (u) to make the project assessment conclusions report available by including the project assessment conclusions report as part of its *Distribution Annual Planning Report* provided that the report is *published* within 4 weeks from the date of making available the project assessment conclusions report under paragraph (t) or (u), as the case may be.

**Exemption from drafting a project assessment draft report for RIT-T projects without material market benefits**

- (z1) A RIT-T proponent is exempt from paragraphs (j) to (s) if:
  - (1) the estimated capital cost of the proposed preferred option is less than \$35 million (as varied in accordance with a cost threshold determination);
  - (2) the relevant *Network Service Provider* has identified in its project specification consultation report:
    - (i) its proposed preferred option;
    - (ii) its reasons for the proposed preferred option; and
    - (iii) that its RIT-T project has the benefit of this exemption;
  - (3) the RIT-T proponent considers, in accordance with clause 5.16.1(c)(6), that the proposed preferred option and any other credible option in respect of the *identified need* will not have a material market benefit for the classes of market benefit specified in clause 5.16.1(c)(4) except those classes specified in clauses 5.16.1(c)(4)(ii) and (iii), and has stated this in its project specification consultation report; and
  - (4) the RIT-T proponent forms the view that no submissions were received on the project specification consultation report which identified additional credible options that could deliver a material market benefit.
- (z2) The RIT-T proponent must address in the project assessment conclusions report any issues that were raised in relation to a proposed preferred option to which paragraph (z1) applies during the consultation on the project specification consultation report.

### **Reapplication of regulatory investment test for transmission**

(z3) If:

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

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

(z4) For the purposes of paragraph (z3), 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 project assessment conclusions report; or
- (2) the credible options assessed in the project assessment conclusions report.

(z5) When making a determination under paragraph (z3) the *AER* must have regard to:

- (1) the credible options (other than the preferred option) identified in the project assessment conclusions report;
- (2) the change in circumstances identified by the RIT-T proponent; and
- (3) whether a failure to promptly undertake the RIT-T project is likely to materially affect the *reliability* and *secure operating state* of the *transmission network* or a significant part of that *network*.

### **Declared transmission system operator may request assistance from AEMO to conduct market benefits assessments for replacement RIT-T projects**

(z6) Where a RIT-T proponent is a *declared transmission system operator* within a *declared shared network*, it may in relation to RIT-T projects to address an *identified need* that arises from the retirement or de-rating of *network* assets, request assistance and information from *AEMO* as reasonably required for it to consider and conduct market benefits assessments as required by:

- (1) clause 5.16.4(b)(6)(iii);

- (2) clause 5.16.4(k)(3) to (k)(6); and
  - (3) clause 5.16.4(v).
- (z7) *AEMO* must provide assistance and information requested under paragraph (z6) to the *declared transmission system operator* within a reasonable period of time.

#### **5.16.5 Disputes in relation to application of regulatory investment test for transmission**

- (a) *Registered Participants*, the *AEMC*, *Connection Applicants*, *Intending Participants*, *AEMO* and *interested parties* may, by notice to the *AER*, dispute conclusions made by the RIT-T proponent in the project assessment conclusions report in relation to:
  - (1) the application of the *regulatory investment test for transmission*;
  - (2) the basis on which the RIT-T proponent has classified the preferred option as being for reliability corrective action; or
  - (3) the RIT-T proponent's assessment regarding whether the preferred option will have a *material inter-network impact*, in accordance with any criteria for a *material inter-network impact* that are in force at the time of the preparation of the project assessment conclusions report.
- (b) A dispute under this clause 5.16.5 may not be raised in relation to any matters set out in the project assessment conclusions report which:
  - (1) are treated as externalities by the *regulatory investment test for transmission*; or
  - (2) relate to an individual's personal detriment or property rights.
- (c) Within 30 days of the date of *publication* of the project assessment conclusions report under clause 5.16.4 (t), (u), (y) or (z) (as the case may be), the party disputing a conclusion made in the project assessment conclusions 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-T proponent.
- (d) Subject to paragraph (f)(3), within 40 days of receipt of the dispute notice or within an additional period of up to 60 days where the *AER* notifies *interested parties* 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 misconceived or lacking in substance; and
- (2) notify the RIT-T proponent that the dispute has been rejected; or
- (3) subject to paragraph (f), make and *publish* a determination:
  - (i) directing the RIT-T proponent to amend the matters set out in the project assessment conclusions report; or
  - (ii) stating that, based on the grounds of the dispute, the RIT-T proponent will not be required to amend the project assessment conclusions report.
- (e) The RIT-T proponent must comply with an *AER* determination made under paragraph (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-T proponent could reasonably be expected to have considered or undertaken at the time that it performed the *regulatory investment test for transmission*;
  - (2) must *publish* its reasons for making a determination;
  - (3) may request further information regarding the dispute from the disputing party or the RIT-T proponent in which case the period of time for rejecting a dispute or making a determination under paragraph (d) is extended by the time it takes the relevant party to provide the requested further information to the *AER*;
  - (4) may disregard any matter raised by the disputing party or the RIT-T proponent that is misconceived or lacking in substance; and
  - (5) where making a determination under subparagraph (d)(3)(i), must specify a reasonable timeframe for the RIT-T proponent to comply with the *AER*'s direction to amend the matters set out in the project assessment conclusions report.
- (g) The *AER* may only make a determination under subparagraph (d)(3)(i) if it determines that:
  - (1) the RIT-T proponent has not correctly applied the *regulatory investment test for transmission* in accordance with the *Rules*;
  - (2) the RIT-T proponent has erroneously classified the preferred option as being for reliability corrective action;



- (3) the RIT-T proponent has not correctly assessed whether the preferred option will have a *material inter-network impact*; or
  - (4) there was a manifest error in the calculations performed by the RIT-T proponent in applying the *regulatory investment test for transmission*.
- (h) A disputing party or the RIT-T proponent (as the case may be) must as soon as reasonably practicable provide any information requested under paragraph (f)(3) to the *AER*.
- (i) The relevant period of time in which the *AER* must make a determination under paragraph (d)(3) is automatically extended by the period of time taken by the RIT-T proponent or a disputing party to provide any additional information requested by the *AER* under this clause 5.16.5, provided:
  - (1) the *AER* makes the request for the additional information at least 7 *business days* prior to the expiry of the relevant period; and
  - (2) the RIT-T proponent or the disputing party provides the additional information within 14 *business days* of receipt of the request.

#### **5.16.6 Determination that preferred option satisfies the regulatory investment test for transmission**

- (a) After the expiry of the 30 day period referred to in clause 5.16.5(c) and where a preferred option is not for reliability corrective action, the RIT-T proponent may request, in writing to the *AER*, that the *AER* make a determination as to whether the preferred option satisfies the *regulatory investment test for transmission*.
- (b) The *AER*:
  - (1) must, within 120 *business days* of receipt of the request from the applicant, subject to paragraph (c), make and *publish* a determination, including reasons for its determination;
  - (2) must use the findings and recommendations in the project assessment conclusions report in making its determination under subparagraph (1);
  - (3) may request further information from the RIT-T proponent; and
  - (4) may have regard to any other matter the *AER* considers relevant.
- (c) The relevant period of time in which the *AER* must make a determination under paragraph (b) is automatically extended by the period of time taken by the RIT-T proponent to provide any additional information requested by the *AER* under this clause 5.16.6, provided:
  - (1) the *AER* makes the request for the additional information at least 7 *business days* prior to the expiry of the relevant period; and

- (2) the RIT-T proponent provides the additional information within 14 *business days* of receipt of the request.

## **5.17 Regulatory investment test for distribution**

### **5.17.1 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 *National Electricity Market* (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 Generators* 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 *National Electricity Market* ;
  - (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 *National Electricity Market* 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.

### 5.17.2 Regulatory investment test for distribution application guidelines

- (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 *National Electricity Market* 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.

### 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*.
- (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.

#### 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 demand side engagement register.

#### Screening for non-network options

- (b) Subject to paragraph (c), a RIT-D proponent must prepare and *publish* a non-network options 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* 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.

### **Non-network options report**

- (e) A non-network options 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 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* and *non-network 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 *non-network* proposal for consideration by the RIT-D proponent.

- (f) The non-network options 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 non-network options report, the RIT-D proponent, if it is a *Distribution Network Service Provider*, must notify persons registered on its demand side 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* demand side engagement register must be provided with not less than three months in which to make submissions on the non-network options 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 non-network options report then the RIT-D proponent, having regard, where relevant, to any submissions received on the non-network options report, must prepare and *publish* a draft project assessment report within:
  - (1) 12 months of:
    - (i) the end of the consultation period on a non-network options report; or
    - (ii) where a non-network options 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 non-network options 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 demand side 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 demand side 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*.

### **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*.

## 5.18 Construction of funded augmentations

- (a) The term *Transmission Network Service Provider* when used in this rule 5.18 is not intended to refer to, and is not to be read or construed as referring to, any *Transmission Network Service Provider* in its capacity as a *Market Network Service Provider*.
- (b) A *Transmission Network Service Provider* who proposes to construct a *funded augmentation* must make available to all *Registered Participants* and *AEMO* a notice which must set out:
  - (1) a detailed description of the proposed *funded augmentation*;
  - (2) all relevant technical details concerning the proposed *funded augmentation*, the impact of the *funded augmentation* on the relevant *transmission network's Transmission Network Users* and the construction timetable and commissioning date for the *funded augmentation*;
  - (3) an *augmentation technical report* prepared by *AEMO* if, and only if, the *funded augmentation* is reasonably likely to have a *material inter-network impact* and the *Transmission Network Service Provider* has not received consent to proceed with construction from all *Transmission Network Service Providers* whose *transmission networks* are materially affected by the *funded augmentation*. In assessing whether a *funded augmentation* is reasonably likely to have a *material inter-network impact*, the *Transmission Network Service Provider* must have regard to the objective set of criteria *published* by *AEMO* (if any such criteria have been *published* by *AEMO*).
- (c) The *Transmission Network Service Provider* must provide a summary of the notice prepared in accordance with paragraph (b) to *AEMO*. Within 3 *business days* of receipt of the summary, *AEMO* must *publish* the summary on its website.
- (d) The *Transmission Network Service Provider* must consult with any *interested parties*, in accordance with the *Rules consultation procedures*, on any matter set out in the notice prepared in accordance with paragraph (b).

## 5.18A Large generator connections

### 5.18A.1 Definitions

- (a) In this rule 5.18A:

**assessment date** means, in respect of a new large generator connection, the first TAPR date that falls no earlier than 18 months after the commissioning date for that large generator connection.

**commissioning date** means, in respect of a new large generator connection, the date of commencement of commissioning of the *connection* and *connected facilities* of that large generator connection.

**connections register** has the meaning given in clause 5.18A.2.

**impact assessment** has the meaning given in clause 5.18A.3.

**large generator connection** means *generating units* that:

- (1) have a *nameplate rating* of 30MW or greater; or
- (2) are part of a group of *generating units* connected at a common *connection point* with a combined *nameplate rating* of 30 MW or greater,

which are owned, operated or controlled by a *Generator* and are *connected* to the *Transmission Network Service Provider's network*.

**TAPR date** means the date under clause 5.12.2 by which a *Transmission Network Service Provider* must *publish* its *Transmission Annual Planning Report*.

#### 5.18A.2 Register of large generator connections

- (a) A *Transmission Network Service Provider* must establish, maintain and publish, on its website, a register of information regarding large generator connections (**connections register**), including but not limited to the following information in respect of each large generator connection:
  - (1) location of the *connection point* for the large generator connection;
  - (2) person who is registered by *AEMO* as a *Generator* in respect of the large generator connection at that *connection point*;
  - (3) technology of the *generating units* (e.g. hydro, open cycle gas turbine, steam sub-critical etc);
  - (4) aggregate *nameplate rating* capacity of all *generating units* comprised in the large generator connection;
  - (5) date of cessation of a person's registration with *AEMO* as *Generator* in respect of the large generator connection, where relevant; and
  - (6) impact assessment of that large generator connection, prepared in accordance with clause 5.18A.3 (if any).
- (b) Subject to satisfying any relevant exemptions contained in clause 8.6.2, the *Transmission Network Service Provider* must not publish *confidential information* as part of, or in connection with, the connections register.
- (c) The *Transmission Network Service Provider* must:



- (1) include in the first connections register the details contained in subparagraphs (a)(1)-(5), for all large generator connections on its *network* with a commissioning date after 13 December 1998; and
- (2) by the TAPR date each year, update the connections register to include:
  - (i) the details contained in subparagraphs (a)(1)-(6) for all new large generator connections on its *network*; and
  - (ii) updated information for all large generator connections contained in the connections register where the information listed in subparagraphs (a)(1)-(5) has changed.

### 5.18A.3 Impact assessment of large generator connections

- (a) Following the commissioning date of a new large generator connection on a *Transmission Network Service Provider's network*, the *Transmission Network Service Provider* must prepare an assessment of the impact of that large generator connection on its *network* by the assessment date (**impact assessment**).
- (b) An impact assessment prepared in accordance with this clause 5.18A.3 is not required to be updated by the *Transmission Network Service Provider* at any future point in time.
- (c) The purpose of the impact assessment is to identify any material effects of the large generator connection on the *Transmission Network Service Provider's network*, as compared with the absence of that large generator connection on its *network*.
- (d) Subject to paragraph (e), when preparing an impact assessment, a *Transmission Network Service Provider* must consider whether the new large generator connection has resulted in changes to:
  - (1) *ancillary service* requirements to the extent such changes relate specifically to the *Transmission Network Service Provider's network*;
  - (2) the level, and pattern, of *network* congestion on its *network*;
  - (3) the timing of expenditure for the *Transmission Network Service Provider* on its *network*; and
  - (4) the level of *interconnector power transfer capability* on its *network*,and if such changes have occurred, include details of the changes in the impact assessment to the extent they have had a material impact on the *Transmission Network Services Provider's network*.
- (e) If the *Transmission Network Service Provider* considers any of the changes referred to in paragraph (d) to have an immaterial impact on its *network*, outline the reasons why it has determined such impacts to be immaterial.

- (f) The impact assessment must:
  - (1) be based on historical data;
  - (2) consider the impacts referred to in paragraph (d) for the 12 months immediately preceding the commissioning date as compared to the 12 months following the commissioning date; and
  - (3) include a detailed description of the methodologies or data used in quantifying each impact referred to in paragraph (d).

## **5.18B Completed embedded generation projects**

### **5.18B.1 Definitions**

- (a) For the purposes of this rule 5.18B:

**completed embedded generation projects** means all *embedded generating units* owned, operated or controlled by:

- (1) a *Generator*; or
- (2) a person who was required to apply to *AEMO* for an exemption from the requirement to register as a *Generator* in respect of an *embedded generating unit*,

and are connected to the *Distributor Network Service Provider's network*.

**DAPR date** has the same meaning as in clause 5.13.2.

### **5.18B.2 Register of completed embedded generation projects**

- (a) In relation to completed embedded generation projects, a *Distribution Network Service Provider* must establish and *publish*, on its website, a register of the *plant*, including but not limited to:
  - (1) technology of *generating unit* (e.g. *synchronous generating unit*, induction generator, photovoltaic array, etc) and its make and model;
  - (2) maximum power *generation* capacity of all *embedded generating units* comprised in the relevant *generating system*;
  - (3) contribution to fault levels;
  - (4) the size and rating of the relevant *transformer*;
  - (5) a single line diagram of the *connection* arrangement;
  - (6) *protection systems* and communication systems;
  - (7) *voltage* control and *reactive power capability*; and

- (8) details specific to the location of a *facility connected* to the *network* that are relevant to any of the details in subparagraphs (1)-(7).
- (b) Subject to satisfying any relevant exemptions contained in clause 8.6.2, the *Distribution Network Service Provider* must not *publish confidential information* as part of, or in connection with, the register.
- (c) The *Distribution Network Service Provider* must:
  - (1) include in the register the details contained in paragraph (b) for all completed embedded generation projects within the 5 year period preceding the establishment of the register; and
  - (2) update the register by the DAPR date each year thereafter with details of all completed embedded generation projects in the 5 year period preceding the DAPR date.

## 5.19 SENE Design and Costing Study

### 5.19.1 Definitions

In this rule 5.19:

**forecast generation scenarios** means different assumptions made by the *Transmission Network Service Provider* conducting a SENE Design and Costing Study about the likely timing and capacity of future *connections* of *generating systems* in the geographic area relevant to the study and the probability of that capacity materialising.

**Scale Efficient Network Extension** means an *augmentation* to a *transmission network* which is capable of facilitating the future *connection* to the *transmission network* of two or more *generating systems* in the same geographic area that have different owners, operators or controllers.

**SENE Design and Costing Study** means a study undertaken by a *Transmission Network Service Provider* in accordance with this rule 5.19 which compares the cost of forecast *connections* of *generating systems* to a *transmission network augmented* by a Scale Efficient Network Extension and the cost of those forecast *connections connecting* to the *national grid* in the same geographic area in the absence of the Scale Efficient Network Extension.

**SENE Study Proponent** means a person that makes a request under clause 5.19.2(a).

**SENE study information** means:

- (a) any data or information provided to a *Transmission Network Service Provider* by a *Network Service Provider* under clause 5.19.5 for the purposes of a SENE Design and Costing Study;
- (b) any data or information provided to a *Transmission Network Service Provider* by a person for the purposes of a SENE Design and Costing Study,

provided that the person has registered its interest in response to an invitation under clause 5.19.3(e)(3); and

- (c) any data or information contained in a SENE Design and Costing Study published under clause 5.19.6.

### 5.19.2 Interpretation

In this rule 5.19:

- (a) a reference to a *Transmission Network Service Provider* does not include a *Distribution Network Service Provider* in its capacity as owner, controller or operator of a *dual function asset*; and
- (b) a reference to a *transmission network* does not include *dual function assets*.

### 5.19.3 Request for SENE Design and Costing Study

- (a) Any person may request a *Transmission Network Service Provider* to undertake a SENE Design and Costing Study in relation to the construction of a Scale Efficient Network Extension for *connection* to its *transmission network*.
- (b) If the *Transmission Network Service Provider* receives a request under paragraph (a), the *Transmission Network Service Provider* must undertake a SENE Design and Costing Study if the following conditions are satisfied:
  - (1) at the time the study is requested, the *Transmission Network Service Provider* is not undertaking another SENE Design and Costing Study in relation to the same geographic area;
  - (2) it has agreed the scope and timing of the SENE Design and Costing Study with the SENE Study Proponent in accordance with paragraph (c); and
  - (3) the SENE Study Proponent or any other person or group of persons (which may include the SENE Study Proponent) has agreed to pay all the reasonable costs incurred by the *Transmission Network Service Provider* in undertaking the study, including any costs it incurs in meeting its obligation under clause 5.19.5(b).
- (c) The *Transmission Network Service Provider*:
  - (1) must in accordance with clause 5.19.4, negotiate with the SENE Study Proponent in good faith to reach agreement on the cost, scope and timeframes for undertaking the SENE Design and Costing Study; and
  - (2) without limiting subparagraph (1), must not unreasonably withhold its consent to undertake a SENE Design and Costing Study in accordance with the scope and timeframes for the study proposed by the SENE Study Proponent.

- (d) The *Transmission Network Service Provider* must undertake the SENE Design and Costing Study in accordance with the agreement reached with the SENE Study Proponent under paragraph (c).
- (e) As soon as practicable after the conditions referred to in paragraph (b) are satisfied in relation to a SENE Design and Costing Study, the relevant *Transmission Network Service Provider* must publish on its website a notice of the commencement of the study. A notice under this paragraph (e) must:
  - (1) specify the geographic area that is being considered in the study;
  - (2) specify the dates agreed between the *Transmission Network Service Provider* and the SENE Study Proponent for completion of the study and any other milestones for the study;
  - (3) invite any person who may be interested in providing SENE study information to the *Transmission Network Service Provider* to register their interest by written notice to the *Transmission Network Service Provider* within a period specified in the notice, being a period not less than 10 *business days* from the date the notice is published; and
  - (4) include a statement to the effect that by registering with the *Transmission Network Service Provider* in accordance with subparagraph (3), the person is giving consent to the use and disclosure of the SENE study information subsequently provided by that person in accordance with clause 5.19.7.

#### **5.19.4 Content of SENE Design and Costing Study**

In negotiating the scope of the SENE Design and Costing Study with the SENE Study Proponent under clause 5.19.3(c), the *Transmission Network Service Provider* must consider the following matters:

- (a) the construction of future *generating systems* and the capacity of those *generating systems* in the relevant geographic area that are considered likely to require *connection* to the *national grid*, based on forecast generation scenarios;
- (b) having regard to each forecast generation scenario:
  - (1) the most appropriate location of the point of *connection* of the Scale Efficient Network Extension to the present *transmission network*;
  - (2) the configuration of the Scale Efficient Network Extension including the point at which *generating systems* may connect to the Scale Efficient Network Extension;
  - (3) the capacity and technical specifications of the Scale Efficient Network Extension;

- (4) indicative development, operating and other costs for the Scale Efficient Network Extension, based on an indicative timetable for development of the Scale Efficient Network Extension;
- (5) opportunities for developing the Scale Efficient Network Extension incrementally;
- (6) the likely impact of the Scale Efficient Network Extension on its *transmission network*, including the type and estimated cost of any other *augmentation* that would be required to ensure that the Scale Efficient Network Extension did not increase congestion on its *transmission network*;
- (7) a comparison between:
  - (i) the estimated total project expenditure (excluding any revenue impact) of forecast *connections of generating systems* to the *Transmission Network Service Provider's network* as *augmented* by a Scale Efficient Network Extension; and
  - (ii) the estimated total project expenditure (excluding any revenue impact) of forecast *connections of generating systems* to the *Transmission Network Service Provider's network*, or, if different, the *Local Network Service Provider's network*, in the same geographic area in the absence of the Scale Efficient Network Extension; and
- (c) the most recent *NTNDP* and the *Transmission Network Service Provider's* most recent *Transmission Annual Planning Report* (to the extent relevant).

#### **5.19.5 Co-operation of other Network Service Providers**

- (a) A *Network Service Provider* must co-operate with any *Transmission Network Service Provider* that is undertaking a SENE Design and Costing Study to enable that *Transmission Network Service Provider* to undertake the study expeditiously and consider the matters referred to in clause 5.19.4.
- (b) A *Transmission Network Service Provider* may request data or information (including *confidential information*) or assistance from another *Network Service Provider* for the purposes of undertaking a SENE Design and Costing Study but must meet the reasonable costs of the *Network Service Provider* in complying with the request.
- (c) A *Network Service Provider* may, but is not required to, provide such data, information or assistance as requested under paragraph (b). If a *Network Service Provider* provides such information or data it must identify any information or data that is *confidential information*.

### 5.19.6 Publication of SENE Design and Costing Study report

As soon as practicable after the SENE Design and Costing Study is completed, the *Transmission Network Service Provider* that undertook the study must publish on its website a report of the study that includes:

- (a) a description of the scope of the SENE Design and Costing Study;
- (b) a description of the Scale Efficient Network Extension for each forecast generation scenario considered in the study, including its configuration;
- (c) any assumptions made as part of the study;
- (d) a summary of the key matters considered as part of the SENE Design and Costing Study; and
- (e) the study's conclusions as well as an explanation of the reasoning which underlies those conclusions.

### 5.19.7 Provision and use of information

- (a) The SENE study information must:
  - (1) be prepared, given and used in good faith; and
  - (2) not be disclosed or made available by the relevant *Transmission Network Service Provider* to a third party except as set out in this clause 5.19.7 or in accordance with rule 8.6 as if it were *confidential information* for the purposes of that rule.
- (b) A *Transmission Network Service Provider* conducting a SENE Design and Costing Study may disclose SENE study information to another *Network Service Provider* if the relevant *Transmission Network Service Provider* considers the data or information is materially relevant to that provider for the purposes of providing information or assistance under clause 5.19.5.
- (c) If a *Transmission Network Service Provider* intends to disclose information under paragraph (b), it must first advise the relevant information provider of the extent of the disclosure, unless the information may be disclosed in accordance with rule 8.6.
- (d) A *Transmission Network Service Provider* may:
  - (1) use SENE study information to prepare the relevant SENE Design and Costing Study or any future SENE Design and Costing Study; and
  - (2) subject to paragraph (e), include SENE study information in a report published under clause 5.19.6.
- (e) A *Transmission Network Service Provider* must not include in a report published under clause 5.19.6, SENE study information which the relevant

*Network Service Provider* has identified as *confidential information* under clause 5.19.5(c).

## 5.20 National transmission planning

In this rule:

**NSCAS trigger date** means for any *NSCAS gap* identified in clause 5.20.2(c)(8)(i), the date that the *NSCAS gap* first arises.

**NSCAS tender date** means for any *NSCAS gap* identified in clause 5.20.2(c)(8)(i), the date or indicative date that *AEMO* would need to act so as to call for offers to acquire *NSCAS* to meet that *NSCAS gap* by the relevant *NSCAS* trigger date in accordance with clause 3.11.3(c)(4).

### 5.20.1 Preliminary consultation

- (a) By no later than 30 January each year, *AEMO* must *publish*:
  - (1) a document that sets out the *NTNDP inputs* that it proposes to use for the preparation or revision of the *NTNDP* for the following calendar year; and
  - (2) a document (the **statement of material issues**):
    - (i) summarising the issues *AEMO* considers to be the material issues involved in the preparation or revision of the *NTNDP* for the following calendar year; and
    - (ii) giving an indication of *AEMO*'s preliminary views on how those issues should be resolved; and
  - (3) the *inertia requirements methodology* and the *system strength requirements methodology*.
- (b) At the same time as it *publishes* the documents referred to in paragraph (a), *AEMO* must *publish* an invitation for written submissions to be made to *AEMO* within a period (at least 30 *business days*) specified in the invitation on:
  - (1) the proposed *NTNDP inputs*; and
  - (2) the content of the *NTNDP* as it applies for the current year, including the location of the current and potential *national transmission flow paths* identified in the *NTNDP*; and
  - (3) the issues raised in the statement of material issues; and
  - (4) the *inertia requirements methodology* and the *system strength requirements methodology*.



- (c) A person may make a written submission to *AEMO* on the proposed *NTNDP inputs*, the content of the *NTNDP* as it applies for the current year, the *inertia requirements methodology*, the *system strength requirements methodology* or an issue raised in the statement of material issues within the period specified in the invitation.

### 5.20.2 Publication of NTNDP

- (a) By no later than 31 December each year, *AEMO* must *publish* the *NTNDP* for the following year.
- (b) In preparing the *NTNDP* that is to be *published* under paragraph (a), *AEMO* must:
  - (1) take into account the submissions made in response to the invitation referred to in clause 5.20.1(b); and
  - (2) consider the following matters:
    - (i) the quantity of electricity that flowed, the periods in which the electricity flowed, and *constraints* on the *national transmission flow paths* over the previous year;
    - (ii) the forecast quantity of electricity that is expected to flow, the periods in which the electricity is expected to flow, and the magnitude and significance of future *network losses* and *constraints*, on the current and potential *national transmission flow paths* over the year in which the *NTNDP* is to apply or some other period to which a scenario that is used for the purposes of the *NTNDP* applies;
    - (iii) the projected capabilities of the *national transmission grid*, and the *network support and control ancillary services* required to support the existing and future capabilities of the *national transmission grid*, under each of the scenarios that is being used for the purposes of the *NTNDP*;
    - (iv) relevant intra-jurisdictional developments and any incremental works that may be needed to co-ordinate *national transmission flow path* planning with intra-jurisdictional planning;
    - (v) such other matters as *AEMO*, in consultation with the *participating jurisdictions*, considers appropriate; and
  - (3) have regard to the following documents:
    - (i) the most recent *Transmission Annual Planning Reports* that have been *published*;
    - (ii) the most recent *statement of opportunities* that has been *published*;

- (iii) the most recent gas statement of opportunities published under the National Gas Law;
  - (iv) the current revenue determination for each *Transmission Network Service Provider*;
  - (v) any other documents that *AEMO* considers relevant.
- (c) An *NTNDP* that is *published* under paragraph (a) must:
  - (1) consider and assess an appropriate course for the efficient development of the *national transmission grid* for a planning horizon of at least 20 years from the beginning of the year in which the *NTNDP* applies; and
  - (2) take into account all *transmission elements* which are part of, or materially affect, the transmission capability of any current or potential *national transmission flow paths*; and
  - (3) take into account all *NSCAS* provided; and
  - (4) identify a range of credible scenarios for the geographic pattern of the demand for, and supply of, electricity for the planning horizon of the *NTNDP*; and
  - (5) identify the location of current *national transmission flow paths* and specify their transmission capability; and
  - (6) identify the location of the potential *national transmission flow paths* over the planning horizon of the *NTNDP* under each of the scenarios referred to in subparagraph (3); and
  - (7) specify a development strategy for each current and potential *national transmission flow path* in accordance with clause 5.20.3; and
  - (8) include an assessment that identifies:
    - (i) any *NSCAS gap*; and
    - (ii) for any *NSCAS gap* identified in subparagraph (i) required to maintain *power system security* and reliability of *supply* of the *transmission network* in accordance with the *power system security standards* and the *reliability standard*, the relevant *NSCAS* trigger date;
    - (iii) for any *NSCAS gap* identified in subparagraph (i) required to maintain *power system security* and reliability of *supply* of the *transmission network* in accordance with the *power system security standards* and the *reliability standard*, the relevant *NSCAS* tender date;

- (9) report on *NSCAS* acquired by *AEMO* in the previous *NTNDP* year; and
  - (10) include a summary of the information specified in rule 3.7A in relation to congestion on each current *national transmission flow path*; and
  - (11) include a consolidated summary of the *augmentations* proposed by each *Transmission Network Service Provider* in the most recent *Transmission Annual Planning Reports* they have *published* and an analysis of the manner in which the proposed *augmentations* relate to the *NTNDP* and any previous *NTNDP*; and
  - (12) summarise the material issues arising from the submissions received in response to the invitation referred to in clause 5.20.1(b), explain how those issues have been addressed in the *NTNDP* and give reasons for not addressing any of those issues in the *NTNDP*; and
  - (13) describe the boundaries of the *inertia sub-networks* and related *inertia requirements* determined by *AEMO* under rule 5.20B since the last *NTNDP* and details of *AEMO*'s assessment of any *inertia shortfall* and *AEMO*'s forecast of any *inertia shortfall* arising at any time within a planning horizon of at least 5 years; and
  - (14) describe the *system strength requirements* determined by *AEMO* under rule 5.20C since the last *NTNDP* and details of *AEMO*'s assessment of any *fault level shortfall* and *AEMO*'s forecast of any *fault level shortfall* arising at any time within a planning horizon of at least 5 years.
- (d) *AEMO* must *publish* the first *NTNDP* (the ***NTNDP for 2011***) no later than 31 December 2010.
  - (e) If, after the *publication* of the most recent *NTNDP*, *AEMO* becomes aware of information that shows the *NTNDP* to be incorrect in a material respect, *AEMO* must *publish* a correction of the *NTNDP* as soon as practicable.

### 5.20.3 Development strategies for national transmission flow paths

A development strategy for a current or potential *national transmission flow path* that is specified in accordance with clause 5.20.2(c)(7) must:

- (a) be proposed for each of the scenarios referred to in clause 5.20.2(c)(4); and
- (b) to the extent reasonably practicable and appropriate, be consistent with:
  - (1) the co-optimisation of *network* and non-*network* investment; and
  - (2) the maximisation of net economic benefit to all those who produce, consume and transport electricity to the *market*; and

- (3) the service standards that are linked to the technical requirements of schedule 5.1 or in *applicable regulatory instruments*; and
- (c) take into account the following matters:
  - (1) the current or likely capacity of the *national transmission flow path*, and the need to increase that capacity to relieve current or likely *constraints* and congestion points; and
  - (2) technically feasible *network* and *non-network options* (including additional *generation* and demand side options) for relieving current or likely *constraints* or congestion points; and
  - (3) possible market benefits associated with each of the options identified under subparagraph (2); and
- (d) include a high level assessment as to:
  - (1) which of the options, or combination of options, identified under paragraph (c)(2) provides the most efficient strategy for the development of the *national transmission grid* under each of the scenarios referred to in clause 5.20.2(c)(4); and
  - (2) the manner in which each such option, or combination of options, relates to the overall development of the *power system*.

#### 5.20.4 NTNDP database

- (a) AEMO must establish, maintain and make available to the public a database (the *NTNDP database*) that includes *NTNDP inputs* used by it in preparing the most recent *NTNDP*.
- (b) The *NTNDP inputs* for an *NTNDP* include:
  - (1) assumptions made about the cost of fuel used for the generation of electricity (including gas and coal); and
  - (2) the conversion factors used to relate the consumption of a given quantity of fuel to the production of electricity using that quantity of fuel; and
  - (3) assumptions about the capital costs associated with the generation of electricity; and
  - (4) prevailing location of generation capacity; and
  - (5) assumptions about the price of carbon; and
  - (6) electricity demand forecasts.
- (b1) Subject to paragraph (b2), AEMO must include the following in the *NTNDP database*:

- (i) any forecasts prepared under clause 5.20.6(b)(i); and
  - (ii) sufficient information used to develop the forecasts referred to in paragraph (i) to enable an understanding of how such forecasts were developed.
- (b2) The information referred to in paragraph (b1)(ii) must be included in the *NTNDP database* at the same time as, or as soon as reasonably practical after, the inclusion of the forecasts in the database.
- (d) A part of the database established for *confidential information* is not to be accessible to the public.

**Note:**

The disclosure of *protected information* to the public may however be authorised under the *National Electricity Law*.

#### **5.20.5 Jurisdictional planning bodies and jurisdictional planning representatives**

- (a) A *jurisdictional planning body* must provide assistance *AEMO* reasonably requests in connection with the performance of its *NTP functions*.
- (b) If there is no *jurisdictional planning body* or no *jurisdictional planning representative* for a *participating jurisdiction*, *AEMO* may assume the functions of such a body or representative under the *Rules*.

#### **5.20.6 NTP Functions**

- (a) This rule has effect for the purposes of section 49(2)(e) of the *National Electricity Law*.
- (b) The *NTP functions* also include the following:
  - (i) developing any forecasts of electricity demand at a *regional* or *connection point* level.
- (c) To avoid doubt, the *NTP functions* do not include determining the *inertia requirements* or the assessment of *inertia shortfalls* or the *system strength requirements* or the assessment of any *fault level shortfalls*.

#### **5.20.7 Inertia and system strength requirements methodologies**

- (a) The *inertia requirements methodology* determined by *AEMO* must provide for *AEMO* to take the following matters into account in determining the *secure operating level of inertia*:
  - (1) the capabilities and expected response times provided by *generating units* providing *market ancillary services* (other than the *regulating raise service* or *regulating lower service*) in the *inertia sub-network*;

- (2) the maximum *load shedding* or *generation shedding* expected to occur on the occurrence of any *credible contingency event* affecting the *inertia sub-network* when the *inertia sub-network* is islanded;
  - (3) additional *inertia* needed to account for the possibility of a reduction in *inertia* if the *contingency event* that occurs is the loss or unavailability of a *synchronous generating unit*, *synchronous condenser* or any other *facility* or service that is material in determining *inertia requirements*;
  - (4) any *constraints* that could reasonably be applied to the *inertia sub-network* when islanded to achieve a *secure operating state* and any *unserved energy* that might result from the *constraints*; and
  - (5) any other matters as *AEMO* considers appropriate.
- (b) The *system strength requirements methodology* determined by *AEMO* must provide for *AEMO* to take the following matters into account in determining the *fault level nodes* and the minimum *three phase fault level*:
- (1) the combination of *three phase fault levels* at each *fault level node* in the *region* that could reasonably be considered to be sufficient for the *power system* to be in a *secure operating state*;
  - (2) the maximum *load shedding* or *generation shedding* expected to occur on the occurrence of any *credible contingency event* or *protected event* affecting the *region*;
  - (3) the stability of the *region* following any *credible contingency event* or *protected event*;
  - (4) the risk of *cascading outages* as a result of any *load shedding* or *generating system* or *market network service facility* tripping as a result of a *credible contingency event* or *protected event* in the *region*;
  - (5) additional contribution to the *three phase fault level* needed to account for the possibility of a reduction in the *three phase fault level* at a *fault level node* if the *contingency event* that occurs is the loss or unavailability of a *synchronous generating unit* or any other *facility* or service that is material in determining the *three phase fault level* at the *fault level node*;
  - (6) the stability of any equipment that is materially contributing to the *three phase fault level* or *inertia* within the *region*; and
  - (7) any other matters as *AEMO* considers appropriate.

## 5.20A Frequency management planning

### 5.20A.1 Power system frequency risk review

- (a) *AEMO* must, through a *power system frequency risk review* under this rule, review:
  - (1) *non-credible contingency events* the occurrence of which *AEMO* expects would be likely to involve uncontrolled increases or decreases in *frequency* (alone or in combination) leading to *cascading outages*, or *major supply disruptions*;
  - (2) current arrangements for management of the *non-credible contingency events* described in sub-paragraph (1); and
  - (3) options for future management of those events.
- (b) the options referred to in subparagraph (a)(3) may include:
  - (1) new or modified *emergency frequency control schemes*;
  - (2) declaration of the event as a *protected event*;
  - (3) *network augmentation*; and
  - (4) *non-network alternatives to augmentation*.
- (c) a *power system frequency risk review* must:
  - (1) identify *non-credible contingency events* referred to in paragraph (a) that *AEMO* considers should be priorities for assessment having regard to:
    - (i) the likely *power system security* outcomes if the event occurs;
    - (ii) the likelihood of the event occurring;
    - (iii) whether in *AEMO*'s opinion there are reasonably likely to be options for management of the event that are technically feasible, and (on the basis of *AEMO*'s preliminary assessment of the estimated costs and benefits of that option) are economically feasible; and
    - (iv) other factors that *AEMO* considers relevant;
  - (2) for events identified under subparagraph (1):
    - (i) assess options for future management of the event that are technically and economically feasible;
    - (ii) assess the expected costs and time for implementation of each option and any other factors that *AEMO* considers should be taken into account in selecting a recommended option; and

- (iii) identify the recommended option or range of options;
- (3) for current *protected events*:
  - (i) assess the adequacy and costs of the arrangements for management of the event;
  - (ii) consider whether to recommend a request to the *Reliability Panel* to revoke the declaration of the event as a *protected event*; and
  - (iii) except where a recommendation is to be made under subparagraph (ii), identify any need for changes to the arrangements for management of the event and where applicable, identify the options for change and in relation to each option, the matters referred to in subparagraphs (2)(ii) and (iii); and
- (4) assess the performance of existing *emergency frequency control schemes* and identify any need to modify the scheme.

#### **5.20A.2 Power system frequency risk review process**

- (a) *AEMO* must undertake a *power system frequency risk review* at least every two years.
- (b) *AEMO* must put in place arrangements it considers appropriate to consult with and take into account the views of *Transmission Network Service Providers* in the conduct of a *power system frequency risk review*.
- (c) Where *AEMO* is considering a new or modified *emergency frequency control scheme*, *AEMO* must consult with *Distribution Network Service Providers* whose *distribution system* is likely to be directly affected by the scheme.
- (d) When undertaking a *power system frequency risk review*, *AEMO* may consult with any other parties it considers appropriate, including without limitation, *Jurisdictional System Security Coordinators*.

#### **5.20A.3 Power system frequency risk review report**

- (a) On completion of a *power system frequency risk review*, *AEMO* must publish a draft report setting out its findings and recommendations on the matters set out in clause 5.20A.1, and invite written submissions to be made within a period of at least 10 *business days* specified in the invitation. *AEMO* must publish its final report as soon as reasonably practicable following the receipt of submissions.
- (b) Where a *power system frequency risk review* identifies the need for a new or modified *emergency frequency control scheme* (alone or in combination with the declaration of a *protected event*) the report under this clause must:



- (1) specify the areas of the *power system* to which the *emergency frequency control scheme* will apply and whether it is an *over frequency scheme*, *under frequency scheme*, or both; and
  - (2) include the anticipated time required to design, procure and commission the new or modified scheme.
- (c) Where, as the result of a *power system frequency risk review*, AEMO recommends seeking declaration or revocation of a *non-credible contingency event* as a *protected event*, the report under this clause must include the proposed timetable for submission of a request to the *Reliability Panel* under clause 5.20A.4 or clause 5.20A.5 (as applicable).

#### **5.20A.4 Request for protected event declaration**

- (a) AEMO must develop and submit to the *Reliability Panel* a request for declaration of a *non-credible contingency event* as a *protected event* in accordance with the recommendations of a *power system frequency risk review* and taking into account any guidelines issued by the *Reliability Panel* under clause 8.8.1(a)(2d) as to the timing and content of requests under this clause.
- (b) A request under this clause must include:
- (1) information explaining the nature and likelihood of the *non-credible contingency event* and the consequences for the *power system* if the event were to occur including AEMO's estimate of *unserved energy*;
  - (2) options for managing the *non-credible contingency event* as a *protected event*, AEMO's recommended option or range of options and the rationale for the recommendation;
  - (3) for each recommended option under subparagraph (2), AEMO's estimate of the additional costs to operate the *power system* in accordance with the *power system security principles* in clause 4.2.6 if the event is declared to be a *protected event* including a description of the mechanisms that may be used;
  - (4) where a recommended option for managing the *non-credible contingency event* includes a new or modified *emergency frequency control scheme*:
    - (i) the *target capabilities* proposed to be included in the *protected event EFCS standard* for the scheme, the rationale for the proposed *target capabilities* and the corresponding expected *power system security* outcomes including AEMO's estimate of *unserved energy* associated with operation of the scheme; and
    - (ii) AEMO's estimate of the costs to procure and commission the scheme and maintain its availability and performance, including upfront costs and ongoing maintenance costs;

- (5) *AEMO's proposals for other matters that may be determined by the Reliability Panel under clause 8.8.4 in connection with the request; and*
- (6) *other information AEMO considers reasonably necessary to assist the Reliability Panel to consider the request.*

#### **5.20A.5 Request to revoke a protected event declaration**

- (a) *If AEMO recommends in a power system frequency risk review that a non-credible contingency event should no longer be managed as a protected event, AEMO must submit to the Reliability Panel a request to revoke the declaration of a non-credible contingency event as a protected event in accordance with the recommendations of the power system frequency risk review.*
- (b) *A request under this clause must include:*
  - (1) *information explaining the nature of the non-credible contingency event and the consequences for the power system if the event were to cease to be managed as a protected event; and*
  - (2) *other information AEMO considers reasonably necessary to assist the Reliability Panel to consider the request.*

### **5.20B Inertia sub-networks and requirements**

#### **5.20B.1 Boundaries of inertia sub-networks**

- (a) *For the purpose of determining the required levels of inertia in the national grid, the connected transmission systems forming part of the national grid are to be divided into inertia sub-networks.*
- (b) *AEMO must determine the boundaries of inertia sub-networks and may from time to time adjust the boundaries, including adjustments that result in new inertia sub-networks.*
- (c) *The boundaries of an inertia sub-network must be aligned with the boundaries of a region or wholly confined within a region.*
- (d) *Subject to paragraph (c), in determining and adjusting the boundaries of inertia sub-networks, AEMO must take into account the following matters:*
  - (1) *synchronous connections between the proposed inertia sub-network and adjacent parts of the national grid;*
  - (2) *the likelihood of the proposed inertia sub-network being islanded; and*
  - (3) *the criticality and practicality of maintaining the proposed inertia sub-network in a satisfactory operating state if it is islanded and being able to return to a secure operating state while islanded.*

- (e) In determining and adjusting the boundaries of *inertia sub-networks*, AEMO must comply with the *Rules consultation procedures*.
- (f) AEMO must publish the boundaries of the *inertia sub-networks* and any adjustments in the *NTNDP*.

### 5.20B.2 Inertia requirements

- (a) AEMO must from time to time determine the *inertia requirements* for *inertia sub-networks* applying the *inertia requirements methodology*. AEMO must make a determination under this paragraph:
  - (1) subject to subparagraph (2) and any other requirements under the *Rules*, for any *inertia sub-network*, no more than once in every 12 month period; and
  - (2) for each affected *inertia sub-network*, as soon as reasonably practical after becoming aware of a material change to the *power system* likely to affect the *inertia requirements* for the *inertia sub-network* where the timing, occurrence or impact of the change was unforeseen.
- (b) The *inertia requirements* to be determined for each *inertia sub-network* are:
  - (1) the *minimum threshold level of inertia*, being the minimum level of *inertia* required to operate the *inertia sub-network* in a *satisfactory operating state* when the *inertia sub-network* is *islanded*; and
  - (2) the *secure operating level of inertia*, being the minimum level of *inertia* required to operate the *inertia sub-network* in a *secure operating state* when the *inertia sub-network* is *islanded*.
- (c) AEMO must *publish* the *inertia requirements* determined for each *inertia sub-network* together with the results of its assessment under clause 5.20B.3 in the *NTNDP*.

### 5.20B.3 Inertia shortfalls

- (a) AEMO must as soon as practicable following its determination of the *inertia requirements* for an *inertia sub-network* under clause 5.20B.2 assess:
  - (1) the level of *inertia* typically provided in the *inertia sub-network* having regard to typical patterns of *dispatched generation* in *central dispatch*;
  - (2) whether in AEMO's reasonable opinion, there is or is likely to be an *inertia shortfall* in the *inertia sub-network* and AEMO's forecast of the period over which the *inertia shortfall* will exist; and
  - (3) where AEMO has previously assessed that there was or was likely to be an *inertia shortfall*, whether in AEMO's reasonable opinion that *inertia shortfall* has been or will be remedied.

- (b) In making its assessment under paragraph (a) for an *inertia sub-network*, *AEMO* must take into account:
  - (1) over what time period and to what extent the *inertia* that is typically provided in the *inertia sub-network* is or is likely to be below the *secure operating level of inertia*;
  - (2) the levels of *inertia* that are typically provided in adjacent *connected inertia sub-networks* and the likelihood of the *inertia sub-network* becoming *islanded*; and
  - (3) any other matters that *AEMO* reasonably considers to be relevant in making its assessment.
- (c) If *AEMO* assesses that there is or is likely to be an *inertia shortfall* in any *inertia sub-network*, *AEMO* must *publish* and give to the *Inertia Service Provider* for the *inertia sub-network* a notice of that assessment that includes *AEMO's* specification of the date by which the *Inertia Service Provider* must ensure the availability of *inertia network services* in accordance with clause 5.20B.4(b), which must not be earlier than 12 months after the notice is *published* unless an earlier date is agreed with the *Inertia Service Provider*.
- (d) If *AEMO* assesses that an *inertia shortfall* in an *inertia sub-network* has been or will be remedied, *AEMO* must *publish* and give to the *Inertia Service Provider* for the *inertia sub-network* a notice of that assessment that includes *AEMO's* specification of the date from which the obligation of the *Inertia Service Provider* under clause 5.20B.4(b) ceases, which must not be earlier than 12 months after the notice is *published* unless an earlier date is agreed with the *Inertia Service Provider*.

#### **5.20B.4 Inertia Service Provider to make available inertia services**

- (a) The *Inertia Service Provider* for an *inertia sub-network* is:
  - (1) the *Transmission Network Service Provider* for the *inertia sub-network*; or
  - (2) if there is more than one *Transmission Network Service Provider* for the *inertia sub-network*, the *jurisdictional planning body* for the *participating jurisdiction* in which the *inertia sub-network* is located.
- (b) If *AEMO* gives a notice under clause 5.20B.3(c) that *AEMO* has assessed that there is or is likely to be an *inertia shortfall* in an *inertia sub-network*, the *Inertia Service Provider* for the *inertia sub-network* must make *inertia network services* available in accordance with paragraph (c) that when *enabled* will provide *inertia* to:
  - (1) the *secure operating level of inertia*; or

- (2) the *secure operating level of inertia* as adjusted for *inertia support activities*, but not less than the *minimum threshold level of inertia* as adjusted for *inertia support activities*.

**Note**

This clause is classified as a 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) For the purposes of paragraph (b), an *Inertia Service Provider* for an *inertia sub-network* must:
  - (1) use reasonable endeavours to make the *inertia network services* available by the date specified by *AEMO* in the notice under clause 5.20B.3(c);
  - (2) make a range and level of *inertia network services* available such that it is reasonably likely that *inertia network services* that provide the required level of *inertia* when *enabled* are continuously available, taking into account planned *outages* and the risk of unplanned *outages*;
  - (3) ensure that the *inertia network services* that when *enabled* provide *inertia* up to the *minimum threshold level of inertia* (as adjusted for *inertia support activities* if applicable) are qualifying *inertia network services* as specified in paragraph (d);
  - (4) ensure that the *inertia network services* that when *enabled* provide *inertia* beyond the *minimum threshold level of inertia* up to the *secure operating level of inertia* (as adjusted for *inertia support activities* if applicable), are qualifying *inertia network services* as specified in paragraph (e); and
  - (5) maintain the availability of those *inertia network services* until the date the *Inertia Service Provider's* obligation ceases, as specified by *AEMO* under clause 5.20B.3(d).
- (d) The *inertia network services* that qualify to provide *inertia* up to the *minimum threshold level of inertia* are:
  - (1) *inertia network services* made available by the *Inertia Service Provider* investing in its *network* through the installation, commissioning and operation of a *synchronous condensor*; and
  - (2) *inertia network services* made available to the *Inertia Service Provider* by a *Registered Participant* and provided by means of a *synchronous generating unit* or a *synchronous condensor* under an *inertia services agreement*.
- (e) The *inertia network services* that qualify to provide *inertia* beyond the *minimum threshold level of inertia* up to the *secure operating level of inertia* are:

- (1) the *inertia network services* referred to in paragraph (d);
  - (2) *inertia network services* made available by the *Inertia Service Provider* investing in its *network* other than those referred to in paragraph (d); and
  - (3) *inertia network services* made available to the *Inertia Service Provider* by a *Registered Participant* under an *inertia services agreement* other than those referred to in paragraph (d).
- (f) An *Inertia Service Provider* required to make *inertia network services* available under paragraph (b) must make available the least cost option or combination of options that will satisfy its obligation within the time referred to in subparagraph (c)(1) and for so long as the obligation to make the *inertia network services* available continues.
- (g) An *Inertia Service Provider* required to make *inertia network services* available under paragraph (b) must prepare and *publish* information to enable potential providers of *inertia network services* to develop *non-network options* for consideration by the *Inertia Service Provider* including:
  - (1) a description of the requirement for *inertia network services* including timing;
  - (2) the technical characteristics that a *non-network option* would be required to deliver, such as the level of *inertia*, location, availability, response time and operating profile;
  - (3) a summary of potential options to make the *inertia network services* available identified by the *Inertia Service Provider*, including *network options* and *non-network options*; and
  - (4) information to assist providers of *non-network options* wishing to present proposals to the *Inertia Service Provider* including details of how to submit a proposal for consideration.
- (h) An *Inertia Service Provider* must provide information in its *Transmission Annual Planning Report* about:
  - (1) the activities undertaken to satisfy its obligation to make *inertia network services* available under paragraph (b); and
  - (2) *inertia support activities* undertaken to reduce the *minimum threshold level of inertia* or the *secure operating level of inertia*.
- (i) If the *Inertia Service Provider* proposes *network* investment for either of the purposes specified in paragraph (h), the *Inertia Service Provider* must provide the following information in its next *Transmission Annual Planning Report*:

- (1) the date when the proposed relevant *network* investment became or will become operational;
  - (2) the purpose of the proposed relevant *network* investment;
  - (3) the total cost of the proposed relevant *network* investment; and
  - (4) the indicative total cost of any *non-network options* considered.
- (j) An *Inertia Service Provider* may include the cost of *inertia service payments* in the calculation of *network support payments* in accordance with Chapter 6A.

### 5.20B.5 Inertia support activities

- (a) AEMO may at the request of an *Inertia Service Provider* approve activities (*inertia support activities*) under this clause and agree corresponding adjustments to the *minimum threshold level of inertia* or the *secure operating level of inertia* for the purposes of clause 5.20B.4(b) where the activities:
- (1) are to be undertaken by the *Inertia Service Provider* or provided as a service to the *Inertia Service Provider*;
  - (2) are not *inertia network services*; and
  - (3) AEMO is satisfied the activities will contribute to the operation of the *inertia sub-network* in a *satisfactory operating state* or *secure operating state* in the circumstances described in clause 4.4.4(a) or (b) as applicable.

#### Note

If approved by AEMO under paragraph (a), inertia support activities may include installing or contracting for the provision of *frequency* control services, installing emergency protection schemes or contracting with *Generators* in relation to the operation of their *generating units* in specified conditions.

- (b) An adjustment to the *minimum threshold level of inertia* or the *secure operating level of inertia* for *inertia support activities* will apply to the level determined by AEMO and only where and to the extent that the approved activity is *enabled* and performing in accordance with the conditions of any approval determined by AEMO.
- (c) An *Inertia Service Provider* making a request under paragraph (a) must give AEMO:
- (1) details of the proposed *inertia support activity* and the other information about the *inertia support activity* consistent with the requirements of clause 5.20B.6(c);

- (2) the proposed technical specification and performance standards and the information about arrangements to *enable* the *inertia support activity* consistent with the requirements of clause 5.20B.6(d);
  - (3) information about how the *inertia support activity* will contribute to operation of the *inertia sub-network* in a *satisfactory operating state* or *secure operating state* in the circumstances described in clause 4.4.4(a) or (b) as applicable;
  - (4) the *Inertia Service Provider's* proposal for calculating adjustments to be made and the times they will apply; and
  - (5) any other information requested by *AEMO* in connection with the request.
- (d) *AEMO* may give or withhold its approval under this clause in its discretion and subject to any conditions determined by *AEMO*.
  - (e) The technical specification, performance standards and information referred to in paragraph (c)(2) and any change to them must be approved by *AEMO*.
  - (f) An *Inertia Service Provider* must obtain *AEMO's* approval under paragraph (e) before any change to the technical specification, performance standards or arrangements to give instructions that apply to an *inertia support activity* comes into effect.

**Note**

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

## **5.20B.6 Inertia network services information and approvals**

- (a) An *Inertia Service Provider* required to make *inertia network services* available under clause 5.20B.4(b) must prepare and give to *AEMO* and keep up to date, a schedule setting out:
  - (1) the *inertia network services* made available by the *Inertia Service Provider* for the *inertia sub-network*; and
  - (2) the *Inertia Service Provider's* proposed order of priority for the *inertia network services* to be *enabled*.
- (b) Where the *Inertia Service Provider* procures *inertia network services* from a *Generator* provided by means of a *synchronous generating unit* under an *inertia services agreement*, the *Inertia Service Provider* must register the *generating unit* with *AEMO* as an *inertia generating unit* and specify that the *generating unit* may be periodically used to provide *inertia network services* and will not be eligible to set *spot prices* when *constrained on* to provide *inertia* in accordance with clause 3.9.7(c).



**Note**

This clause is classified as a 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) An *Inertia Service Provider* required to make *inertia network services* available under clause 5.20B.4(b) must give to *AEMO* and keep up to date the following details for each *inertia network service*:
  - (1) a description of the *inertia network service*, including:
    - (i) the nature of the *inertia network service*;
    - (ii) the *generating unit* or other *facilities* used to provide the *inertia network service*;
    - (iii) the purpose for which the *inertia network service* is being provided;
    - (iv) the location in the *transmission network* or *distribution network* of the *facilities* used to provide the *inertia network service*;
    - (v) the quantity of *inertia* to be provided when the *inertia network service* is *enabled* and;
    - (vi) any other information requested by *AEMO* in connection with the *inertia network service*;
  - (2) information about the availability of the *inertia network service*, including:
    - (i) the times when, and the period over which, the *inertia network service* will be available to provide *inertia*; and
    - (ii) any possible restrictions on the availability of the *inertia network service*
- (d) An *Inertia Service Provider* required to make *inertia network services* available under clause 5.20B.4(b) must prepare and submit to *AEMO* for approval under paragraph (e) the following details for each *inertia network service*:
  - (1) the technical specification and performance standards for the *inertia network service*; and
  - (2) the arrangements necessary for *AEMO* to give instructions to *enable* or cease the provision of the *inertia network service* including:
    - (i) the period of any notice that has to be given to the provider of the *inertia network service* for it to be *enabled*;

- (ii) the response time to any instruction for the *inertia network service* to be *enabled* or to cease being provided; and
  - (iii) communication protocols between it, *AEMO* and the *Registered Participants* that provide *inertia network services*.
- (e) The technical specification, performance standards and arrangements necessary for *AEMO* to give the instructions referred to in paragraph (d) and any change to them must be consistent with the *Rules* and approved by *AEMO*.
- (f) An *Inertia Service Provider* must ensure that *AEMO's* approval is obtained under paragraph (e) before the *inertia network service* is first made available and in the case of a change, before the change comes into effect.

**Note**

This clause is classified as a 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) *AEMO* must use reasonable endeavours to respond to the *Inertia Service Provider* within 20 *business days* following the receipt of a request for approval under paragraph (e) stating whether it gives its approval.
- (h) If *AEMO* does not approve the matters in a request for approval under paragraph (e):
  - (1) *AEMO* must tell the *Inertia Service Provider* its reasons for withholding approval and may advise the *Inertia Service Provider* of the changes *AEMO* requires to be made; and
  - (2) the *Inertia Service Provider* must amend its request to address the matters identified by *AEMO* and submit to *AEMO* a new request for approval.

## 5.20C System strength requirements

### 5.20C.1 System strength requirements

- (a) *AEMO* must from time to time determine the *system strength requirements* for each *region* applying the *system strength requirements methodology*. *AEMO* must make a determination under this paragraph:
  - (1) subject to subparagraph (2) and any other requirements under the *Rules*, for any *region*, no more than once in every 12 month period; and
  - (2) for each affected *region*, as soon as reasonably practical after becoming aware of a material change to the *power system* likely to affect the *system strength requirements* for the *region* where the timing, occurrence or impact of the change was unforeseen.

- (b) The *system strength requirements* to be determined for each *region* are:
  - (1) the *fault level nodes* in the *region*, being the location on the *transmission network* for which the *three phase fault level* must be maintained at or above a minimum *three phase fault level* determined by AEMO; and
  - (2) for each *fault level node*, the minimum *three phase fault level*.
- (c) AEMO must publish the *system strength requirements* determined for each *region* together with the results of its assessment under clause 5.20C.2 in the NTNDP.

### 5.20C.2 Fault level shortfalls

- (a) AEMO must as soon as practicable following its determination of the *system strength requirements* for a *region* under clause 5.20C.1 assess:
  - (1) the *three phase fault level* typically provided at each *fault level node* in the *region* having regard to typical patterns of *dispatched generation* in *central dispatch*;
  - (2) whether in AEMO's reasonable opinion, there is or is likely to be a *fault level shortfall* in the *region* and AEMO's forecast of the period over which the *fault level shortfall* will exist; and
  - (3) where AEMO has previously assessed that there was or was likely to be a *fault level shortfall*, whether in AEMO's reasonable opinion that *fault level shortfall* has been or will be remedied.
- (b) In making its assessment under paragraph (a) for a *region*, AEMO must take into account:
  - (1) over what time period and to what extent the *three phase fault levels* at *fault level nodes* that are typically observed in the *region* are likely to be insufficient to maintain the *power system* in a *secure operating state*; and
  - (2) any other matters that AEMO reasonably considers to be relevant in making its assessment.
- (c) If AEMO assesses that there is or is likely to be a *fault level shortfall* in a *region*, AEMO must *publish* and give to the *System Strength Service Provider* for the *region* a notice of that assessment that includes AEMO's specification of:
  - (1) the extent of the *fault level shortfall*; and
  - (2) the date by which the *System Strength Service Provider* must ensure the availability of *system strength services* in accordance with clause 5.20C.3(b), which must not be earlier than 12 months after the notice

is *published* unless an earlier date is agreed with the *System Strength Service Provider*.

- (d) If *AEMO* assesses that a *fault level shortfall* in a *region* has been or will be remedied, *AEMO* must *publish* and give to the *System Strength Service Provider* for the *region* a notice of that assessment that includes *AEMO's* specification of the date from which the obligation of the *System Strength Service Provider* under clause 5.20C.3(b) ceases, which must not be earlier than 12 months after the notice is *published* unless an earlier date is agreed with the *System Strength Service Provider*.

### **5.20C.3 System Strength Service Provider to make available system strength services**

- (a) The *System Strength Service Provider* for a *region* is:
  - (1) the *Transmission Network Service Provider* for the *region*; or
  - (2) if there is more than one *Transmission Network Service Provider* for a *region*, the *jurisdictional planning body* for the *participating jurisdiction* in which the *region* is located.
- (b) If *AEMO* gives a notice under clause 5.20C.2(c) that *AEMO* has assessed that there is or is likely to be a *fault level shortfall* at a *fault level node* in a *region*, the *System Strength Service Provider* for the *region* must make *system strength services* available in accordance with paragraph (c) that when *enabled* will address the *fault level shortfall* at the relevant *fault level node*.

#### **Note**

This clause is classified as a 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) For the purposes of paragraph (b), a *System Strength Service Provider* for a *region* must:
  - (1) use reasonable endeavours to make the *system strength services* available by the date specified by *AEMO* in the notice under clause 5.20C.2(c);
  - (2) make a range and level of *system strength services* available such that it is reasonably likely that *system strength services* that address the *fault level shortfall* when *enabled* are continuously available, taking into account planned *outages*, the risk of unplanned *outages* and the potential for the *system strength services* to impact typical patterns of *dispatched generation in central dispatch*; and
  - (3) maintain the availability of those *system strength services* until the date the *System Strength Service Provider's* obligation ceases, as specified by *AEMO* under clause 5.20C.2(d).

- (d) A *System Strength Service Provider* required to make *system strength services* available under paragraph (b) must make available the least cost option or combination of options that will satisfy its obligation within the time referred to in subparagraph (c)(1) and for so long as the obligation to make the *system strength services* available continues.
- (e) A *System Strength Service Provider* required to make *system strength services* available under paragraph (b) must prepare and *publish* information to enable potential providers of *system strength services* to develop *non-network options* for consideration by the *System Strength Service Provider* including:
  - (1) a description of the requirement for *system strength services* including timing;
  - (2) the technical characteristics that a non-network option would be required to deliver, such as the contribution to the *three phase fault level*, location, availability, response time and operating profile;
  - (3) a summary of potential options to make the *system strength services* available identified by the *System Strength Service Provider*, including *network options* and *non-network options*; and
  - (4) information to assist providers of *non-network options* wishing to present proposals to the *System Strength Service Provider* including details of how to submit a proposal for consideration.
- (f) A *System Strength Service Provider* must provide information in its *Transmission Annual Planning Report* about the activities undertaken to satisfy its obligation to make *system strength services* available under paragraph (b).
- (g) If the *System Strength Service Provider* proposes *network* investment for the purpose specified in paragraph (f), the *System Strength Service Provider* must provide the following information in its next *Transmission Annual Planning Report*:
  - (1) the date when the proposed relevant *network* investment became or will become operational;
  - (2) the purpose of the proposed relevant *network* investment;
  - (3) the total cost of the proposed relevant *network* investment;
  - (4) the indicative total costs of any *non-network options* considered.
- (h) A *System Strength Service Provider* may include the cost of *system strength service payments* in the calculation of *network support payments* in accordance with Chapter 6A.

#### 5.20C.4 System strength services information and approvals

- (a) A *System Strength Service Provider* required to make *system strength services* available under clause 5.20C.3(b) must prepare and give to AEMO and keep up to date, a schedule setting out:
  - (1) the *system strength services* available to contribute to the *three phase fault level* at each *fault level node* in the *region* for which there is a *fault level shortfall*; and
  - (2) the *System Strength Service Provider's* proposed order of priority for the *system strength services* to be *enabled*.
- (b) Where the *System Strength Service Provider* procures *system strength services* from a *Generator* provided by means of a *generating unit* under a *system strength services agreement*, the *System Strength Service Provider* must register the *generating unit* with AEMO as a *system strength generating unit* and specify that the *generating unit* may be periodically used to provide *system strength services* and will not be eligible to set *spot prices* when *constrained on* to provide *system strength services* in accordance with clause 3.9.7(c).

#### Note

This clause is classified as a 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) A *System Strength Service Provider* required to make *system strength services* available under clause 5.20C.3(b) must give to AEMO and keep up to date the following details for each *system strength service*:
  - (1) a description of the *system strength service*, including:
    - (i) the nature of the *system strength service*;
    - (ii) the *generating unit* or other *facilities* used to provide the *system strength service*;
    - (iii) the purpose for which the *system strength service* is being provided;
    - (iv) the location in the *transmission network* or *distribution network* of the *facilities* used to provide the *system strength service*;
    - (v) the contribution to the *three phase fault level* at each relevant *fault level node* and the *facility's connection point* when the *system strength service* is *enabled*; and
    - (vi) any other information (including models) requested by AEMO to assess the contribution of the *system strength service* referred to in subparagraph (v).

- (2) information about the availability of the *system strength service*, including:
  - (i) the times when, and the period over which, the *system strength service* will be available to contribute to the *three phase fault level* at each relevant *fault level node*; and
  - (ii) any possible restrictions on the availability of the *system strength service*.
- (d) A *System Strength Service Provider* required to make *system strength services* available under clause 5.20C.3(b) must prepare and submit to AEMO for approval under paragraph (e) the following details for each *system strength service*:
  - (1) the technical specification and performance standards for the *system strength service*; and
  - (2) the arrangements necessary for AEMO to give instructions to *enable* or cease the provision of the *system strength service* including:
    - (i) the period of any notice that has to be given to the provider of the *system strength service* for it to be *enabled*;
    - (ii) the response time to any instruction for the *system strength service* to be *enabled* or to cease being provided; and
    - (iii) communication protocols between it, AEMO and the *Registered Participants* that provide *system strength services*.
- (e) The technical specification, performance standards and arrangements necessary for AEMO to give the instructions referred to in paragraph (d) and any change to them must be consistent with the *Rules* and approved by AEMO.
- (f) A *System Strength Service Provider* must ensure that AEMO's approval is obtained under paragraph (e) before the *system strength service* is first made available and in the case of a change, before the change comes into effect.

**Note**

This clause is classified as a 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) AEMO must use reasonable endeavours to respond to the *System Strength Service Provider* within 20 *business days* following the receipt of a request for approval under paragraph (e) stating whether it gives its approval.
- (h) If AEMO does not approve the matters in a request for approval under paragraph (e):

- (1) *AEMO* must tell the *System Strength Service Provider* its reasons for withholding approval and may advise the *System Strength Service Provider* of the changes *AEMO* requires to be made; and
- (2) the *System Strength Service Provider* must amend its request to address the matters identified by *AEMO* and submit to *AEMO* a new request for approval.

## 5.21 **AEMO's obligation to publish information and guidelines and provide advice**

- (a) In carrying out its *NTP functions*, *AEMO* must:
  - (1) *publish* an objective set of criteria for assessing whether a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact*; and
  - (2) prepare and *publish augmentation technical reports* on proposed *transmission network augmentations* that are reasonably likely to have a *material inter-network impact*; and
  - (3) *publish* guidelines to assist *Registered Participants* to determine when an *inter-network test* may be required; and
  - (4) provide advice to the *AEMC* as requested about the exercise of the *last resort planning power*.
- (b) *AEMO* must develop and *publish*, and may vary from time to time, an objective set of criteria for assessing whether a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact*. In developing (or varying) the objective set of criteria, *AEMO* must:
  - (1) proceed in accordance with the *Rules consultation procedures*; and
  - (2) have regard to:
    - (i) the relevant guiding objectives and principles provided by the *AEMC*; and
    - (ii) the advice of *jurisdictional planning representatives*.
- (c) The *AEMC* must provide *AEMO* with guiding objectives and principles for the development by *AEMO* of the objective set of criteria for assessing whether or not a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact*.
- (d) If *AEMO* receives a written request for an *augmentation technical report* on a proposed *transmission network augmentation* that is reasonably likely to have a *material inter-network impact*, or *AEMO* decides in the course of exercising its functions under Chapter 8, Part H, that a proposed *transmission network augmentation* is reasonably likely to have a *material inter-network impact*, *AEMO* must:



- (1) immediately undertake a review of all matters referred to it by the *Transmission Network Service Provider* in order to assess the proposed *augmentation*; and
- (2) consult with, and take into account the recommendations of, the *jurisdictional planning representatives* in relation to the proposed *augmentation*; and
- (3) make a determination as to:
  - (i) the performance requirements for the equipment to be *connected*; and
  - (ii) the extent and cost of *augmentations* and changes to all affected *transmission networks*; and
  - (iii) the possible material effect of the new *connection* on the *network power transfer capability* including that of other *transmission networks*; and
- (4) within 90 *business days* of the date of the request or decision (or some other period agreed between the *Transmission Network Service Provider* and *AEMO*), *AEMO* must *publish an augmentation technical report* that sets out:
  - (i) *AEMO's* determination; and
  - (ii) the reasons for the determination (including a statement of any information and assumptions on which the determination is based).

A request for an *augmentation technical report* on a proposed *transmission network augmentation* must be accompanied by sufficient information to enable *AEMO* to make a proper assessment of the proposed *augmentation* and *AEMO's* reasonable fees covering the direct costs and expenses of preparing the report.

- (e) *AEMO* may, for the purpose of preparing an *augmentation technical report*, by written notice request a *Transmission Network Service Provider* to provide *AEMO* with additional information reasonably available to it and the *Transmission Network Service Provider* must comply with the request.
- (f) The period for *AEMO* to *publish an augmentation technical report* will be automatically extended by the time taken by the *Transmission Network Service Provider* to provide additional information requested by *AEMO*.
- (g) If the objective set of criteria developed and published under paragraph (b) is changed after a project assessment draft report has been made available to *Registered Participants* and *AEMO*, the relevant *Transmission Network Service Provider* is entitled to choose whether the new criteria, or the criteria that existed when the project assessment draft report was made available to *Registered Participants* and *AEMO*, are to be applied.

## 5.22 Last resort planning power

- (a) In this rule 5.22:

**directed party** means one or more *Registered Participants* directed by the *AEMC* in accordance with this rule 5.22 and may include:

- (1) a single *Registered Participant*;
- (2) two or more *Registered Participants* who are directed by the *AEMC* to jointly and co-operatively comply with a direction under paragraph (c).

**direction notice** is a notice issued under paragraph (i).

### Purpose

- (b) The purpose of a *last resort planning power* is to ensure timely and efficient *inter-regional transmission* investment for the long term interests of consumers of electricity.

### AEMC last resort planning power

- (c) The *AEMC* may, in accordance with this rule 5.22, direct one or more *Registered Participants*:
- (1) to identify a potential transmission project and apply the *regulatory investment test for transmission* to that project; or
  - (2) to apply the *regulatory investment test for transmission* to a potential transmission project identified by the *AEMC*.
- (d) The *AEMC* must exercise a *last resort planning power*:
- (1) consistently with the purpose referred to in paragraph (b); and
  - (2) in accordance with the *last resort planning power guidelines*.

### Advice from AEMO

- (e) The *AEMC* may request advice from *AEMO* in relation to the exercise of the *last resort planning power*, in accordance with the *last resort planning power guidelines*.

### Relevant considerations

- (f) In deciding whether or not to exercise a *last resort planning power* the *AEMC* must take into account:
- (1) advice provided by *AEMO*;
  - (2) the *NTNDP* for the current and the previous year;

- (3) *Transmission Annual Planning Reports published by Transmission Network Service Providers* under clause 5.12.2; and
  - (4) other matters that are relevant in all the circumstances.
- (g) In deciding whether or not to exercise the *last resort planning power* the *AEMC* must:
  - (1) identify a problem relating to *constraints* in respect of *national transmission flow paths* between *regional reference nodes* or a potential transmission project (**the problem** or **the project**);
  - (2) make reasonable inquiries to satisfy itself that there are no current processes underway for the application of the *regulatory investment test for transmission* in relation to the problem or the project;
  - (3) consider whether there are other options, strategies or solutions to address the problem or the project, and must be satisfied that all such other options are unlikely to address the problem or the project in a timely manner;
  - (4) be satisfied that the problem or the project may have a significant impact on the efficient operation of the *market*; and
  - (5) be satisfied that but for the *AEMC* exercising the *last resort planning power*, the problem or the project is unlikely to be addressed.

**Direction notice**

- (h) The *AEMC* must exercise a *last resort planning power* by giving a direction notice in writing to a directed party that states:
  - (1) the relevant action under paragraph (c) that the directed party is required to undertake; and
  - (2) the *AEMC's* reasons for exercising the *last resort planning power*.
- (i) A direction notice given by the *AEMC* under paragraph (h) may specify one or more of the following:
  - (1) one or more alternative projects which a directed party must consider when applying the *regulatory investment test for transmission* to potential transmission projects;
  - (2) the time period within which the application of the *regulatory investment test for transmission* must be carried out by a directed party; or
  - (3) consultation and publication requirements that are in addition to those required by the *regulatory investment test for transmission*.

- (j) The *AEMC* must *publish* the direction notice referred to in paragraph (h) on its website.
- (k) A directed party must comply with:
  - (1) a direction notice;
  - (2) the requirements of the *last resort planning power guidelines*; and
  - (3) the requirements for the application of the *regulatory investment test for transmission*.
- (l) If a directed party (an earlier directed party) fails to comply with a direction notice, the *AEMC* may:
  - (1) in accordance with this rule 5.22, give a direction notice to a *Registered Participant* other than the earlier directed party; and
  - (2) inform the *AER* of the earlier directed party's failure to comply with the direction notice.

**Annual reporting for last resort planning power**

- (m) The *AEMC* must report annually on the matters which the *AEMC* has considered during that year in deciding whether or not to exercise the *last resort planning power*, and may include the information in its Annual Report published under s.27 of the *Australian Energy Market Commission Establishment Act 2004* (SA).

**Last resort planning power guidelines**

- (n) The *AEMC* must develop and *publish* guidelines (the *last resort planning power guidelines*) for or with respect to:
  - (1) the processes to be followed by the *AEMC* in exercising the *last resort planning power*;
  - (2) the advice to be provided to the *AEMC* by *AEMO*, including the terms of reference for any such advice;
  - (3) the matters that *AEMO* and the *AEMC* may consider in recommending or nominating a person as an appropriate directed party; and
  - (4) the provision of information to the *AEMC* in relation to the exercise of the *last resort planning power*.
- (o) The *AEMC* must develop and *publish* the *last resort planning power guidelines* in accordance with the *transmission consultation procedures*.
- (p) The *AEMC* must develop and *publish* the first *last resort planning power guidelines* by 1 January 2008 and there must be such guidelines available at all times after that date.

- (q) The AEMC may from time to time and in accordance with the *transmission consultation procedures*, amend or replace the *last resort planning power guidelines*.

## Schedule 5.1a System standards

### S5.1a.1 Purpose

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

- (a) are necessary or desirable for the safe and reliable operation of the *facilities of Registered Participants*;
- (b) are necessary or desirable for the safe and reliable operation of equipment;
- (c) could be reasonably considered *good electricity industry practice*; and
- (d) seek to avoid the imposition of undue costs on the industry or *Registered Participants*.

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

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

The *system standards* are set out below.

### S5.1a.2 Frequency

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

### S5.1a.3 System stability

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

- (a) **Transient stability:** following any *credible contingency event* or *protected event*; and
- (b) **Oscillatory stability:** in the absence of any *contingency event*, for any level of *inter-regional* or *intra-regional* power transfer up to the applicable operational limit; and
- (c) **Voltage stability:** stable *voltage* control must be maintained following the most severe *credible contingency event* or any *protected event*.

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

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

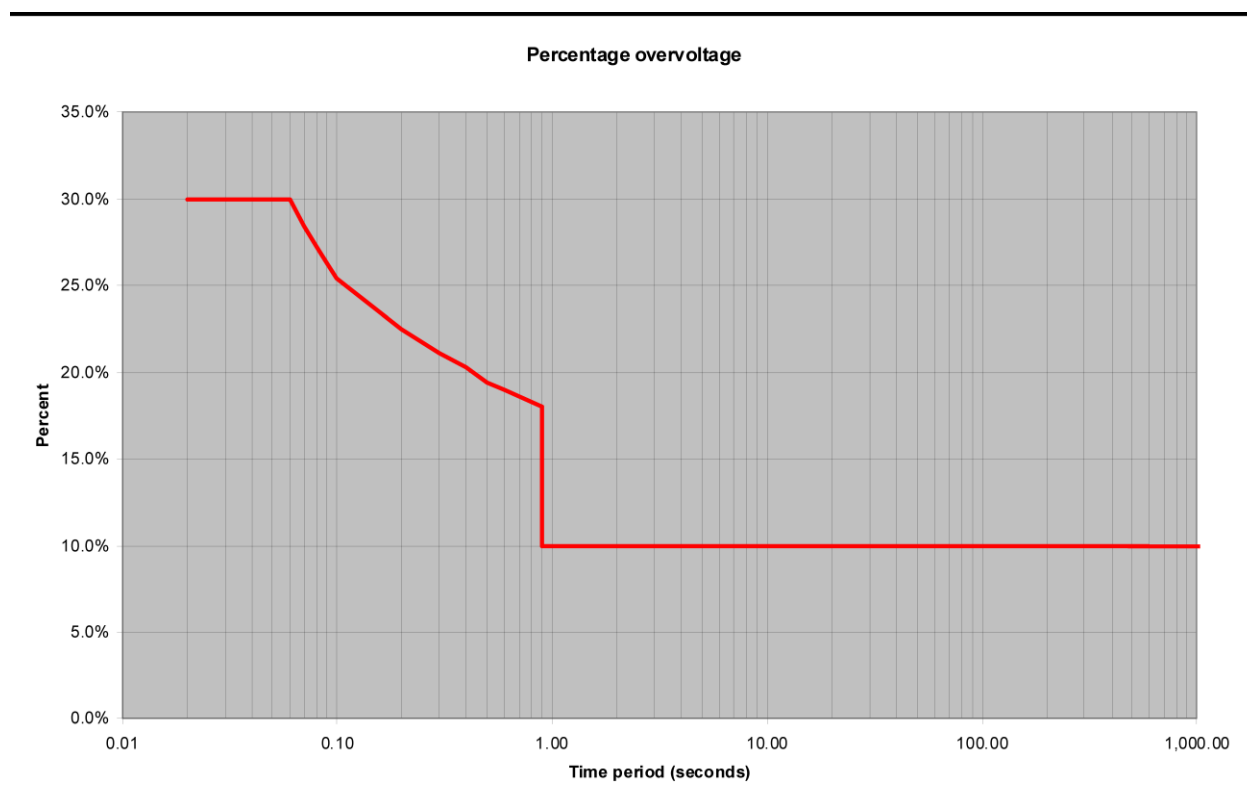
#### S5.1a.4 Power frequency voltage

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

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

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

Figure S5.1a.1



### **S5.1a.5 Voltage fluctuations**

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

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

- (a) the sharing between *Network Users* of the capability of *connection assets* to withstand *voltage* fluctuations is to be managed by *Network Service Providers* in accordance with the provisions of clause S5.1.5 of schedule 5.1; and
- (b) to the extent practicable, the costs of managing or abating the impact of *voltage* fluctuations in excess of the costs which would result from the application of an *automatic access standard* are to be borne by those *Network Users* whose *facilities* cause the *voltage* fluctuations.

### **S5.1a.6 Voltage waveform distortion**

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

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

- (a) the sharing between *Network Users* of the capability of *connection assets* to absorb or mitigate harmonic *voltage* distortion is to be managed by *Network Service Providers* in accordance with the provisions of clause S5.1.6 of schedule 5.1; and
- (b) to the extent practicable, the costs of managing or abating the impact of harmonic distortion in excess of the costs which would result from the application of an *automatic access standard* are to be borne by those *Network Users* whose *facilities* cause the harmonic *voltage* distortion.

### **S5.1a.7 Voltage unbalance**

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

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

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

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

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

**Table S5.1a.1**

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

#### **S5.1a.8 Fault clearance times**

- (a) Faults anywhere within the *power system* should be cleared sufficiently rapidly that:
  - (1) the *power system* does not become unstable as a result of faults that are *credible contingency events*;
  - (2) *inter-regional* or *intra-regional power transfers* are not unduly constrained; and
  - (3) consequential equipment damage is minimised.
- (b) The *fault clearance time* of a primary *protection system* for a *short circuit fault* of any *fault type* anywhere:



- (1) within a *substation*;
  - (2) within *connected plant*; or
  - (3) on at least the half of a power line nearer to the *protection system*,
- should not exceed the relevant time in column 2 of Table S5.1a.2 for the *nominal voltage* that applies at the fault location.
- (c) The *fault clearance time* of a primary *protection system* for a *short circuit fault* of any *fault type* anywhere on the remote portion of a power line for which the near portion is protected by a primary *protection system* under clause S5.1a8(b) should not exceed the relevant time in column 3 of Table S5.1a.2 for the *nominal voltage* that applies at the fault location.
  - (d) The *fault clearance time* of a *breaker fail protection system* or similar back-up *protection system* for a *short circuit fault* of any *fault type* should not exceed the relevant time in column 4 of Table S5.1a.2 for the *nominal voltage* that applies at the fault location.
  - (e) The owner of the faulted element may require shorter *fault clearance times* to minimise *plant* damage.
  - (f) The allowable *fault clearance times* specified in Table S5.1a.2 apply in accordance with the provisions of clause S5.1.9 to *facilities* constructed or modified on or after the *performance standards commencement date*.
  - (g) For *facilities* other than those referred to in clause S5.1a.8(f), the applicable allowable *fault clearance times* must be derived by the relevant *Network Service Provider* from the existing capability of each *facility* on the *performance standards commencement date*.

**Table S5.1a.2**

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

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

### **S5.1.1      Introduction**

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

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

- (a) those required to achieve adequate levels of *network power transfer capability* or quality of *supply* for the common good of all, or a significant number of, *Registered Participants*; and
- (b) those required to achieve a specific level of *network service* at an individual *connection point*.

A *Network Service Provider* must:

- (1) fully describe the quantity and quality of *network services* which it agrees to provide to a person under a *connection agreement* in terms that apply to the *connection point* as well as to the *transmission or distribution system* as a whole;
- (2) ensure that the quantity and quality of those *network services* are not less than could be provided to the relevant person if the *national grid* were planned, designed and operated in accordance with the criteria set out in this clause S5.1.1 and recognising that levels of service will vary depending on location of the *connection point* in the *network*; and
- (3) observe and apply the relevant provisions of the *system standards* in accordance with this schedule 5.1.

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

This schedule includes provisions for *Network Service Providers* and *Registered Participants* to negotiate the criteria to apply to a *connection* within defined ranges between a lower bound (*minimum access standard*) and an upper bound (*automatic access standard*). All criteria which are intended to apply to a *connection* must be recorded in a *connection agreement*. Where it is intended to apply a *negotiated access standard* in accordance with clause 5.3.4A of the *Rules*,

the *Network Service Provider* must first be satisfied that the application of the *negotiated access standard* will not adversely affect other *Registered Participants*.

## **S5.1.2 Network reliability**

### **S5.1.2.1 Credible contingency events**

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

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

- (a) The *credible contingency events* must include the *disconnection* of any single *generating unit* or *transmission line*, with or without the application of a single circuit two-phase-to-ground solid fault on lines operating at or above 220 kV, and a single circuit three-phase solid fault on lines operating below 220 kV. The *Network Service Provider* must assume that the fault will be cleared in primary protection time by the faster of the duplicate protections with installed intertrips available. For existing *transmission lines* operating below 220 kV but above 66 kV a two-phase to earth fault criterion may be used if the modes of operation are such as to minimise the probability of three-phase faults occurring and operational experience shows this to be adequate, and provided that the *Network Service Provider* upgrades performance when the opportunity arises.
- (b) For lines at any *voltage* above 66 kV which are not protected by an overhead earth wire and/or lines with tower footing resistances in excess of 10 ohms, the *Network Service Provider* may extend the criterion to include a single circuit three-phase solid fault to cover the increased risk of such a fault occurring. Such lines must be examined individually on their merits by the relevant *Network Service Provider*.
- (c) For lines at any *voltage* above 66 kV a *Network Service Provider* must adopt operational practices to minimise the risk of slow fault clearance in case of inadvertent closing on to earths applied to equipment for maintenance purposes. These practices must include but not be limited to:
  - (1) Not leaving lines equipped with intertrips alive from one end during maintenance; and

- (2) *Off-loading* a three terminal (tee connected) line prior to restoration, to ensure switch on to fault *facilities* are operative.
- (d) The *Network Service Provider* must ensure that all *protection systems* for lines at a *voltage* above 66 kV, including associated intertripping, are well maintained so as to be available at all times other than for short periods (not greater than eight hours) while the maintenance of a *protection system* is being carried out.

#### **S5.1.2.2 Network service within a region**

The following paragraphs of this section set out minimum standards for certain *network services* to be provided to *Registered Participants* by *Network Service Providers* within a *region*. The amount of *network* redundancy provided must be determined by the process set out in 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.

### **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*.

### **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*.

### **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.

### **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/NZS 61000.3.7:2001.
- (c) In respect of each new *connection* at a level of performance below the *automatic access standard* the *Network Service Provider* must include provisions in the relevant *connection agreement* requiring the *Network User* if necessary to meet the *system standards* or allow connection of other *Network Users* to either upgrade to the *automatic access standard* or fund the reasonable cost of the works necessary to mitigate their effect of connecting at a standard below the *automatic access standard*.
- (d) If for existing customer *connections* the level of *voltage* fluctuation is, or may be, exceeded as a result of a proposed new *connection*, the *Network Service Provider* must, if the cause of that excessive level cannot be remedied by enforcing the provisions of existing *connection agreements*, undertake all reasonable works necessary to meet the technical standards in this schedule or to permit the proposed new *connection* within the requirements stated in this clause.

For other than a new *connection* in accordance with the preceding paragraph, the responsibility of a *Network Service Provider* for excursions in *voltage* fluctuations above the levels defined above is limited to *voltage* fluctuations caused by

*network plant* and the pursuit of all reasonable measures available under the *Rules* and its *connection agreements*.

### **S5.1.6 Voltage harmonic or voltage notching distortion**

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

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

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

- (a) *Automatic access standard*: the *Network Service Provider* must allocate emission limits no more onerous than the lesser of the acceptance levels determined in accordance with either of the stage 1 or the stage 2 evaluation procedures defined in AS/NZS 61000.3.6:2001.
- (b) *Minimum access standard*: subject to clause S5.1.6(c), the determination by the *Network Service Provider* of acceptable emission limits must be undertaken in consultation with the party seeking *connection* using the Stage 3 evaluation procedure defined in AS/NZS61000.3.6:2001.
- (c) In respect of each new *connection* at a level of performance below the *automatic access standard* the *Network Service Provider* must include provisions in the relevant *connection agreement* requiring the *Network User* if necessary to meet the *system standards* or allow connection of other *Network Users* to either upgrade to the *automatic access standard* or fund the reasonable cost of the works necessary to mitigate their effect of connecting at a standard below the *automatic access standard*.
- (d) If for existing customer *connections* the level of harmonic *voltage* distortion is, or may be, exceeded as a result of a proposed new *connection*, the *Network Service Provider* must, if the cause of that excessive level cannot be remedied by enforcing the provisions of existing *connection agreements*, undertake all works necessary to meet the technical standards in this schedule or to permit a proposed new *connection* within the *automatic access standard* defined in clause S5.3.8 and the requirements stated in this clause.



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

### **S5.1.7 Voltage unbalance**

- (a) A *Transmission Network Service Provider* must balance the effective impedance of the phases of its *network*, and a *Distribution Network Service Provider* must balance the current drawn in each phase at each of its *connection points*, so as to achieve average levels of negative sequence *voltage* at all *connection 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(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.

### **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* or *distribution network* and to significantly reduce the probability of cascading failure.

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

## S5.1.9 Protection systems and fault clearance times

### Network Users

- (a) A *Network Service Provider* must determine the *automatic access standard* and *minimum access standard* that applies to the protection zone of each *protection system* in relation to the *connection point* and the *plant* to be *connected*, as follows:
  - (1) The *automatic access standard* for *fault clearance time* for any *fault type* is the lesser of the *system standard* set out in clause S5.1a.8 that applies to the highest *nominal voltage* within the *protection system's* protection zone and the corresponding *minimum access standard* determined under 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*.

## **S5.1.10 Load, generation and network control facilities**

### **S5.1.10.1 General**

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

- (a) sufficient *load* is under the control of underfrequency 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 undervoltage relays to minimize or reduce the risk of voltage collapse on the occurrence of multiple *contingency events*; and
- (c) there is sufficient *load* under manual 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* 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*.

#### **S5.1.10.1a Emergency frequency control schemes**

- (a) A *Network Service Provider* must:
  - (1) cooperate with *AEMO* in the conduct of *power system frequency risk reviews* and provide to *AEMO* all information and assistance reasonably requested by *AEMO* in connection with *power system frequency risk reviews*; and
  - (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 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 *power system frequency 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.

#### **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 undervoltage settings to relays as notified by the *Transmission Network Service Provider* in accordance with clause S5.1.10.3(b).

#### **S5.1.10.3 Transmission Network Service Providers**

*Transmission Network Service Providers must:*

- (a) conduct periodic functional tests of the *load shedding facilities* and *emergency frequency control schemes*; and



- (b) notify *Distribution Network Service Providers* regarding the settings of undervoltage *load shed* relays as determined by *AEMO* in consultation with the *Transmission Network Service Provider*.

#### **S5.1.11 Automatic reclosure of transmission or distribution lines**

Where *automatic reclose equipment* is provided on *transmission lines* or *distribution lines*, check or blocking *facilities* must be applied to the *automatic reclose equipment* in those circumstances where there is any possibility of the two ends of the *transmission line* or *distribution line* being *energised* from sources that are not in synchronism.

#### **S5.1.12 Rating of transmission lines and equipment**

For operational purposes each *Network Service Provider* must, on reasonable request, advise *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*.

### **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.

## **Schedule 5.2 Conditions for Connection of Generators**

### **S5.2.1 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 any *generating system* that is:
  - (1) subject to an exemption from registration under clause 2.2.1(c); or
  - (2) eligible for exemption under any guidelines issued under clause 2.2.1(c),
 and which is *connected* or intended for use in a manner the *Network Service Provider* considers is unlikely to cause a material degradation in the quality of *supply* to other *Network Users*.
- (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*.

### 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.

### **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 these *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.

#### **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.
- (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*.
- (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*.

## **S5.2.5 Technical requirements**

### **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*.

#### **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*.

## 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

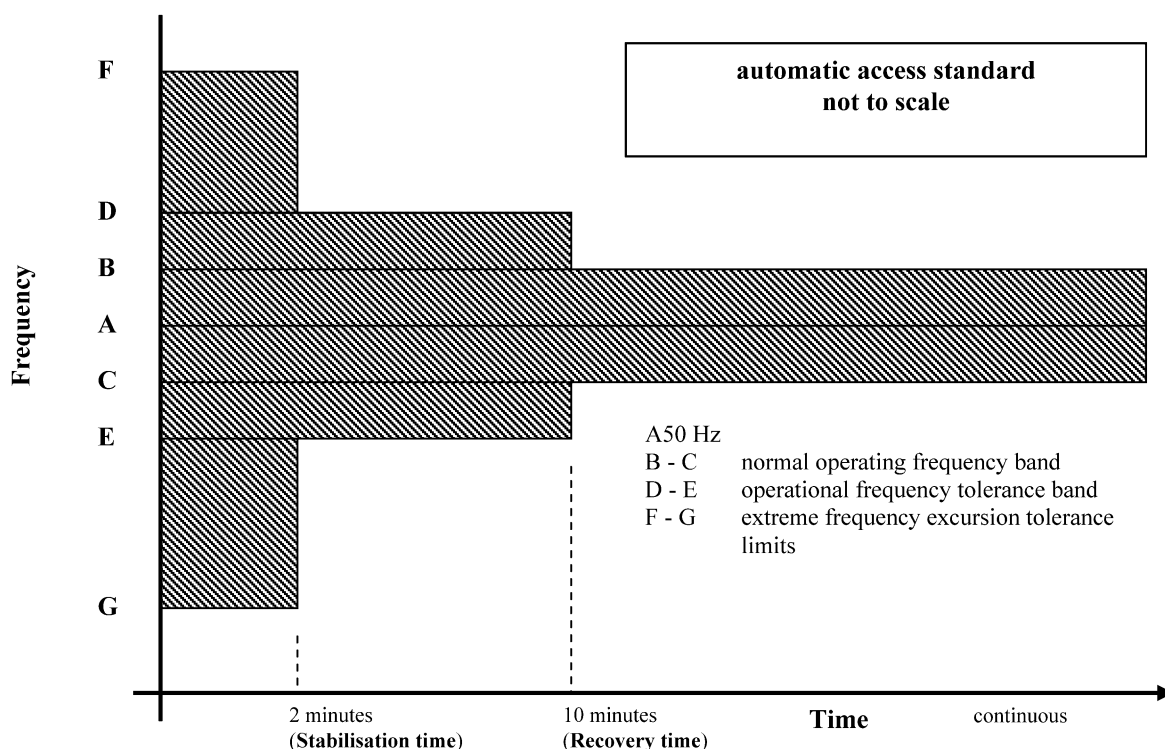
- (b) The *automatic access standard* is a *generating system* and each of its *generating units* must be capable of *continuous uninterrupted operation* for *frequencies* in the following ranges:
- (1) the lower bound of the extreme frequency excursion tolerance limits to the lower bound of the operational 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:

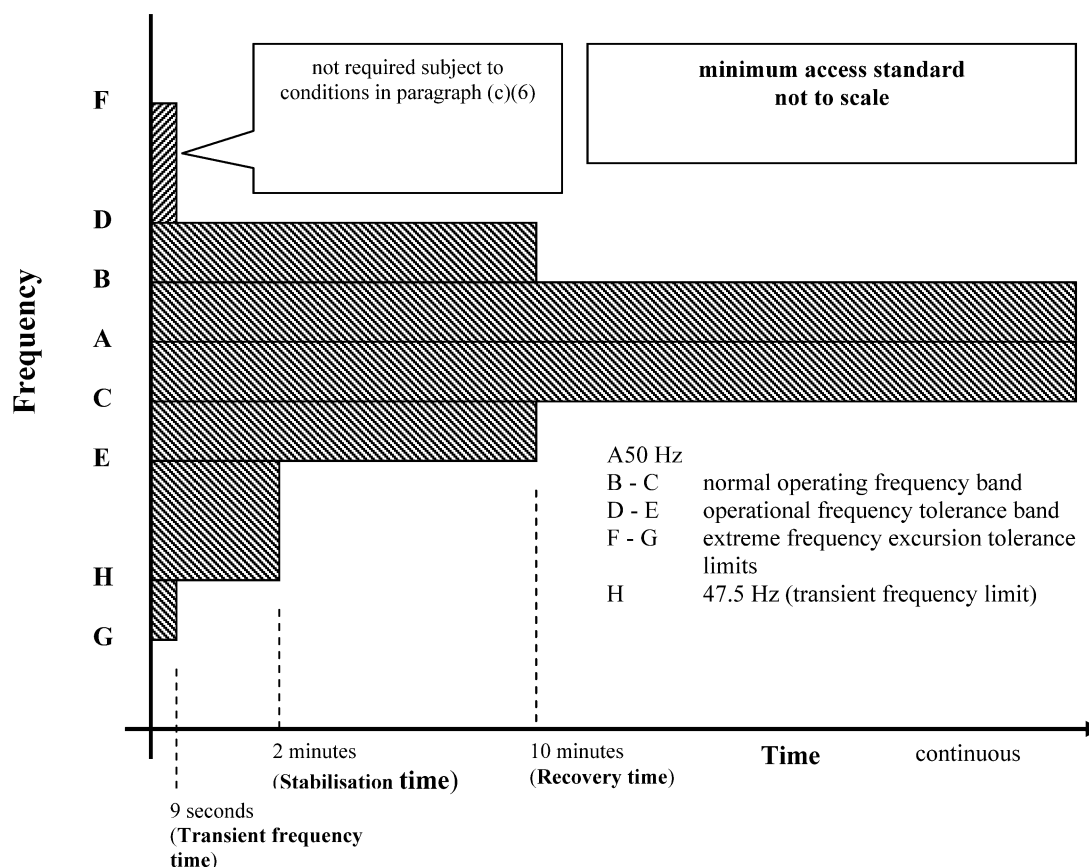
- (1) the lower bound of the extreme frequency excursion tolerance limits to the transient frequency limit for at least the transient frequency time;
- (2) the transient frequency limit to the lower bound of the operational frequency tolerance band for at least the stabilisation time;
- (3) the lower 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*.

## 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.

**S5.2.5.5 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 at least 2% 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 paragraph (o)(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 2% 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 paragraph (o)(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 (p); 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*.
- (o) For the purpose of paragraph (n):
- (1) the *generating system* must commence a response when the *voltage* is in an under-voltage range of 80% to 90% or an over-voltage range of 110% to 120% 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  $\Delta 10\%$ );
  - (2) where *AEMO* and the *Network Service Provider* require the *generating system* to sustain a response duration of 2 seconds or less, 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*; and
  - (3) where *AEMO* and the *Network Service Provider* require the generating system to sustain a response duration of greater than 2 seconds, the reactive current *rise time* and *settling time* must be as soon as practicable and must be *adequately damped*.
- (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*.

#### **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.

### **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*;
  - (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 all conditions (which may include temperature) considered relevant by *AEMO* and the *Network*

*Service Provider* under which the reactive current response is required.

### **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*.

## **S5.2.5.6 Quality of electricity generated and continuous uninterrupted operation**

### **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.

## **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*.

## 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*.

### 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*.

### **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*.

#### **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*.

**[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  $\pm 1.0$  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) a *generating system* is required to operate in *frequency response mode* only when it is enabled for the provision of a relevant *market ancillary service*; and
- (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*.

#### **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.

#### **S5.2.5.13 Voltage and reactive power control**

- (a) For the purpose of this clause S5.2.5.13:

**static excitation system** means in relation to a *synchronous generating unit*, an *excitation control system* that does not use rotating machinery to produce the field current.

#### **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 MVar); 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 MVar);
  - (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 MVar); 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 MVar); 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).

#### **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 *automatic generation control system*, 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 *automatic generation control system*, 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 *automatic generation control system*, 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 *automatic generation control system*, 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*.

### **S5.2.6 Monitoring and control requirements**

#### **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 *automatic generation control system* 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.

### 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.

### **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*.

### **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.

## Schedule 5.3 Conditions for Connection of Customers

### S5.3.1a Introduction to the schedule

- (a) This schedule applies to the following classes of *Network User*:
- (1) a *First-Tier Customer* in respect of its *first-tier load*;
  - (2) a *Second-Tier Customer* in respect of its *second-tier load*;
  - (3) a *Market Customer* in respect of its *market load*;
  - (4) a *Non-Registered Customer* in respect of *supply* it takes from a *network*; and



- (5) a *Distribution Network Service Provider* in respect of its *distribution network*.
- (b) For the purposes of this schedule 5.3 the term ***Network Service Provider*** must be interpreted to mean the *Network Service Provider* with whom the *Connection Applicant* has sought, or is seeking, a *connection* in accordance with clause 5.3.2 of the *Rules*.
- (c) All *Network Users* must comply with the requirements for the establishment of *performance standards* in accordance with provisions contained in schedule 5.1a for *system standards* or schedule 5.1 for *Network Service Providers* and this schedule 5.3 for *Customers*.
- (d) If the *Connection Applicant* is a *Registered Participant* in relation to the proposed *connection*, the *Network Service Provider* may include as terms and conditions of the *connection agreement* any provision of this schedule that is expressed as an obligation on a *Network User*. If the *Connection Applicant* is not a *Registered Participant* in relation to the proposed *connection*, the *Network Service Provider* must include as terms and conditions of the *connection agreement*:
  - (1) each provision of this schedule that is expressed as an obligation on a *Network User*; and
  - (2) each agreed *performance standard* and an obligation to comply with it.
- (e) The purpose of this schedule is to:
  - (1) describe the information that must be exchanged for the *connection enquiry* and *application to connect* processes described in rule 5.3 of the *Rules*;
  - (2) establish the *automatic access standards* and *minimum access standards* that will apply to the process of negotiating access standards under clause 5.3.4A of the *Rules*; and
  - (3) establish obligations to apply prudent design standards for the *plant* to be *connected*.

### **S5.3.1 Information**

- (a) Before a *Network User* connects any new or additional equipment to a *network*, the *Network User* must submit the following kinds of information to the *Network Service Provider*:
  - (1) a single line diagram with the protection details;
  - (2) *metering system* design details for any metering equipment being provided by the *Network User*;
  - (3) a general arrangement locating all the equipment on the site;

- (4) a general arrangement for each new or altered *substation* showing all exits and the position of all electrical equipment;
  - (5) type test certificates for all new switchgear and *transformers*, including measurement *transformers* to be used for *metering* purposes in accordance with Chapter 7 of the *Rules*;
  - (6) earthing details;
  - (7) the proposed methods of earthing cables and other equipment to comply with the regulations of the relevant *participating jurisdiction*;
  - (8) *plant* and earth grid test certificates from approved test authorities;
  - (9) a secondary injection and trip test certificate on all circuit breakers;
  - (10) certification that all new equipment has been inspected before being *connected* to the *supply*; and
  - (11) operational arrangements.
- (a1) Before a *Network User* connects any new or additional equipment to a *network*, the *Network User* must submit:
- (1) to *AEMO* and the relevant *Network Service Provider(s)*, information about the *protection systems* of the equipment;
  - (2) to *AEMO* and the relevant *Network Service Provider(s)*, information about the *control systems* of the equipment including:
    - (i) a set of functional block diagrams, including all functions between feedback signals and output;
    - (ii) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits;
    - (iii) the characteristics of non-linear elements;
    - (iv) encrypted models in a form suitable for the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*;
  - (3) 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*;
  - (4) to *AEMO*, model source code (in the circumstances required by the *Power System Model Guidelines*) associated with the model in subparagraph (2)(iv) 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 simulation products nominated by *AEMO* in the *Power System Model Guidelines*.

- (a2) The information provided under paragraph (a1) 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*.
- (a3) Notwithstanding paragraph (a1), *AEMO* may exempt a *Network User* or class of *Network Users* from the requirement to provide some or all of the information specified in paragraph (a1), and must do so in accordance with the circumstances set out in the *Power System Model Guidelines*.
- (a4) All information provided to *AEMO* and the relevant *Network Service Provider(s)* under paragraph (a1) or pursuant to paragraph (a3) must be treated as *confidential information* by those recipients.
- (b) For the purposes of clause 5.3.2(f) of the *Rules*, the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of the proposed *connection* includes:
  - (1) the highest expected single phase and three phase fault levels at the *connection point* without the proposed *connection*;
  - (2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;
  - (3) the expected limits of *voltage* fluctuation, harmonic *voltage* distortion and *voltage* unbalance at the *connection point* without the proposed *connection*;
  - (4) technical information relevant to the *connection point* without the proposed *connection* including equivalent source impedance information, sufficient to estimate fault levels, *voltage* fluctuations, harmonic *voltage* distortion and *voltage* unbalance; and
  - (5) any other information or data not being *confidential information* relating to the performance of the *Network Service Provider's facilities* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*;

except where the *Connection Applicant* agrees the *Network Service Provider* may provide alternative or less detailed technical information in satisfaction of this clause S5.3.1.(b).

### **S5.3.2 Design standards**

A *Network User* must ensure that:

- (a) the electrical *plant* in its *facility* complies with the relevant *Australian Standards* as applicable at the time of first installation of that electrical *plant* in the *facility*;
- (b) circuit breakers provided to isolate the *Network User's facilities* from the *Network Service Provider's facilities* are capable of breaking, without damage or restrike, fault currents nominated by the *Network Service Provider* in the relevant *connection agreement*; and
- (c) new equipment including circuit breakers provided to isolate the *Network User's facilities* from the *Network Service Provider's facilities* is capable of withstanding, without damage, power *frequency voltages* and impulse levels nominated by the *Network Service Provider* to apply at the *connection point* in accordance with the relevant provisions of the *system standards* and recorded in the relevant *connection agreement*.

### S5.3.3 Protection systems and settings

A *Network User* must ensure that all *connections* to the *network* are protected by protection devices which effectively and safely *disconnect* any faulty circuit automatically within a time period specified by the *Network Service Provider* in accordance with the following provisions:

- (a) The *automatic access standard* is:
  - (1) Primary *protection systems* must be provided to *disconnect* any faulted element from the *power system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l).
  - (2) Each primary *protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.
  - (3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).
- (b) The *minimum access standard* is:
  - (1) Primary *protection systems* must be provided to *disconnect* from the *power system* any faulted element within their respective protection zones within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l).
  - (2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault

within that protection zone that is not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

- (c) The *Network Service Provider* and the *Network User* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:
  - (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;
  - (2) tripping of one party's circuit breakers by a *protection system* of the other party; and
  - (3) co-ordination of *protection system* settings to ensure inter-operation.

Before the *Network User's* installation is *connected* to the *Network Service Provider's* transmission or distribution system the *Network User's* *protection system* must be tested and the *Network User* must submit the appropriate test certificate to the *Network Service Provider*.

The application of settings of the protection scheme must be undertaken in accordance with clause S5.3.4.

#### **S5.3.4 Settings of protection and control systems**

A *Network User* must only apply settings to a *control system* or a *protection system* that are necessary to comply with performance requirements of this schedule 5.3 if the settings have been approved in writing by the *Network Service Provider* and, if the requirement is one that would involve AEMO under clause 5.3.4A(c) of the *Rules*, also by AEMO. A *Network User* must not allow its *plant* to take *supply* of electricity from the *power system* without such prior approval.

If a *Network User* seeks approval from the *Network Service Provider* to apply or change a setting, approval must not be withheld unless the *Network Service Provider* or, if the requirement is one that would involve AEMO under clause 5.3.4A(c) of the *Rules*, AEMO, reasonably determines that the changed setting would cause the *plant* to not comply with the relevant *performance standard* or cause an *inter-regional* or *intra-regional* power transfer capability to be reduced.

If the *Network Service Provider* or, if the requirement is one that would involve AEMO under clause 5.3.4A(c) of the *Rules*, AEMO, reasonably determines that a setting of a *control system* or *protection system* of the *plant* needs to change to comply with the relevant *performance standard* or to maintain or restore an *inter-regional* or *intra-regional* power transfer capability, the *Network Service Provider* or AEMO (as applicable) must consult with the *Network User*, and the *Network Service Provider* may request in writing that a setting be applied in accordance with the determination.

The *Network Service Provider* may also request a test to verify the performance of the relevant *plant* with the new setting.

A *Network User* who receives such a request must arrange for the notified setting to be applied as requested and for a test to be conducted as requested. After the test, the *Network User* must, on request, provide both *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 *Network User* must not change a setting requested by the *Network Service Provider* without its prior written agreement. If the *Network Service Provider* requires a *Network User* to change a setting within 18 months of a previous request, the *Network Service Provider* must pay the *Network User* its reasonable costs of changing the setting and conducting the tests as requested.

### S5.3.5 Power factor requirements

*Automatic access standard:* For loads equal to or greater than 30 percent of the *maximum demand* at the *connection point* the *power factors* for *Network Users* and for *distribution networks connected to another transmission network or distribution network* are shown in Table S5.3.1:

**Table S5.3.1**

| Permissible Range        |                              |
|--------------------------|------------------------------|
| Supply Voltage (nominal) | Power Factor Range           |
| > 400 kV                 | 0.98 lagging to unity        |
| 250 kV - 400 kV          | 0.96 lagging to unity        |
| 50 kV - 250 kV           | 0.95 lagging to unity        |
| 1 kV < 50 kV             | 0.90 lagging to 0.90 leading |

For *load* less than 30 percent of the *maximum demand* at the *connection point* a *Network Service Provider* may accept a *power factor* outside the range stipulated in Table S5.3.1 provided this does not cause the *system standards* to be violated.

*Minimum access standard:* A *Network Service Provider* may permit a lower lagging or leading *power factor* where the *Network Service Provider* is advised by *AEMO* that this will not detrimentally affect *power system security* or reduce *intra-regional or inter-regional power transfer capability*.

General:

If the *power factor* falls outside the relevant *performance standard* over any critical loading period nominated by the *Network Service Provider*, the *Network User* must, where required by the *Network Service Provider* in order to maintain satisfactory *voltage levels* at the *connection point* or to restore *intra-regional or inter-regional power transfer capability*, take action to ensure that the *power*

*factor* falls within range as soon as reasonably practicable. This may be achieved by installing additional *reactive plant* or reaching a commercial agreement with the *Network Service Provider* to install, operate and maintain equivalent *reactive plant* as part of the *connection assets* or by alternative commercial arrangements with another party.

A *Registered Participant* who installs *shunt capacitors* to comply with *power factor* requirements must comply with the *Network Service Provider's* reasonable requirements to ensure that the design does not severely attenuate audio *frequency* signals used for *load* control or operations, or adversely impact on harmonic *voltage* levels at the *connection point*.

### **S5.3.6 Balancing of load currents**

A *Network Service Provider* may require a *connected Registered Participant's* *load* to be balanced across all phases in order to maintain the negative sequence *voltage* at each *connection point* at less than or equal to the limits set out in Table S5.1a.1 of the *system standards* for the applicable nominal *supply voltage* level.

*Automatic access standard:* A *Network User* must ensure that:

- (a) for *connections* at 30 kV or higher *voltage*, the current in any phase is not greater than 102 percent or less than 98 percent of the average of the currents in the three phases; and
- (b) for *connections* at *voltages* less than 30 kV, that the current in any phase is not greater than 105 percent or less than 95 percent of the average of the currents in the three phases.

*Minimum access standard:* Where agreed with the relevant *Network Service Provider* and subject to any specific conditions imposed, a *Network User* may cause current unbalance greater than that specified in the *automatic access standard* provided the *Network User* does not cause the limits specified in clause S5.1a.7 to be exceeded at any point in the *network*.

General:

The limit to *load* current unbalance must be included in the *connection agreement* and is subject to verification of compliance by the *Network Service Provider*.

Where these requirements cannot be met the *Registered Participant* may enter into a commercial arrangement with the *Network Service Provider* for the installation of equipment to correct the phase unbalance. Such equipment must be considered as part of the *connection assets* for the *Registered Participant*.

The limit to *load* current unbalance must be included in the *connection agreement* and is subject to verification of compliance by the *Network Service Provider*.

### **S5.3.7 Voltage fluctuations**

- (a) *Automatic access standard:* The *voltage* fluctuations caused by variations in *loading level* at the *connection point*, including those arising from *energisation*, de-energisation or other operation of *plant*, must not exceed the limits determined under clause S5.1.5(a).
- (b) *Minimum access standard:* The *voltage* fluctuations caused by variations in *loading level* at the *connection point*, including those arising from *energisation*, de-energisation or other operation of *plant*, must not exceed the limits determined under clause S5.1.5(b).

The *voltage* fluctuation emission limits and any specified conditions must be included in the *connection agreement*, and are subject to verification of compliance by the *Network Service Provider*.

### **S5.3.8 Harmonics and voltage notching**

- (a) *Automatic access standard:* The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(a).
- (b) *Minimum access standard:* The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(b).

The harmonic *voltage* distortion emission limits and any special conditions must be included in the *connection agreement*, and is subject to verification of compliance by the *Network Service Provider*.

### **S5.3.9 Design requirements for Network Users' substations**

A *Network User* must comply with the following requirements applicable to the design, station layout and choice of equipment for a *substation*:

- (a) safety provisions must comply with requirements applicable to the *participating jurisdiction* notified by the *Network Service Provider*;
- (b) where required by the *Network Service Provider*, appropriate interfaces and accommodation must be incorporated for communication *facilities*, remote monitoring and control and protection of *plant* which is to be installed in the *substation*;
- (c) a *substation* must be capable of continuous uninterrupted operation with the levels of *voltage*, harmonics, unbalance and *voltage* fluctuation specified in the *system standards* as modified in accordance with the relevant provisions of schedule 5.1;



- (d) earthing of primary *plant* in the *substation* must be in accordance with the Electricity Supply Association of Australia Safe Earthing Guide and must reduce step and touch potentials to safe levels;
- (e) *synchronisation facilities* or reclose blocking must be provided if a *generating unit* is *connected* through the *substation*;
- (f) secure electricity supplies of adequate capacity must be provided for *plant* performing communication, monitoring, control and protection functions;
- (g) *plant* must be tested to ensure that the *substation* complies with the approved design and specifications as included in a *connection agreement*;
- (h) the protection equipment required would normally include protection schemes for individual items of *plant*, back-up arrangements, auxiliary DC supplies and instrumentation *transformers*; and
- (i) insulation levels of *plant* in the *substation* must co-ordinate with the insulation levels of the *network* to which the *substation* is *connected* as nominated in the *connection agreement*.

### **S5.3.10 Load shedding facilities**

*Network Users* who are *Market Customers* and who have expected peak demands in excess of 10MW must provide automatic *interruptible load* in accordance with clause 4.3.5 of the *Rules*.

*Load shedding procedures* may be applied by AEMO, or *EFCS settings schedules* may be determined, in accordance with the provisions of clause 4.3.2 of the *Rules* for the shedding of all *loads* including *sensitive loads*.

## **Schedule 5.3a Conditions for connection of Market Network Services**

### **S5.3a.1a Introduction to the schedule**

This schedule sets out obligations of *Market Network Service Providers* who *connect* to either a *transmission network* or a *distribution network*. It represents the requirements to be met for access to a *network*. Particular provisions may be varied by the *Network Service Provider* under the provisions of the *Rules* for the application of *minimum access standards* and *automatic access standards*.

This schedule includes specific provisions for the determination of *automatic access standards* and *negotiated access standards* which, once determined, must be recorded together with the *automatic access standards* in a *connection agreement* and registered with AEMO as *performance standards*.

In this schedule, the term ***Network Service Provider*** applies only to the *Network Service Provider* with whom the *Market Network Service Provider* has lodged, or is considering lodging, an *application to connect*.

- (a) The schedule includes, in respect of each *market network service*, provisions regarding the capability to:
  - (1) automatically control the transfer of real power at the *connection point* for any given set of system conditions within the limits permitted under the *Rules*;
  - (2) respond to control requirements under expected normal and abnormal conditions;
  - (3) comply with general requirements to meet quality of *supply* obligations in accordance with clauses S5.3a.9, S5.3a.10 and S5.3a.11 and to maintain security of *supply* to other *Registered Participants*; and
  - (4) automatically *disconnect* itself when necessary to prevent any damage to the *market network service facilities* or threat to *power system security*.
- (b) This schedule also sets out the requirements and conditions, which (subject to clause 5.2.3 of the *Rules*) are obligations of *Market Network Service Providers* to:
  - (1) co--operate with the relevant *Network Service Provider* on technical matters when making a new *connection*;
  - (2) provide information to the *Network Service Provider* or *AEMO*; and
  - (3) observe and apply the relevant provisions of the *system standards* contained in schedule 5.1a in relation to the planning, design and operation of its *market network service facilities*.
- (c) This schedule does not set out arrangements by which a *Market Network Service Provider* may enter into an agreement or contract with *AEMO* to:
  - (1) provide additional services that are necessary to maintain *power system security*; or
  - (2) provide additional service to facilitate management of the *market*.

### **S5.3a.1 Provision of Information**

- (a) Before a *Market Network Service Provider* connects any new or additional equipment to a *network*, the *Market Network Service Provider* must submit the following kinds of information to the *Network Service Provider*:
  - (1) a single line diagram with the protection details;
  - (2) *metering system* design details for any metering equipment being provided by the *Market Network Service Provider*;
  - (3) a general arrangement locating all relevant equipment on the site;

- (4) a general arrangement for each new or altered *substation* showing all exits and the position of all electrical equipment;
  - (5) type test certificates for all new switchgear and *transformers*, including measurement *transformers* to be used for *metering* purposes in accordance with Chapter 7 of the *Rules*;
  - (6) earthing details;
  - (7) the proposed methods of earthing cables and other equipment to comply with the regulations of the relevant *participating jurisdiction*;
  - (8) *plant* and earth grid test certificates from approved test authorities;
  - (9) a secondary injection and trip test certificate on all circuit breakers;
  - (10) certification that all new equipment has been inspected before being *connected* to the *supply*; and
  - (11) operational arrangements.
- (a1) Before a *Market Network Service Provider* connects any new or additional equipment to a *network*, the *Market Network Service Provider* must submit:
- (1) to *AEMO* and the relevant *Network Service Provider(s)*, information about the *protection systems* of the equipment;
  - (2) to *AEMO* and the relevant *Network Service Provider(s)*, information about the *control systems* of the equipment including:
    - (i) a set of functional block diagrams, including all functions between feedback signals and output;
    - (ii) the parameters of each functional block, including all settings, gains, time constraints, delays, deadbands and limits;
    - (iii) the characteristics of non-linear elements;
    - (iv) encrypted models in a form suitable for the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*;
  - (3) 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*;
  - (4) to *AEMO*, model source code (in the circumstances required by the *Power System Model Guidelines*) associated with the model in subparagraph (2)(iv) 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 simulation products nominated by *AEMO* in the *Power System Model Guidelines*.

- (a2) The information provided under paragraph (a1) 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*.
- (a3) All information provided to *AEMO* and the relevant *Network Service Provider(s)* under paragraph (a1) must be treated as *confidential information* by those recipients.
- (b) For the purposes of clause 5.3.2(f) of the *Rules*, the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of the proposed *connection* of a *market network service facility* includes:
  - (1) the highest expected single phase and three phase fault levels at the *connection point* without the proposed *connection*;
  - (2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;
  - (3) the expected limits of *voltage* fluctuation, harmonic *voltage* distortion and *voltage* unbalance at the *connection point* without the proposed *connection*;
  - (4) technical information relevant to the *connection point* without the proposed *connection* including equivalent source impedance information, sufficient to estimate fault levels, *voltage* fluctuations, harmonic *voltage* distortion and *voltage* unbalance; and
  - (5) any other information or data not being *confidential information* relating to the performance of the *Network Service Provider's facilities* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*;

except where the *Connection Applicant* agrees the *Network Service Provider* may provide alternative or less detailed technical information in satisfaction of this clause S5.3a.1(b).

### **S5.3a.2 Application of settings**

A *Market Network Service Provider* must only apply settings to a *control system* or a *protection system* that are necessary to comply with performance requirements of this schedule 5.3a if the settings have been approved in writing by the *Network Service Provider* and, if the requirement is one that would involve *AEMO* under clause 5.3.4A(c) of the *Rules*, also by *AEMO*. A *Market Network Service Provider* must not allow its *market network service facilities* to take electricity from the *power system* without such prior approval.

If a *Market Network Service Provider* seeks approval from the *Network Service Provider* to apply or change a setting, approval must not be withheld unless the *Network Service Provider* or, if the requirement is one that would involve AEMO under clause 5.3.4A(c) of the *Rules*, AEMO, reasonably determines that the changed setting would cause the *market network service facilities* to not comply with the relevant *performance standard* or cause an *inter-regional* or *intra-regional power transfer capability* to be reduced.

If the *Network Service Provider* or, if the requirement is one that would involve AEMO under clause 5.3.4A(c) of the *Rules*, AEMO, reasonably determines that a setting of a *market network service facility's control system* or *protection system* needs to change to comply with the relevant *performance standard* or to maintain or restore an *inter-regional* or *intra-regional power transfer capability*, the *Network Service Provider* or AEMO (as applicable) must consult with the *Market Network Service Provider*, and may request in writing that a setting be applied in accordance with the determination.

The *Network Service Provider* may also request a test to verify the performance of the relevant *plant* with the new setting. The *Network Service Provider* must provide AEMO with a copy of its request to a *Market Network Service Provider* to apply a setting or to conduct a test.

A *Market Network Service Provider* who receives such a request must arrange for the notified setting to be applied as requested and for a test to be conducted as requested. After the test, the *Market Network Service Provider* must, on request, provide both 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 *Market Network Service Provider* must not change a setting requested by the *Network Service Provider* without its prior written agreement. If the *Network Service Provider* requires a *Market Network Service Provider* to change a setting within 18 months of a previous request, the *Network Service Provider* must pay the *Market Network Service Provider* its reasonable costs of changing the setting and conducting the tests as requested.

### **S5.3a.3 Technical matters to be co-ordinated**

A *Market Network Service Provider* and the relevant *Network Service Provider* must use all reasonable endeavours to agree upon the following matters in respect of each new or altered *connection* of a *market network service facility* to a *network*:

- (a) design at the *connection point*;
- (b) physical layout adjacent to the *connection point*;
- (c) primary protection and backup protection (clause S5.3a.6);
- (d) control characteristics (clause S5.3a.4);

- (e) communications and alarms (clause S5.3a.4);
- (f) insulation co-ordination and lightning protection;
- (g) fault levels and *fault clearance times*;
- (h) switching and *isolation facilities*;
- (i) interlocking arrangements; and
- (j) *metering installations* as described in Chapter 7 of the *Rules*.

## **S5.3a.4 Monitoring and control requirements**

### **S5.3a.4.1 Remote Monitoring**

- (a) *Automatic access standard*:
  - (1) Each *market network service facility* must have *remote monitoring equipment* to transmit to *AEMO's control centres* in real time, the quantities that *AEMO* reasonably requires to discharge its *market* and *power system security* functions as set out in Chapters 3 and 4 of the *Rules* respectively.
  - (2) The quantities may include such data as current, *voltage*, *active power*, *reactive power*, operational limits and critical temperatures in respect of *connection points* and power conversion systems.
- (b) *Minimum access standard*:
  - (1) Each *market network service facility* must have *remote monitoring equipment* to transmit to *AEMO's control centres* in real time:
    - (A) *connection point active power* flow, *reactive power* flow and *voltage*;
    - (B) *active power*, *reactive power* and *voltage* for AC power lines, *transformers* and *busbars*, and power and *voltage* (or alternatively current) for DC power lines; and
    - (C) the status of circuit breakers.
- (c) **[Deleted]**

### **S5.3a.4.2 [Deleted]**

### **S5.3a.4.3 Communications equipment**

*A Market Network Service Provider* must provide electricity *supplies* for *remote monitoring equipment* and *remote control equipment* installed in relation to its *market network service facilities* capable of keeping such equipment available for

at least three hours following total loss of *supply* at the *connection point* for the relevant *market network service facility*.

A *Market Network Service Provider* must provide communications paths (with appropriate redundancy) from the *remote monitoring equipment* or *remote control equipment* installed at any of its *market network service facilities* to a interface for communication purposes in a location reasonably acceptable to the *Network Service Provider* at the relevant *connection point*. Communications systems between this interface for communication purposes and the *control centre* are the responsibility of the *Network Service Provider* unless otherwise agreed by the *Market Network Service Provider* and the *Network Service Provider*.

Telecommunications between *Network Service Providers* and *Market Network Service Providers* for *operational communications* must be established in accordance with the requirements set down below.

(a) **Primary Speech Facility**

The relevant *Network Service Provider* must provide and maintain equipment by means of which routine and emergency control telephone calls may be established between the *Market Network Service Provider's* responsible Engineer/Operator and AEMO.

The *facilities* to be provided, including the interface requirement between the *Network Service Provider's* equipment and the *Market Network Service Provider's* equipment, must be specified by the *Network Service Provider*.

The costs of the equipment must be recovered by the *Network Service Provider* only through the charge for *connection*.

(b) **Back-up Speech Facility**

Where the *Network Service Provider* or AEMO reasonably determines that a back-up speech *facility* to the primary *facility* is required, the *Network Service Provider* must provide and maintain a separate telephone link or radio installation on a cost-recovery basis only through the charge for *connection*.

The *Network Service Provider* is responsible for radio system planning and for obtaining all necessary radio licences.

### S5.3a.5 Design standards

A *Market Network Service Provider* must ensure that:

- (a) the electrical *plant* in its *facility* complies with the relevant *Australian Standards* as applicable at the time of first installation of that electrical *plant* in the *facility*;
- (b) circuit breakers provided to isolate the *Market Network Service Provider's facilities* from the *Network Service Provider's facilities* are capable of

breaking, without damage or restrike, fault currents nominated by the *Network Service Provider* in the relevant *connection agreement*; and

- (c) all new equipment including circuit breakers provided to isolate the *Market Network Service Provider's facilities* from the *Network Service Provider's facilities* is capable of withstanding, without damage, power frequency voltages and impulse levels nominated by the *Network Service Provider* in accordance with the relevant provisions of the *system standards* and recorded in the relevant *connection agreement*.

### S5.3a.6 Protection systems and settings

A *Market Network Service Provider* must ensure that all *connections* to the *network* are protected by protection devices which effectively and safely *disconnect* any faulty circuit automatically within a time period specified by the *Network Service Provider* in accordance with the following provisions:

- (a) The *automatic access standard* is:
  - (1) Primary *protection systems* must be provided to *disconnect* any faulted element from the *power system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l).
  - (2) Each primary *protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.
  - (3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).
- (b) The *minimum access standard* is:
  - (1) Primary *protection systems* must be provided to *disconnect* from the *power system* any faulted element within their respective protection zones within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l).
  - (2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the primary *protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).



- (c) The *Network Service Provider* and the *Market Network Service Provider* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:
- (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;
  - (2) tripping of one party's circuit breakers by a *protection system* of the other party; and
  - (3) co-ordination of *protection system* settings to ensure inter-operation.

The *Market Network Service Provider* must ensure that the protection settings of its protective equipment grade with the *Network Service Provider's* *transmission system* or *distribution system* protection settings. Similarly the grading requirements of fuses must be co-ordinated with the *Network Service Provider*. The *Market Network Service Provider* must provide details of the protection scheme implemented by the *Market Network Service Provider* to the *Network Service Provider* and must liaise with the *Network Service Provider* when determining gradings and settings.

The application of settings of the protection scheme must be undertaken in accordance with clause S5.3a.2.

Before the *Market Network Service Provider's* installation is *connected* to the *Network Service Provider's* *transmission* or *distribution system* the *Market Network Service Provider's* *protection system* must be tested and the *Market Network Service Provider* must submit the appropriate test certificate to the *Network Service Provider*.

#### **S5.3a.7 [Deleted]**

#### **S5.3a.8 Reactive power capability**

Subject to the access standards stated in this clause S5.3a.8, if additional *reactive support* is required as a result of the *connection* or operation of the *network elements* which provide a *market network service* then the requisite *reactive support* must be supplied or paid for by the *Market Network Service Provider*.

Additional reactive support is required if, at rated power output as measured at the *connection point* of the *market network service* the *market network service* has a lagging power factor of less than 0.9 or a leading power factor of less than 0.95.

*Automatic access standard:* For power export, at rated power output and target *network voltage* as determined in accordance with clause S5.1a.4 of the *system standards* when measured at the *connection point* of the *market network service*, the *market network service* must be capable of operation in the range from a lagging power factor of 0.9 to a leading power factor of 0.95. For power import, the power factor must satisfy the requirements of clause S5.3.5 of schedule 5.3.

*Minimum access standard:* With the agreement of AEMO and the *Network Service Provider*, a power factor capability less than that defined by the *automatic access standard* may be provided if the requirements of the *system standards* are satisfied under all operating conditions of the *market network service*.

### **S5.3a.9 Balancing of load currents**

A *Network Service Provider* may require a *Market Network Service Provider's* power transfer to be balanced at a *connection point* in order to maintain the negative sequence voltage at each connection point at less than or equal to the limits set out in Table S5.1a.1 of the *system standards* for the applicable nominal supply voltage level.

*Automatic access standard:* A *Market Network Service Provider* must ensure that for connections at 11kV or higher voltage, the current in any phase drawn by its equipment from the *Network Service Provider's* network is not greater than 102 percent or less than 98 percent of the average of the currents in the three phases.

*Minimum access standard:* Where agreed with the relevant *Network Service Provider* and subject to any specific conditions imposed, a *Market Network Service Provider* may cause current unbalance greater than that specified in the *automatic access standard* provided the *Market Network Service Provider* does not cause the limits specified in clause S5.1a.7 of the *system standards* to be exceeded at any point in the *network*.

Where these requirements cannot be met the *Market Network Service Provider* may enter into a commercial arrangement with the *Network Service Provider* for the installation of equipment to correct the phase unbalance. Such equipment must be considered as part of the *connection assets* for the *Market Network Service Provider*.

The limit to power transfer current unbalance must be included in the *connection agreement* and is subject to verification of compliance by the *Network Service Provider*.

### **S5.3a.10 Voltage fluctuations**

- (a) *Automatic access standard:* The voltage fluctuations caused by variations in loading level at the *connection point*, including those arising from energisation, de-energisation or other operation of plant, must not exceed the limits determined under clause S5.1.5(a).
- (b) *Minimum access standard:* The voltage fluctuations caused by variations in loading level at the *connection point*, including those arising from energisation, de-energisation or other operation of plant, must not exceed the limits determined under clause S5.1.5(b).

The voltage fluctuation emission limits and any specified conditions must be included in the *connection agreement*, and are subject to verification of compliance by the *Network Service Provider*.

### **S5.3a.11 Harmonics and voltage notching**

- (a) *Automatic access standard:* The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(a).
- (b) *Minimum access standard:* The harmonic *voltage* distortion caused by non-linearity, commutation of power electronic equipment, harmonic resonance and other effects within the *plant*, must not exceed the limits determined under clause S5.1.6(b).

A *Market Network Service Provider* must ensure that all of its *plant connected* to a *transmission network* or *distribution network* is capable of withstanding the effects of harmonic levels produced by that *plant* plus those imposed from the *network*.

The harmonic *voltage* distortion emission limits and any special conditions must be included in the *connection agreement*, and are subject to verification of compliance by the *Network Service Provider*.

### **S5.3a.12 Design requirements for Market Network Service Providers' substations**

A *Market Network Service Provider* must comply with the following requirements applicable to the design, station layout and choice of equipment for a *substation*:

- (a) safety provisions must comply with requirements applicable to the *participating jurisdiction* notified by the *Network Service Provider*;
- (b) where required by the *Network Service Provider*, appropriate interfaces and accommodation must be incorporated for communication *facilities*, remote monitoring and control and protection of *plant* which is to be installed in the *substation*;
- (c) a *substation* must be capable of continuous uninterrupted operation with the levels of *voltage*, harmonics, unbalance and *voltage* fluctuation specified in the *system standards* as modified in accordance with the relevant provisions of schedule 5.1;
- (d) earthing of primary *plant* in the *substation* must be in accordance with the Electricity Supply Association of Australia Safe Earthing Guide and must reduce step and touch potentials to safe levels;
- (e) *synchronisation facilities* or reclose blocking must be provided if necessary;
- (f) secure electricity supplies of adequate capacity must be provided for *plant* performing communication, monitoring, control and protection functions;
- (g) *plant* must be tested to ensure that the *substation* complies with the approved design and specifications as included in a *connection agreement*;

- (h) the protection equipment required would normally include protection schemes for individual items of *plant*, back-up arrangements, auxiliary DC supplies and instrumentation *transformers*; and
- (i) insulation levels of *plant* in the *substation* must co-ordinate with the insulation levels of the *network* to which the *substation* is *connected* as nominated in the *connection agreement*.

#### **S5.3a.13 Market network service response to disturbances in the power system**

- (a) Each *market network service* must be capable of continuous uninterrupted operation during the occurrence of:
  - (1) *power system frequency* within the *frequency operating standards*; or
  - (2) the range of *voltage* variation conditions permitted by the *system standards*.
- (b) The equipment associated with each *market network service* must be designed to withstand without damage or reduction in life expectancy the harmonic distortion and *voltage* unbalance conditions determined to apply in accordance with the provisions of schedule 5.1, clauses S5.1.6 and S5.1.7, respectively, at the *connection point*.

#### **S5.3a.14 Protection of market network services from power system disturbances**

- (a) *Minimum access standard*: If a *Connection Applicant* requires that its *market network service facility* be automatically *disconnected* from the *power system* in response to abnormal conditions arising from the *power system*, the relevant *protection system* or *control system* must not *disconnect* the *facility* for conditions under which it must continuously operate or must withstand under a provision of the *Rules*.
- (b) There is no *automatic access standard* for this technical requirement.
- (c) For the purposes of this clause S5.3a.14, the abnormal conditions include:
  - (1) *frequency* outside the *extreme frequency excursion tolerance limits*;
  - (2) sustained and uncontrollable DC current beyond a short term *current rating* for the period assigned to that rating;
  - (3) DC *voltage* above the *voltage* maximum rating or sustained below any lower limit for stable operation;
  - (4) *voltage* to *frequency* ratio beyond a *transformer* magnetic flux based *voltage* to *frequency* rating;
  - (5) sustained *voltage* fluctuations at the *connection point* beyond the level determined under clause S5.1.5(a);

- (6) sustained harmonic *voltage* distortion at the *connection point* beyond the level determined under clause S5.1.6(a);
  - (7) sustained negative phase sequence *voltage* at the *connection point* beyond the level determined under clause S5.1.7(a); and
  - (8) any similar condition agreed between the *Market Network Service Provider* and *AEMO* after consultation with each relevant *Network Service Provider*.
- (d) **[Deleted]**
- (e) The *Network Service Provider* is not liable for any loss or damage incurred by the *Market Network Service Provider* or any other person as a consequence of a fault on either the *power system*, or within the *Market Network Service Provider's facility*.

## **Schedule 5.4 Information to be Provided with Preliminary Enquiry**

The following items of information are required to be submitted with a preliminary enquiry for *connection* or modification of an existing *connection*:

- (a) Type of *plant* – (eg. gas turbine *generating unit*; rolling mill, etc.).
- (b) Preferred site location – (listing any alternatives in order of preference as well).
- (c) Maximum power *generation* or demand of whole *plant* – (maximum MW and/or MVA, or average over 15 minutes or similar).
- (d) Expected *energy* production or consumption (MWh per month).
- (e) *Plant* type and configuration – (eg. number and type of *generating units* or number of separate production lines).
- (f) Nature of any disturbing *load* (size of disturbing component MW/MVAr, duty cycle, nature of power electronic *plant* which may produce harmonic distortion).
- (g) Technology of proposed *generating unit* (e.g. *synchronous generating unit*, induction generator, photovoltaic array, etc).
- (h) When *plant* is to be in service – (eg. estimated date for each *generating unit*).
- (i) Name and address of enquirer, and, if relevant, of the party for whom the enquirer is acting.
- (j) Other information may be requested by the *Network Service Provider*, such as amount and timing of power required during construction or any auxiliary power requirements.

## Schedule 5.4A Preliminary Response

### Note

The local definitions in clause 5.10.2 apply to this schedule.

For the purposes of clause 5.3A.7(a), the following information must be included in the preliminary response:

- (a) relevant technical information about the *Distribution Network Service Provider's distribution network*, including guidance on how the *Connection Applicant* may meet the following requirements if it were to proceed to prepare an *application to connect*:
  - (1) primary protection and backup protection;
  - (2) other protection and control requirements applicable to *embedded generating units* and associated *plant*;
  - (3) *remote monitoring equipment* and control communications *facilities*;
  - (4) insulation co-ordination and lightning protection;
  - (5) existing maximum and minimum fault levels and *fault clearance times* of relevant local zone substations;
  - (6) switching and *isolation* facilities;
  - (7) interlocking and *synchronising* arrangements;
  - (8) *metering installations*; and
  - (9) remedy or avoid an *adverse system strength impact* caused by the *connection*;
- (b) if not otherwise provided in accordance with paragraph (a), to the extent the *Distribution Network Service Provider* holds technical information necessary to prepare an *application to connect*, that information;
- (c) information relevant to each technical requirement of the proposed *plant* as relevant to:
  - (1) the *automatic access standards*;
  - (2) any relevant *minimum access standards*;
  - (3) any applicable *plant standards*; and
  - (4) the *normal voltage* level, if it is expected to change from the *nominal voltage* level;
- (d) the identity of other parties that the *Distribution Network Service Provider* considers;

- (1) will need to be involved in planning to make the *connection* or must be involved under clause 5.3A.10(c); and
  - (2) must be paid for *transmission services* or *distribution services*;
- (e) whether it will be necessary for any of the parties identified in subparagraph (d) to enter into an agreement with the *Connection Applicant* in respect of the provision of *connection services* or other *transmission services* or *distribution services* or both, to the *Connection Applicant*;
- (f) where relevant the *Distribution Network Service Provider* is to identify whether any service required to establish a *connection* is *contestable* in the relevant *participating jurisdiction*;
- (g) worked examples of *connection service* charges relevant to the enquiry and an explanation of the factors on which the charges depend;
- (h) information regarding the *Distribution Network Service Provider* and its *network*, system limitations for sub-transmission lines and zone substations and other information relevant to constraints on the *network* as such information is relevant to the *application to connect*;
- (i) an indication of whether *network augmentation* may be required and if required, what work the *network augmentation* may involve;
- (il) an indication of whether the new *connection* is expected in the reasonable opinion of a *Network Service Provider* to have an *adverse system strength impact*;
- (j) a hyperlink to the *Distribution Network Service Provider's* information pack;
- (k) the contact details for the relevant point of contact within the *Distribution Network Service Provider* managing the *connection* enquiry;
- (l) the *Distribution Network Service Provider's* response to the objectives of the *connection* sought as included by the *Connection Applicant* in its enquiry under clause 5.3A.5(c)(1);
- (m) a description of the process for the provision of the detailed response, including the further information to be provided by the *Connection Applicant* and analysis to be undertaken by the *Distribution Network Service Provider* as part of the preparation of the detailed response;
- (n) an overview of any available options for *connection* to the *Distribution Network Service Provider's network*, as relevant to an enquiry lodged, at more than one *connection point* in a *network*, including:
  - (1) example single line diagram and relevant *protection systems* and *control systems* used by existing *connection* arrangements;
  - (2) a description of the characteristics of supply; and

- (3) an indication of the likely impact on terms and conditions of *connection*,  
  
as relevant to each optional differing *connection point*;
- (o) a statement of further information required from the *Connection Applicant* for the preparation of the detailed response, 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 paragraphs (a) to (c); and
  - (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) the *Connection Applicant's* proposal for any *system strength remediation scheme*;
- (p) an estimate of the enquiry fee payable by the *Connection Applicant* for the detailed response, including details of how components of the fee were calculated;
- (q) the component of the estimate of the enquiry fee payable by the *Connection Applicant* to request the detailed response;
- (r) an estimate of the application fee which is payable on submitting an *application to connect*; and
- (s) any additional information relevant to the enquiry.

## **Schedule 5.4B Detailed Response to Enquiry**

For the purposes of clause 5.3A.8(g), the following information must be included in the detailed response:

- (a) the contact details for the relevant point of contact within the *Distribution Network Service Provider* who will manage the *application to connect*;
- (b) written details of each technical requirement relevant to the proposed *plant* as relevant to the:
  - (1) *automatic access standards*;
  - (2) *minimum access standards*;
  - (3) any applicable *plant standards*; and
  - (4) *normal voltage* level, if that is to change from the *nominal voltage* level;



- (c) details of the *connection* requirements based on the *Connection Applicant's* specifications of the *facility* to be *connected*;
- (d) details of the level and standard of service of *power transfer capability* that the *Distribution Network Service Provider*, with reasonable endeavours, considers the *network* provides at the location of the *connection point* or *connection points*, if options have been made available under clause S5.4A(n);
- (e) *negotiated access standards* that will require *AEMO's* involvement in accordance with clause 5.3.4A(c);
- (e1) written details of:
  - (1) the minimum *three phase fault level* at the *connection point*; and
  - (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;
- (f) 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*. The list provided under this paragraph (f) will generally be in the nature of the information set out in schedule 5.5 but may be varied by the *Distribution Network Service Provider* as appropriate to suit the size and complexity of the proposed *facility* to be *connected*;
- (g) commercial information to be supplied by the *Connection Applicant* to allow a *Network Service Provider* (as is relevant) 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;
- (h) so far as is relevant, and in relation to services that the *Distribution Network Service Provider* intends to provide, an itemised estimate of *connection* costs including:
  - (1) *connection services* charges;
  - (2) costs associated with the proposed *metering* requirements for the *connection*;
  - (3) costs of any *network extension*;
  - (4) details of *augmentation* required to provide the *connection* and associated costs;
  - (5) details of the interface equipment required to provide the *connection* and associated costs;
  - (6) details of any ongoing operation and maintenance costs and charges to be undertaken by the *Distribution Network Service Provider*; and

- (7) other incidental costs and their basis of calculation;
- (i) an explanation of the factors affecting each component of the itemised estimate of *connection* costs and the further information that will be taken into account by the *Distribution Network Service Provider* in preparing the final itemised statement of *connection* costs to be provided under clause 5.3.6(b2)(1);
- (j) using reasonable endeavours, all risks and obligations in respect of the proposed *connection* associated with planning and environmental laws not contained in the *Rules*;
- (k) a draft *connection agreement* that contains the proposed terms and conditions for *connection* to the *network* including those of the kind set out in schedule 5.6 and:
  - (1) an explanation of the terms and conditions in the *connection agreement* that need to be finalised; and
  - (2) if relevant, further information necessary from the *Connection Applicant* to finalise the *connection agreement*;
- (l) a description of the process for lodging the *application to connect*, including:
  - (1) the options open to the *Connection Applicant* in submitting an *application to connect* in accordance with clause 5.3A.9;
  - (2) the further analysis to be undertaken by the *Distribution Network Service Provider* as part of the *Distribution Network Service Provider's* assessment of the *application to connect*;
  - (3) further information required from the *Connection Applicant* for the *Distribution Network Service Provider* to assess the *application to connect*; and
  - (4) an outline of proposed milestones (and their timeframes) 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;
- (m) the application fee payable when submitting an *application to connect*;
- (n) whether the *Distribution Network Service Provider* agrees to the detailed response remaining valid for a specified period of time to allow the *Connection Applicant* to lodge an *application to connect* within that time; and
- (o) any additional information relevant to the *application to connect*.

## **Schedule 5.5      Technical Details to Support Application for Connection and Connection Agreement**

### **S5.5.1      Introduction to the schedule**

Various sections of the *Rules* require that *Registered Participants* submit technical data to the *Network Service Provider*. This schedule lists the range of data which may be required. The actual data required will be advised by the *Network Service Provider*, and will form part of the technical specification in the *connection agreement*. These data will also be made available to *AEMO* and to other *Network Service Providers* by the *Network Service Provider* at the appropriate time.

### **S5.5.2      Categories of data**

Data is coded in categories, according to the stage at which it is available in the build-up of data during the process of forming a *connection* or obtaining access to a *network*, with data acquired at each stage being carried forward, or enhanced in subsequent stages, eg. by testing.

The *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet* identify for each type of data, its category in terms of clause S5.5.2.

Codes:

S = Standard Planning Data;

D = Detailed Planning Data;

R = Registered Data (R1 pre-connection, R2 post-connection)

#### **Preliminary system planning data**

Preliminary system planning data is required for submission with the *application to connect*, to allow the *Network Service Provider* to prepare an offer of terms and conditions for a *connection agreement* and to assess the requirement for, and effect of, *network augmentation* or *extension* options. Such data is normally limited to the items denoted as Standard Planning Data (S) in the *Power System Model Guidelines*, *Power System Design Data Sheet*, *Power System Setting Data Sheet* and in schedules 5.5.3 to 5.5.5.

The *Network Service Provider* may, in cases where there is reasonable doubt as to the viability of a proposal, require the submission of other data before making an offer to *connect* or to amend a *connection agreement*.

#### **Registered system planning data**

Registered system planning data is the class of data which will be included in the *connection agreement* signed by both parties. It consists of the preliminary system planning data plus those items denoted in the attached schedules as Detailed Planning Data (D). The latter must be submitted by the *Registered Participant* in time for inclusion in the *connection agreement*.

### **Registered data**

Registered Data consists of data validated and agreed between the *Network Service Provider* and the *Registered Participant*, such data being:

- (a) prior to actual *connection* and provision of access, data derived from manufacturers' data, detailed design calculations, works or site tests etc. (R1); and
- (b) after connection, data derived from on-system testing (R2).

All of the data will, from this stage, be categorised and referred to as Registered Data; but for convenience the schedules omit placing a higher ranked code next to items which are expected to already be valid at an earlier stage.

## **S5.5.3 Review, change and supply of data**

Data will be subject to review at reasonable intervals to ensure its continued accuracy and relevance. The *Network Service Provider* must initiate this review. A *Registered Participant* may *change* any data item at a time other than when that item would normally be reviewed or updated by submission to the *Network Service Provider* of the revised data, together with authentication documents, eg. test reports.

The *Network Service Provider* must supply data relating to its system to other *Network Service Providers* for planning purposes and to other *Registered Participants* and *AEMO* as specified in the various sections of the *Rules*, including through the *statement of opportunities*.

## **S5.5.4 Data Requirements**

Schedules 5.5.3 to 5.5.5 cover the following data areas:

- (a) schedule 5.5.3 - Network Plant Technical Data. This comprises fixed electrical parameters.
- (b) schedule 5.5.4 - Plant and Apparatus Setting Data. This comprises settings which can be varied by agreement or by direction of the *Network Service Provider* or *AEMO*.
- (c) schedule 5.5.5 - *Load* Characteristics. This comprises the estimated design parameters of *loads*.

The documents and schedules applicable to each class of *Registered Participant* are as follows:

- (a) *Generators*: the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*;
- (b) *Customers* and *Network Service Providers*: schedules 5.5.3, 5.5.4 and the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*;

- (c) *Customers*: schedule 5.5.5 and the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*; and
- (d) *Market Network Service Providers*: schedules 5.5.3 and 5.5.4 and the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*.

### **S5.5.5 Asynchronous generating unit data**

A *Generator* that connects a generating system, that is an *asynchronous generating unit*, must be given exemption from complying with those parts of the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Design Data Sheet* that are determined by the *Network Service Provider* to be not relevant to such *generating systems*, but must comply with those parts of schedules 5.5.3, 5.5.4, and 5.5.5 that are relevant to such *generating systems*, as determined by the *Network Service Provider*.

### **S5.5.6 Generating units smaller than 30MW data**

A *Generator* that connects a generating unit smaller than 30 MW or *generating units* totalling less than 30 MW to a *connection point* to a *distribution network* must submit registered system planning data and registered data to AEMO and the relevant *Network Service Provider* in accordance with the requirements specified in the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*.

Codes:

S = Standard Planning Data

D = Detailed Planning Data

R = Registered Data (R1 pre-connection, R2 post-connection)

### **S5.5.7 Power System Design Data Sheet, Power System Setting Data Sheet and Power System Model Guidelines**

- (a) AEMO must, subject to paragraphs (b) and (c), develop, *publish* and maintain, in accordance with the *Rules consultation procedures*:
  - (1) a *Power System Design Data Sheet* describing, for relevant *plant technologies*, *plant* design parameters including *plant* configurations, impedances, time constants, non-linearities, ratings and capabilities to be provided under clauses 3.11.5(b)(5), 3.11.9(g), 4.3.4(o), 5.2.3(j), 5.2.3(k), 5.2.3A(a), 5.2.4(c), 5.2.4(d), 5.2.5(d), 5.2.5(e), 5.3.9(b)(2), S5.2.4, S5.3.1, S5.3a.1 and this schedule 5.5;
  - (2) a *Power System Setting Data Sheet* describing, for relevant *power systems* and *control system* technologies, the *protection system* and *control system* functions and their settings, including configurations, gains, time constants, delays, deadbands, non-linearities and limits to

be provided under clauses 3.11.5(b)(5), 3.11.9(g), 4.3.4(o), 5.2.3(j), 5.2.3(k), 5.2.3A(a), 5.2.3A(b), 5.2.4(c), 5.2.4(d), 5.2.5(d), 5.2.5(e), 5.3.9(b)(2), S5.2.4, S5.3.1, S5.3a.1 and this schedule 5.5; and

- (3) *Power System Model Guidelines* describing, for relevant *power system* technologies at the *transmission system* and *distribution system* level, *AEMO's* requirements when developing mathematical models for *plant*, including the impact of their *control systems* and *protection systems* on *power system security* to be provided under clauses 3.11.5(b)(5), 3.11.9(g), 4.3.4(o), 5.2.3(j), 5.2.3(k), 5.2.3A(a), 5.2.3A(b), 5.2.4(c), 5.2.4(d), 5.2.5(d), 5.2.5(e), 5.3.9(b)(2), S5.2.4, S5.3.1, S5.3a.1 and this schedule 5.5.
- (b) When developing, *publishing* and maintaining the *Power System Model Guidelines*, the *Power System Design Data Sheet* and the *Power System Setting Data Sheet* under paragraph (a), *AEMO* must have regard to the purpose of the *Power System Model Guidelines*, the *Power System Design Data Sheet* and the *Power System Setting Data Sheet*, which is to:
- (1) allow *plant* and equipment to be mathematically modelled by *AEMO* with sufficient accuracy to permit:
    - (i) the *power system* operating limits for ensuring *power system security* to be quantified with the lowest practical safety margins;
    - (ii) the assessment of proposed *negotiated access standards*;
    - (iii) settings of *control systems* and *protection systems* of *plant* and *networks* to be assessed and quantified for maximum practical performance of the *power system*; and
    - (iv) the efficient procurement of *system restart ancillary services* and *network support and control ancillary services*; and
  - (2) identify for each type of data its category in terms of clause S5.5.2.
- (b1) The *Power System Model Guidelines* must specify:
- (1) the information, including the types of models, that:
    - (i) *Generators* must provide under clause 5.2.5(d), clause 5.2.5(e), clause 5.3.9(b)(2), clause S5.2.4 and clause S5.5.6;
    - (ii) *Network Service Providers* must provide under clause 4.3.4(o), clause 5.2.3(j) and clause 5.2.3(k);
    - (iii) *Network Users* must provide under clause 5.2.4(c), clause 5.2.4(d) and clause S5.3.1(a1);
    - (iv) *Market Network Service Providers* must provide under clause 5.2.3A(a), clause 5.2.3A(b) and clause S5.3a.1(a1);

- (v) prospective *NSCAS* tenderers must provide under clause 3.11.5(b)(5); and
    - (vi) prospective *SRAS Providers* must provide under clause 3.11.9(g);
  - (2) the model accuracy requirements that are applicable to each type of model provided, as well as the types of *generating systems* and *plant* and equipment that the model accuracy requirements apply to;
  - (3) when information to which the *Power System Model Guidelines* relates must be provided;
  - (4) a process to be followed in circumstances where a person is unable to provide information required to be provided under clauses 3.11.5(b)(5), 3.11.9(g), 4.3.4(o), 5.2.3(j), 5.2.3(k), 5.2.3A(a), 5.2.3A(b), 5.2.4(c), 5.2.4(d), 5.2.5(d), 5.2.4(e), 5.3.9(b)(2), S5.2.4, S5.3.1, S5.3a.1, S5.5.6, schedule 5.5 or as otherwise required by the *Power System Model Guidelines*, *Power System Design Data Sheet* or *Power System Setting Data Sheet*;
  - (5) guidance on the factors that *AEMO* will take into account when determining the circumstances under which *AEMO* will request information to be provided, including the *power system* conditions that necessitate the usage of a certain type of model in order to achieve the desired level of accuracy;
  - (6) the format in which information must be provided and any material *AEMO* requires to assess the accuracy of information provided to it; and
  - (7) the circumstances in which model source code is required to be provided.
- (c) In developing and amending the *Power System Model Guidelines*, the *Power System Design Data Sheet* and the *Power System Setting Data Sheet*, *AEMO* must:
- (1) have regard to the reasonable costs of efficient compliance by *Registered Participants* with those guidelines and data sheets compared to the likely benefits from the use of the information provided under the guidelines and data sheets;
  - (2) have regard to any requirements to protect the intellectual property and confidential information of third parties, including where those third parties are not *Registered Participants*; and
  - (3) have regard to *Distribution Network Service Providers'* and *Transmission Network Service Providers'* requirements for data and modelling information that is reasonably necessary for the relevant provider to fulfil its obligations under the *Rules* or *jurisdictional electricity legislation*.

- (d) *AEMO* may amend the *Power System Model Guidelines*, the *Power System Design Data Sheet* or the *Power System Setting Data Sheet* from time to time.
- (e) Any person may submit a written request (with reasons) for *AEMO* to amend the *Power System Model Guidelines*, the *Power System Design Data Sheet* or the *Power System Setting Data Sheet* from time to time.
- (f) In developing and amending the *Power System Model Guidelines*, the *Power System Design Data Sheet* or the *Power System Setting Data Sheet*, *AEMO* must, subject to paragraph (g), consult with *Registered Participants* and such other persons who, in *AEMO*'s reasonable opinion have, or have identified themselves as having, an interest in the *Power System Model Guidelines*, in accordance with the *Rules consultation procedures*.
- (g) *AEMO* is not required to comply with the *Rules consultation procedures* when making minor or administrative amendments to the *Power System Model Guidelines*, the *Power System Design Data Sheet* or the *Power System Setting Data Sheet*.
- (h) *AEMO* may at the conclusion of the *Rules consultation procedures* under paragraph (f) or otherwise under paragraph (g), amend the relevant data sheet or guidelines (if necessary).

**Schedule 5.5.1 [Deleted]**

**Schedule 5.5.2 [Deleted]**

**Schedule 5.5.3 Network and plant technical data of equipment at or near connection point**

| Data Description   | Units | Data Category |
|--|-------|---------------|
| <b>Voltage Rating</b>  |       |               |
| <i>Nominal voltage</i>   | kV    | S, D          |
| <i>Highest voltage</i>   | kV    | D             |
| <b>Insulation Co-ordination</b>                                      |       |               |
| Rated lightning impulse withstand <i>voltage</i>                     | kVp   | D             |
| Rated short duration power <i>frequency</i> withstand <i>voltage</i> | kV    | D             |
| <b>Rated Currents</b>  |       |               |



| Data Description  | Units            | Data Category |
|---|------------------|---------------|
| Circuit maximum current                                   | kA               | S, D          |
| Rated Short Time Withstand Current                        | kA for seconds   | D             |
| Ambient conditions under which above current applies      | Text             | S,D           |
| <b>Earthing</b>   |                  |               |
| System Earthing Method                                    | Text             | S, D          |
| Earth grid rated current                                  | kA for seconds   | D             |
| <b>Insulation Pollution Performance</b>                   |                  |               |
| Minimum total creepage                                    | mm               | D             |
| Pollution level   | Level of IEC 815 | D             |
| <b>Controls</b>   |                  |               |
| Remote control and data transmission arrangements         | Text             | D             |
| <b>Metering Provided by Customer</b>                      |                  |               |
| Measurement <i>transformer</i> ratios:                    |                  | D             |
| <i>Current transformers</i>                               | A/A              | D             |
| <i>Voltage transformers</i>                               | V/kV             | D             |
| Measurement <i>Transformer</i> Test Certification details | Text             | R1            |
| <b>Network Configuration</b>                              |                  |               |
| Operation Diagrams showing the electrical circuits        | Single line      | S, D, R1      |

| Data Description  | Units                | Data Category |
|---|----------------------|---------------|
| of the existing and proposed main <i>facilities</i> within the <i>Registered Participant's</i> ownership including <i>busbar</i> arrangements, phasing arrangements, earthing arrangements, switching <i>facilities</i> and operating <i>voltages</i> . | Diagrams             |               |
| <b>Network Impedance</b>  |                      |               |
| For each item of <i>plant</i> :   | % on 100<br>MVA base | S, D, R1      |
| details of the positive, negative and zero sequence series and shunt impedance, including mutual coupling between physically adjacent elements.   |                      |               |
| <b>Short Circuit Infeed to the Network</b>  |                      |               |
| Maximum generator 3-phase short circuit infeed including infeeds from <i>generating units connected</i> to the <i>Registered Participant's</i> system, calculated by method of AS 3851 (1991).  | kA<br>symmetrical    | S, D, R1      |
| The total infeed at the instant of fault (including contribution of induction motors).  | kA                   | D, R1         |
| Minimum zero sequence impedance of <i>Registered Participant's network</i> at <i>connection point</i> .   | % on 100<br>MVA base | D, R1         |
| Minimum negative sequence impedance of <i>Registered Participant's network</i> at <i>connection point</i> .   | % on 100<br>MVA base | D, R1         |
| <b>Load Transfer Capability:</b>  |                      |               |
| Where a <i>load</i> , or group of <i>loads</i> , may be fed from alternative <i>connection points</i> :   |                      |               |
| <i>Load</i> normally taken from <i>connection point X</i>   | MW                   | D, R1         |
| <i>Load</i> normally taken from <i>connection point Y</i>   | MW                   | D, R1         |
| Arrangements for transfer under planned or fault <i>outage</i> conditions   | Text                 | D             |

| Data Description | Units | Data Category |
|------------------|-------|---------------|
|------------------|-------|---------------|

**Circuits Connecting Embedded Generating Units to the Network:**

For all *generating units*, all connecting lines/cables, *transformers* etc.

|   |                      |      |
|---|----------------------|------|
| Series Resistance                       | % on 100<br>MVA base | D, R |
| Series Reactance                        | % on 100<br>MVA base | D, R |
| Shunt Susceptance                       | % on 100<br>MVA base | D, R |
| Normal and short-time emergency ratings | MVA                  | D,R  |

Technical Details of *generating units* and *generating systems* as per the *Power System Design Data Sheet*, *Power System Setting Data Sheet* and the *Power System Model Guidelines* where such details are not *confidential information*

***Transformers at connection points:***

|   |          |     |
|---|----------|-----|
| Saturation curve                                | Diagram  | R   |
| Equipment associated with DC Links              |          |     |
| Number of poles                                 | MVA      | D,R |
| Converters per station                          | Quantity | D,R |
| Reactive Power consumption of converters        | MCAr     | D,R |
| Location and Rating of A.C. Filters             | MVAr     | D,R |
| Location and Rating of Shunt Capacitors         | MVAr     | D,R |
| Location and Rating of Smoothing <i>Reactor</i> | MVAr     | D,R |
| Location and Rating of DC Filter                | MVAr     | D,R |

**Schedule 5.5.4 Network Plant and Apparatus Setting Data**

| Data Description | Units | Data Category |
|------------------|-------|---------------|
|------------------|-------|---------------|

**Protection Data for Protection relevant to Connection Point:**

| Data Description  | Units                     | Data Category |
|---|---------------------------|---------------|
| Reach of all protections on <i>transmission lines</i> , or cables                           | ohms or % on 100 MVA base | S, D          |
| Number of protections on each item  | Text                      | S, D          |
| Total fault clearing times for near and remote faults                                       | ms                        | S, D, R1      |
| Line reclosure sequence details   | Text                      | S, D, R1      |
| <b>Tap Change Control Data:</b>   |                           |               |
| Time delay settings of all <i>transformer</i> tap changers.                                 | Seconds                   | D, R1         |
| <b>Reactive Compensation:</b>   |                           |               |
| Location and Rating of individual <i>shunt reactors</i>                                     | MVAr                      | D, R1         |
| Location and Rating of individual <i>shunt capacitor banks</i>                              | MVAr                      | D, R1         |
| <i>Capacitor bank</i> capacitance   | microfarads               | D             |
| Inductance of switching <i>reactor</i> (if fitted)  | millihenries              | D             |
| Resistance of capacitor plus <i>reactor</i>   | Ohms                      | D             |
| Details of special controls (e.g. Point-on-wave switching)                                  | Text                      | D             |
| <b>For each shunt reactor or capacitor bank:</b>  |                           |               |
| Method of switching   | Text                      | S             |
| Details of automatic control logic such that operating characteristics can be determined    | Text                      | D, R1         |
| <b>FACTS Installation:</b>  |                           |               |
| Data sufficient to enable static and dynamic performance of the installation to be modelled | Text, diagrams            | S, D, R1      |

| Data Description   | Units            | Data Category |
|--|------------------|---------------|
|  | control settings |               |
| Transmission line flow control device  | Text,            | D             |
| Details of the operation of the control device under normal operation conditions (including startup and shutdown of the line) and during a fault (close up and remote)           | diagrams         |               |
| Models for the control device and transmission line appropriate for load flow, small signal stability and transient stability analysis   | Text, diagrams   | D             |
| Capability of the line flow control device   | KA, MVA, MW      | D             |
| Details of the rate of change of flow capability of the control device   | Text             | D             |
| Details of the capability of the control device to provide frequency and voltage control   | Text             | D             |
| Description of possible failure modes of control device  | Text             | D             |
| Details of performance of the control device under disturbance conditions including changes in AC frequency, variations in AC system voltages and AC system waveform distortion. | Text             | D             |
| For DC control devices, contribution to the AC system short circuit level  | KA, MVA          | D             |

### Short circuit ratio

The lowest short circuit ratio at the *connection point* for which the *generating system*, including its *control systems*: (i) will be commissioned to maintain stable operation; and (ii) has the design capability to maintain stable operation.

Numeric ratio S, D, R1

For the purposes of the above, “short circuit ratio” is the synchronous *three phase fault level* (expressed in MVA) at the *connection point* divided by the rated output of the *generating system* (expressed in MW or MVA).

### Schedule 5.5.5 Load Characteristics at Connection Point

| Data Description   | Units     | Data Category |
|--|-----------|---------------|
| <b>For all Types of Load</b>   |           |               |
| Type of <i>Load</i>  | Text      | S             |
| eg controlled rectifiers or large motor drives   |           |               |
| <b>For Fluctuating Loads</b>   |           |               |
| Cyclic variation of <i>active power</i> over period  | Graph     | S             |
|  | MW/time   |               |
| Cyclic variation of <i>reactive power</i> over period  | Graph     | S             |
|  | MVAr/time |               |
| Maximum rate of change of <i>active power</i>  | MW/s      | S             |
| Maximum rate of change of <i>reactive power</i>  | MVAr/s    | S             |
| Shortest Repetitive time interval between fluctuations in active and <i>reactive power</i> reviewed annually | s         | S             |
| <b>Largest Step Change:</b>  |           |               |
| In <i>active power</i>   | MW        | S             |
| In <i>reactive power</i>   | MVAr      | S             |

### Schedule 5.6 Terms and Conditions of Connection agreements and network operating agreements

#### Part A Connection agreements

The *connection agreements* must contain the specific conditions that have been agreed to for *connection* and access to the *transmission* or *distribution network*, including but not limited to:

- (a) details of the *connection point* including the *distribution network* coupling points where appropriate;
- (b) *metering* arrangements and adjustments for losses where the point of *metering* is significantly different to the *connection point*;
- (c) authorised demand which may be taken or supplied at the *connection point* (under specified conditions);
- (c1) details of each *access standard* agreed between the *Network Service Provider* and the *Registered Participant* and all related conditions of agreement resulting from the application of any access provisions contained in schedule 5.1 for *Network Service Providers*, or schedule 5.2 for *Generators*, or schedule 5.3 for *Customers*, or schedule 5.3a for *Market Network Service Providers*;
- (c2) details of any *system strength remediation scheme* agreed, determined or modified in accordance with clause 5.3.4B and associated terms and conditions;
- (c3) details of any *system strength connection works*;
- (d) *connection service* charges;
- (e) payment conditions;
- (f) duration and termination conditions of the *connection agreement*;
- (g) terms, conditions and *constraints* that have been agreed to for *connection* to the *network* to protect the legitimate interest of the *Network Service Providers* including rights to *disconnect* the *Registered Participant* for breach of commercial undertakings;
- (h) details of any agreed standards of *reliability* of *transmission service* or *distribution service* at the *connection points* or within the *network*;
- (i) testing intervals for *protection systems* associated with the *connection point*;
- (j) agreed protocols for maintenance co-ordination;
- (k) where an expected *load*, to be connected to a *network*, has a *peak load* requirement in excess 10 MW, the provision, installation, operation and maintenance of automatic *load* shedding facilities for 60 percent of the *load* at anytime;
- (l) terms and conditions of access to the *metering installation* for the *Metering Provider* and access to *metering installations* type 4A, 5 and 6 for the *Metering Data Provider*;
- (m) the arrangements for the provision of services relating to *non-contestable IUSA components* (if applicable);

- (n) the functional specifications for the *contestable IUSA components*; and
- (o) if the *Connection Applicant* has obtained services related to a *contestable IUSA components* other than from the *Primary Transmission Network Service Provider* and intends to transfer ownership of some or all of those components to the *Primary Transmission Network Service Provider*, arrangements for the transfer of ownership of those components upon energisation of the *identified user shared asset* to the *Primary Transmission Network Service Provider* (if applicable) and how any defects liabilities will be managed.

The *connection agreements* may include other technical, commercial and legal conditions governing works required for the *connection* or *extension* to the *network* which the parties have negotiated and agreed to. The circumstances under which the terms of the *connection agreement* would require renegotiation may also be included.

## Part B Network Operating Agreements

A *network operating agreement* between the *Primary Transmission Network Service Provider* and the owner of *contestable IUSA components* must include provisions relating to:

- (a) agreed boundaries and physical connection obligations and interface between the *identified user shared asset* and the *transmission network*;
- (b) conditions to transfer operational control of the asset to the *Primary Transmission Network Service Provider*;
- (c) the standard of care to apply to the *Primary Transmission Network Service Provider* in providing operation and maintenance services;
- (d) insurance obligations;
- (e) termination, events of default and force majeure regime;
- (f) liability and indemnity; and
- (g) defect warranties.

## Schedule 5.7 Annual Forecast Information for Planning Purposes

This schedule sets out the information in respect of each *connection point* that must be provided to the relevant *Network Service Provider* by each *Registered Participant* that has a *connection point* to a *transmission network* of that *Network Service Provider*.



| Data Description  | Units       | Time Scale | Data Category |
|---|-------------|------------|---------------|
| At each <i>connection point</i> to a <i>transmission network</i> , a forecast of:   |             |            |               |
| Annual Maximum <i>Active power</i> - Winter   | MW          | years 1-10 | Annual        |
| Coincident <i>Reactive Power</i> - Winter   | MVAr        | years 1-10 | Annual        |
| Annual Maximum <i>Active power</i> - Summer   | MW          | years 1-10 | Annual        |
| Coincident <i>Reactive Power</i> - Summer   | MVAr        | years 1-10 | Annual        |
| Forecast <i>load</i> diversity between each <i>connection point</i> to the <i>network</i> (winter and summer)   | %           | years 1-5  | Annual        |
| <i>Load Profiles:</i>   |             |            |               |
| The following forecast daily <i>profiles</i> of <i>connection point</i> half-hourly average active and reactive <i>loads</i> are required, net of all <i>generating plant</i> : |             |            |               |
| Day of the peak summer and winter MW <i>peak load</i> at <i>connection point</i>  | MW and MVAr | years 1-5  | Annual        |
| Day of <i>network</i> peak summer and winter MW <i>load</i> (as specified)  | MW and MVAr | years 1-5  | Annual        |
| Data Description  | Units       | Time Scale | Data Category |
| Each July, October, January, April under average  |             |            |               |

| Data Description | Units | Time Scale | Data Category |
|------------------|-------|------------|---------------|
|------------------|-------|------------|---------------|

conditions representing:

|              |             |           |        |
|--------------|-------------|-----------|--------|
| (a) weekdays | MW and MVar | years 1-5 | Annual |
|--------------|-------------|-----------|--------|

|               |             |           |        |
|---------------|-------------|-----------|--------|
| (b) Saturdays | MW and MVar | years 1-5 | Annual |
|---------------|-------------|-----------|--------|

|                      |             |           |        |
|----------------------|-------------|-----------|--------|
| (c) Sundays/holidays | MW and MVar | years 1-5 | Annual |
|----------------------|-------------|-----------|--------|

|   |             |           |        |
|---|-------------|-----------|--------|
| <i>Day of the network</i> minimum demand (as specified) | MW and MVar | years 1-5 | Annual |
|---|-------------|-----------|--------|

Undispatched *generation*:

For each *connection point* to the *network* the following information is required:

|                                |     |           |        |
|--------------------------------|-----|-----------|--------|
| No. of <i>generating units</i> | No. | years 1-5 | Annual |
|--------------------------------|-----|-----------|--------|

|   |               |           |        |
|---|---------------|-----------|--------|
| Capacity of each <i>generating unit</i> | MW (sent out) | years 1-5 | Annual |
|---|---------------|-----------|--------|

|  |      |           |        |
|--|------|-----------|--------|
| Daily/Seasonal Operating characteristics | Text | years 1-5 | Annual |
|--|------|-----------|--------|

|   |    |           |        |
|---|----|-----------|--------|
| Expected output at time of peak <i>network</i> Winter load (as specified) | MW | years 1-5 | Annual |
|---|----|-----------|--------|

| Data Description  | Units | Time Scale | Data Category |
|---|-------|------------|---------------|
| Expected output at time of peak <i>network Summer load</i> (as specified) | MW    | years 1-5  | Annual        |

## Schedule 5.8 Distribution Annual Planning Report

### Note

The local definitions in clause 5.10.2 apply to this schedule.

For the purposes of clause 5.13.2(c), the following information must be included in a *Distribution Annual Planning Report*:

- (a) information regarding the *Distribution Network Service Provider* and its *network*, including:
  - (1) a description of its *network*;
  - (2) a description of its operating environment;
  - (3) the number and types of its distribution assets;
  - (4) methodologies used in preparing the *Distribution Annual Planning Report*, including methodologies used to identify system limitations and any assumptions applied; and
  - (5) analysis and explanation of any aspects of forecasts and information provided in the *Distribution Annual Planning Report* that have changed significantly from previous forecasts and information provided in the preceding year;
- (b) forecasts for the forward planning period, including at least:
  - (1) a description of the forecasting methodology used, sources of input information, and the assumptions applied;
  - (2) *load* forecasts:
    - (i) at the transmission-distribution connection points;
    - (ii) for sub-transmission lines; and
    - (iii) for zone substations,
 including, where applicable, for each item specified above:
    - (iv) total capacity;
    - (v) firm delivery capacity for summer periods and winter periods;

- (vi) *peak load* (summer or winter and an estimate of the number of hours per year that 95% of *peak load* is expected to be reached);
  - (vii) *power factor* at time of *peak load*;
  - (viii) load transfer capacities; and
  - (ix) generation capacity of known *embedded generating units*;
- (3) forecasts of future transmission-distribution connection points (and any associated *connection assets*), sub-transmission lines and zone substations, including for each future transmission-distribution connection point and zone substation:
  - (i) location;
  - (ii) future *loading level*; and
  - (iii) proposed commissioning time (estimate of month and year);
- (4) forecasts of the *Distribution Network Service Provider's* performance against any reliability targets in a *service target performance incentive scheme*; and
- (5) a description of any factors that may have a material impact on its *network*, including factors affecting:
  - (i) fault levels;
  - (ii) *voltage* levels;
  - (iii) other *power system security* requirements;
  - (iv) the quality of *supply* to other *Network Users* (where relevant); and
  - (v) ageing and potentially unreliable assets;
- (b1) for all *network* asset retirements, and for all *network* asset de-ratings that would result in a system limitation, that are planned over the forward planning period, the following information in sufficient detail relative to the size or significance of the asset:
  - (1) a description of the *network* asset, including location;
  - (2) the reasons, including methodologies and assumptions used by the *Distribution 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;
  - (3) the date from which the *Distribution Network Service Provider* proposes that the *network* asset will be retired or de-rated; and

- (4) if the date to retire or de-rate the *network* asset has changed since the previous *Distribution Annual Planning Report*, an explanation of why this has occurred;
- (b2) for the purposes of subparagraph (b1), where two or more *network* assets are:
  - (1) of the same type;
  - (2) to be retired or de-rated across more than one location;
  - (3) to be retired or de-rated in the same calendar year; and
  - (4) 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 *Distribution Annual Planning Report*:
  - (5) a description of the *network* assets, including a summarised description of their locations;
  - (6) the reasons, including methodologies and assumptions used by the *Distribution 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;
  - (7) the date from which the *Distribution Network Service Provider* proposes that the *network* assets will be retired or de-rated; and
  - (8) if the calendar year to retire or de-rate the *network* assets has changed since the previous *Distribution Annual Planning Report*, an explanation of why this has occurred;
- (c) information on system limitations for sub-transmission lines and zone substations, including at least:
  - (1) estimates of the location and timing (month(s) and year) of the system limitation;
  - (2) analysis of any potential for load transfer capacity between *supply* points that may decrease the impact of the system limitation or defer the requirement for investment;
  - (3) impact of the system limitation, if any, on the capacity at transmission-distribution connection points;
  - (4) a brief discussion of the types of potential solutions that may address the system limitation in the forward planning period, if a solution is required; and

- (5) where an estimated reduction in forecast *load* would defer a forecast system limitation for a period of at least 12 months, include:
  - (i) an estimate of the month and year in which a system limitation is forecast to occur as required under subparagraph (1);
  - (ii) the relevant *connection points* at which the estimated reduction in forecast *load* may occur; and
  - (iii) the estimated reduction in forecast *load* in MW or improvements in *power factor* needed to defer the forecast system limitation;
- (d) for any primary distribution feeders for which a *Distribution Network Service Provider* has prepared forecasts of *maximum demands* under clause 5.13.1(d)(1)(iii) and which are currently experiencing an overload, or are forecast to experience an overload in the next two years the *Distribution Network Service Provider* must set out:
  - (1) the location of the primary distribution feeder;
  - (2) the extent to which load exceeds, or is forecast to exceed, 100% (or lower utilisation factor, as appropriate) of the normal cyclic rating under normal conditions (in summer periods or winter periods);
  - (3) the types of potential solutions that may address the overload or forecast overload; and
  - (4) where an estimated reduction in forecast *load* would defer a forecast overload for a period of 12 months, include:
    - (i) estimate of the month and year in which the overload is forecast to occur;
    - (ii) a summary of the location of relevant *connection points* at which the estimated reduction in forecast *load* would defer the overload;
    - (iii) the estimated reduction in forecast *load* in MW needed to defer the forecast system limitation;
- (e) a high-level summary of each RIT-D project for which the *regulatory investment test for distribution* has been completed in the preceding year or is in progress, including:
  - (1) if the *regulatory investment test for distribution* is in progress, the current stage in the process;
  - (2) a brief description of the *identified need*;
  - (3) a list of the credible options assessed or being assessed (to the extent reasonably practicable);

- (4) if the *regulatory investment test for distribution* has been completed a brief description of the conclusion, including:
  - (i) the net economic benefit of each credible option;
  - (ii) the estimated capital cost of the preferred option; and
  - (iii) the estimated construction timetable and commissioning date (where relevant) of the preferred option; and
- (5) any impacts on *Network Users*, including any potential material impacts on *connection* charges and *distribution use of system* charges that have been estimated;
- (f) for each identified system limitation which a *Distribution Network Service Provider* has determined will require a *regulatory investment test for distribution*, provide an estimate of the month and year when the test is expected to commence;
- (g) a summary of all committed investments to be carried out within the forward planning period with an estimated capital cost of \$2 million or more (as varied by a cost threshold determination) that are to address an urgent and unforeseen *network* issue as described in clause 5.17.3(a)(1), including:
  - (1) a brief description of the investment, including its purpose, its location, the estimated capital cost of the investment and an estimate of the date (month and year) the investment is expected to become operational;
  - (2) a brief description of the alternative options considered by the *Distribution Network Service Provider* in deciding on the preferred investment, including an explanation of the ranking of these options to the committed project. Alternative options could include, but are not limited to, *generation* options, demand side options, and options involving other *distribution* or *transmission networks*;
- (h) the results of any joint planning undertaken with a *Transmission Network Service Provider* in the preceding year, including:
  - (1) a summary of the process and methodology used by the *Distribution Network Service Provider* and relevant *Transmission Network Service Providers* to undertake joint planning;
  - (2) a brief description of any investments that have been planned through this process, including the estimated capital costs of the investment and an estimate of the timing (month and year) of the investment; and
  - (3) where additional information on the investments may be obtained;
- (i) the results of any joint planning undertaken with other *Distribution Network Service Providers* in the preceding year, including:

- (1) a summary of the process and methodology used by the *Distribution Network Service Providers* to undertake joint planning;
  - (2) a brief description of any investments that have been planned through this process, including the estimated capital cost of the investment and an estimate of the timing (month and year) of the investment; and
  - (3) where additional information on the investments may be obtained;
- (j) information on the performance of the *Distribution Network Service Provider's network*, including:
  - (1) a summary description of reliability measures and standards in *applicable regulatory instruments*;
  - (2) a summary description of the quality of *supply* standards that apply, including the relevant codes, standards and guidelines;
  - (3) a summary description of the performance of the *distribution network* against the measures and standards described under subparagraphs (1) and (2) for the preceding year;
  - (4) where the measures and standards described under subparagraphs (1) and (2) were not met in the preceding year, information on the corrective action taken or planned;
  - (5) a summary description of the *Distribution Network Service Provider's* processes to ensure compliance with the measures and standards described under subparagraphs (1) and (2); and
  - (6) an outline of the information contained in the *Distribution Network Service Provider's* most recent submission to the AER under the *service target performance incentive scheme*;
- (k) information on the *Distribution Network Service Provider's* asset management approach, including:
  - (1) a summary of any asset management strategy employed by the *Distribution Network Service Provider*;
  - (1A) an explanation of how the *Distribution Network Service Provider* takes into account the cost of *distribution losses* when developing and implementing its asset management and investment strategy;
  - (2) a summary of any issues that may impact on the system limitations identified in the *Distribution Annual Planning Report* that has been identified through carrying out asset management; and
  - (3) information about where further information on the asset management strategy and methodology adopted by the *Distribution Network Service Provider* may be obtained;



- (l) information on the *Distribution Network Service Provider's* demand management activities, including:
  - (1) a qualitative summary of:
    - (i) *non-network options* that have been considered in the past year, including *generation from embedded generating units*;
    - (ii) key issues arising from *applications to connect embedded generating units* received in the past year;
    - (iii) actions taken to promote non-network proposals in the preceding year, including *generation from embedded generating units*; and
    - (iv) the *Distribution Network Service Provider's* plans for demand management and *generation from embedded generating units* over the forward planning period;
  - (2) a quantitative summary of:
    - (i) *connection* enquiries received under clause 5.3A.5;
    - (ii) *applications to connect* received under clause 5.3A.9; and
    - (iii) the average time taken to complete *applications to connect*;
- (m) information on the *Distribution Network Service Provider's* investments in information technology and communication systems which occurred in the preceding year, and planned investments in information technology and communication systems related to management of *network* assets in the forward planning period; and
- (n) a regional development plan consisting of a map of the *Distribution Network Service Provider's network* as a whole, or maps by regions, in accordance with the *Distribution Network Service Provider's* planning methodology or as required under any *regulatory obligation or requirement*, identifying:
  - (1) sub-transmission lines, zone substations and transmission-distribution connection points; and
  - (2) any system limitations that have been forecast to occur in the forward planning period, including, where they have been identified, overloaded primary distribution feeders.

## **Schedule 5.9 Demand side engagement document (clause 5.13.1(h))**

### **Note**

The local definitions in clause 5.10.2 apply to this schedule.

For the purposes of clause 5.13.1(h), the following information must be included in a *Distribution Network Service Provider's* demand side engagement document:

- (a) a description of how the *Distribution Network Service Provider* will investigate, develop, assess and report on potential *non-network options*;
- (b) a description of the *Distribution Network Service Provider's* process to engage and consult with potential non-network providers to determine their level of interest and ability to participate in the development process for potential *non-network options*;
- (c) an outline of the process followed by the *Distribution Network Service Provider* when negotiating with non-network providers to further develop a potential *non-network option*;
- (d) an outline of the information a non-network provider is to include in a *non-network* proposal, including, where possible, an example of a best practice non-network proposal;
- (e) an outline of the criteria that will be applied by the *Distribution Network Service Provider* in evaluating non-network proposals;
- (f) an outline of the principles that the *Distribution Network Service Provider* considers in developing the payment levels for *non-network options*;
- (g) a reference to any applicable incentive payment schemes for the implementation of *non-network options* and whether any specific criteria is applied by the *Distribution Network Service Provider* in its application and assessment of the scheme;
- (h) the methodology to be used for determining *avoided Customer TUOS charges*, in accordance with clauses 5.4AA and 5.5; and;
- (i) a summary of the factors the *Distribution Network Service Provider* takes into account when negotiating *connection agreements* with *Embedded Generators*;
- (j) the process used, and a summary of any specific regulatory requirements, for setting charges and the terms and conditions of *connection agreements* for *embedded generating units*;
- (k) the process for lodging an *application to connect* for an *embedded generating unit* and the factors taken into account by the *Distribution Network Service Provider* when assessing such applications;
- (l) worked examples to support the description of how the *Distribution Network Service Provider* will assess potential *non-network options* in accordance with paragraph (a);
- (m) a hyperlink to any relevant, publicly available information produced by the *Distribution Network Service Provider*;

- (n) a description of how parties may be listed on the demand side engagement register; and
- (o) the *Distribution Network Service Provider's* contact details.

### Schedule 5.10 Information requirements for Primary Transmission Network Service Providers (clause 5.2A.5)

| Information  | Via website or direct enquiry | Additional fee <sup>1</sup> | Comments   |
|--|-------------------------------|-----------------------------|--|
| <b>Technical specification</b>                                     |                               |                             |  |
| Generic interface works  | Website                       | No                          | Typical standards and layouts must be published. This information:<br><br>(a) may be generic but should provide a high level overview of the components of a <i>connection</i> ; and<br><br>(b) must provide <i>Connection Applicants</i> with a high level understanding of what a <i>connection</i> consists of. |
| Generic substation layouts   | Website                       | No                          |  |
| Typical overhead line structures                                   | Website                       | No                          |  |
| Typical underground cable arrangements                             | Website                       | No                          |  |
| Typical primary plant  | Website                       | No                          | <i>Primary Transmission Network Service Providers</i> must provide the design standards which are specific to their <i>network</i> .   |
| Design standards   | Website                       | No                          |  |
| Typical secondary systems  | Website                       | No                          |  |
| Detailed technical requirements for a particular <i>connection</i> | Direct enquiry                | No                          | Functional specification to describe the requirements that must be met by the detailed design.<br><br>The functional specifications  |

<sup>1</sup> This refers to the right for the *Primary Transmission Network Service Providers* to charge an additional fee for the provision of this information to the *connection* enquiry under clause 5.3.2(g) and the *connection* application fee under clause 5.3.4.(b)(2).

| Information                                  | Via website or direct enquiry | Additional fee <sup>1</sup> | Comments   |
|--|-------------------------------|-----------------------------|--|
|  |                               |                             | <p>must include:</p> <p>(a) description of any proposed <i>augmentation</i>; and</p> <p>(b) references to typical plant including primary and secondary equipment so that the detailed design will interface to the existing <i>network</i> and be able to be adopted by the <i>Primary Transmission Network Service Provider</i>.</p> |
| <b>Operation and maintenance</b>             |                               |                             |  |
| Typical operation and maintenance scheduling | Website                       | No                          | Operation and maintenance intervals for specific items of <i>plant</i> used regularly by the <i>Primary Transmission Network Service Provider</i> must be published. These are routine activities irrespective of whether assets are unregulated or regulated and should be in line with <i>good electricity industry practice</i> .   |
| <b>Timescales</b>                            |                               |                             |  |
| Easement acquisition (site specific)         | Direct enquiry                | Yes                         | Site specific timescales may be discussed and negotiated on a project by project basis as part of the <i>connection enquiry / connection application</i> process if the <i>Connection Applicant</i> requests it at their election.   |
| Commission- ing (generic)                    | Website                       | No                          | Generic timescales must be published.  |
| Commission- ing                              | Direct enquiry                | Yes                         | Site specific timescales may   |

| Information                                      | Via website or direct enquiry | Additional fee <sup>1</sup> | Comments  |
|--|-------------------------------|-----------------------------|---|
| (site specific)                                  |                               |                             | be provided as part of the <i>connection enquiry / connection application</i> process if the <i>Connection Applicant</i> requests it at their election.                           |
| <b>Legal</b>                                     |                               |                             |   |
| Standard connection agreements                   | Website                       | No                          | Standard forms of these agreements and deeds to be published.   |
| Standard network operating agreement             | Website                       | No                          | The standard form construction agreement must cover the construction of any interface works.  |
| Standard interface works construction agreements | Website                       | No                          | The standard form <i>connection agreement</i> must cover the <i>connection</i> of the asset to the <i>transmission</i> network.   |
| Standard relocation deeds                        | Website                       | No                          | The standard form <i>network operating agreement</i> must cover those aspects referred to in clause 5.2.7(b).   |
| Environment- al approvals (generic)              | Website                       | No                          | Standard forms or lists of required approvals must be published.  |
| Environment- al approvals (site specific)        | Direct enquiry                | Yes                         | Site specific information may be provided as part of the <i>connection enquiry / connection application</i> process if <i>Connection Applicant</i> requests it at their election. |
| Development approvals (generic)                  | Website                       | No                          |   |
| Development approvals (site specific)            | Direct enquiry                | Yes                         |   |
| <b>Financial</b>                                 |                               |                             |   |
| Amount and terms and                             | Website                       | No                          | A guide to the structure of the application fee under clause  |

| Information  | Via website or direct enquiry | Additional fee <sup>1</sup> | Comments   |
|--|-------------------------------|-----------------------------|--|
| conditions of the connection application charge <sup>2</sup> |                               |                             | 5.3.4, and the terms and conditions under which the charge is paid, must be published.   |
| Relocation of existing assets                                | Direct enquiry                | Yes                         | Specific information about relocation of existing assets may be provided by the <i>Primary Transmission Network Service Provider</i> , if the <i>Connection Applicant</i> requests it at their election.<br><br>The <i>Connection Applicant</i> would be required to pay for any costs associated with the relocation of assets. |

### Schedule 5.11 Negotiating principles for negotiated transmission services (clause 5.2A.6)

- 1 The price for a *negotiated transmission service* should be based on the costs incurred in providing that service, determined in accordance with the principles and policies set out in the *Cost Allocation Methodology* for the relevant *Transmission Network Service Provider*.
- 2 Subject to paragraphs (3) and (4), the price for a *negotiated transmission service* should be at least equal to the avoided cost of providing it but no more than the cost of providing it on a stand-alone basis.
- 3 If the *negotiated transmission service* is the provision of a *shared transmission service* that:
  - (1) exceeds the *network* performance requirements (if any) which that *shared transmission service* is required to meet under any *jurisdictional electricity legislation*; or
  - (2) exceeds the *network* performance requirements set out in schedules 5.1a and 5.1,

then the differential between the price for that service and the price for the *shared transmission service* which meets (but does not exceed) the *network* performance requirements under any *jurisdictional electricity legislation* or

<sup>2</sup> For clarification, information about the structure, terms and conditions of the charge should be made available free of charge on the *Primary Transmission Network Service Provider's* website, but the *Connection Applicant* would still be required to pay the *connection* application fee under clause 5.3.4(b)(2).

as set out in schedules 5.1a and 5.1 (as the case may be) should reflect the increase in the *Transmission Network Service Provider's* incremental cost of providing that service.

- 4 If the *negotiated transmission service* is the provision of a *shared transmission service* that does not meet (and does not exceed) the *network* performance requirements set out in schedules 5.1a and 5.1, the differential between the price for that service and the price for the *shared transmission service* which meets (but does not exceed) the *network* performance requirements set out in schedules 5.1a and 5.1 should reflect the amount of the *Transmission Network Service Provider's* avoided cost of providing that service.
- 5 The price for a *negotiated transmission service* must be the same for all *Transmission Network Users* unless there is a material difference in the costs of providing the *negotiated transmission service* to different *Transmission Network Users* or classes of *Transmission Network Users*.
- 6 The price for a *negotiated transmission service* should be subject to adjustment over time to the extent that the assets used to provide that service are subsequently used to provide services to another person, in which case such adjustment should reflect the extent to which the costs of that asset is being recovered through charges to that other person.
- 7 The price for a *negotiated transmission service* should be such as to enable the *Transmission Network Service Provider* to recover the efficient costs of complying with all *regulatory obligations or requirements* associated with the provision of the *negotiated transmission service*.
- 8 The *terms and conditions of access* for a *negotiated transmission service* should be fair and reasonable and consistent with the safe and reliable operation of the *power system* in accordance with the *Rules* (for these purposes, the price for a *negotiated transmission service* is to be treated as being fair and reasonable if it complies with principles (1) to (7) of this schedule 5.11).
- 9 The *terms and conditions of access* for a *negotiated transmission service* (including, in particular, any exclusions and limitations of liability and indemnities) must not be unreasonably onerous taking into account the allocation of risk between the *Transmission Network Service Provider* and the other party, the price for the *negotiated transmission service* and the costs to the *Transmission Network Service Provider* of providing the *negotiated transmission service*.
- 10 The *terms and conditions of access* for a *negotiated transmission service* should be provided in a manner that does not adversely affect the safe and reliable operation of the *power system* in accordance with the *Rules*.
- 11 The *Connection Applicant* should only be required to pay the costs directly incurred as a result of its *connection*, including its share of costs associated with an *identified user shared asset*.

- 12 Subsequent connections to an *identified user shared asset* by other *connecting* parties should not adversely affect the *negotiated transmission services* provided to the original *identified user group* for that *identified user shared asset*.
- 13 Subject to principle 11, future *Connection Applicants* should pay for a proportion of the costs paid by the *identified user groups* for *negotiated transmission services*. The proportion of costs will be calculated with respect to:
  - (1) the relative capacity of the *Connection Applicant's generating plant*; or
  - (2) the relative number of bays; or
  - (3) respective bays,with the applicable cost sharing methodology determined as appropriate by the nature of the *negotiated transmission services*.

## **Schedule 5.12 Negotiating principles for large DCA services**

- 1 Principles 2 -7 of schedule 5.11 apply in relation to *connection* and access to *large DCA services*, except a reference to a *negotiated transmission service* and a *Transmission Network Service Provider* will be taken to be a reference to a *large DCA service* and a *Dedicated Connection Asset Service Provider* respectively.
- 2 An applicant for *large DCA services* should pay for the cost of any enlargement or increase in capacity of (an “**upgrade**”), or alterations to, an existing *large dedicated connection asset* required to provide it with *large DCA services*, including the moving of metering and other related equipment, necessary for the applicant’s *connection* to the *large dedicated connection asset*.
- 3 The *connection* of an applicant to an existing *large dedicated connection asset* and access to *large DCA services* must not adversely affect the *access standards*, including *performance standards* and *power transfer capability* of an existing connecting party at the time of the access application by the applicant.
- 4 The *connection* of an applicant to an existing *large dedicated connection asset* and access to *large DCA services* must not adversely affect contractual obligations of an existing connecting party to the *large dedicated connection asset* with the relevant *Dedicated Connection Asset Service Provider*.
- 5 An applicant must compensate the *Dedicated Connection Asset Service Provider* (and any existing connecting party) for any lost revenue incurred during an upgrade of, or alterations to, an existing *large dedicated connection asset* and metering and other related equipment moves to



provide for the *connection* and operation of the applicant's *facilities* and access to *large DCA services*.

- 6 The *connection* of an applicant to a *large dedicated connection asset* and access to *large DCA services* must not:
- (a) prevent an existing connecting party at the time of the applicant's access application from obtaining a sufficient amount of *large DCA services* to be able to meet that person's reasonably anticipated requirements, measured at the time of the access application by the applicant;
  - (b) result in the applicant becoming the owner (or one of the owners) of any part of the existing *large dedicated connection asset* or upgrade of that asset without the consent of the existing owner;
  - (c) require an existing connecting party or the owner of the *large dedicated connection asset* to bear all or some of the costs of an upgrade of the *large dedicated connection asset* or maintaining an upgrade;
  - (d) require an existing connecting party to the *large dedicated connection asset* to bear all or some of the costs of an interconnection to the *large dedicated connection asset* or maintaining an interconnection.